IADIS INTERNATIONAL CONFERENCE
WEB BASED COMMUNITIES 2006
PROCEEDINGS OF THE
IADIS INTERNATIONAL CONFERENCE
WEB BASED COMMUNITIES 2006

SAN SEBASTIAN, SPAIN

FEBRUARY 26-28, 2006

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FOREWORD

These proceedings contain the papers of the IADIS International Conference Web Based Communities 2006, which was co-organised by the International Association for Development of the Information Society and the, in San Sebastian, Spain, 26-28 February 2006.

The mission of this conference is to publish and integrate scientific results and act catalytically to the fast developing culture of web communities. The conference called for original papers, review papers, technical reports and case studies on WWW in particular the emerging role of so-called WWW-based Communities. The following five main topical areas made of twenty-seven topics have been object of paper and poster submissions:

A. The history, architecture and future of virtual communities
   1. From mobility to connectivity
   2. Identity and augmented ideologies
   3. Visionary web architectures, implanted computers
   4. Network revolutions, post-colonial and post-modern societies
   5. Escaping from reality, virtual reality and multi-user games
   6. Towards alternative ways of presence

B. Group processes and self-organization
   1. Tele-democracy, morality, netiquette
   2. Social networks, tribal- and open communities, peace education
   3. Computer mediated-, hyper- and narrative communication, woven stories
   4. MUDs, MOOs and avatars
   5. Hosting web-based communities
   6. Nationalities, ethnicities and gender effects

C. Cyborgs, teleworking, telemedicine, art games and learning communities
   1. Fading hierarchies and epistemic dictatorship
   2. Distributed cognition, the electronic cortex and constructivism
   3. Community directories
   4. Mechanic world, organic computer
   5. Agents and the vectorized self
   6. Beyond metaphors: imagining and representation
   7. Communizing as a marketing approach

D. Expanding markets through virtual communities
   1. The WWW as digital market place
   2. The enterprise as a learning community
   3. The learning as a road map for business
   4. Universities as online communities
   5. Business-to-business communication in profit- and non profit sectors

E. Virtual communities for people with special needs
   1. Access to public spaces
   2. Accessibility and long-term disabilities
3. Virtual communities in health care

The IADIS Web Based Communities 2006 Conference had 123 submissions from more than 21 countries. Each submission has been anonymously reviewed by at least two independent reviewers, to ensure the final high standard of the accepted submissions. The final result was the approval of 29 full papers, which means that the acceptance rate was below 24%. A few more papers have been accepted as short papers and posters. Best papers will be selected for publishing as extended versions in the International Journal of Web Based Communities (IJWBC); ISSN: 1477 – 8394. For the Journal web site please visit http://www.inderscience.com/catalogue/w/ijwb/indexijwb.html.

The conference, besides the presentation of full papers, short papers, posters, and a panel session, also included keynote presentations from internationally distinguished researchers. We would therefore like to express our gratitude to Professor Peter Kollock, University of California, Los Angeles, USA, Professor Hermann Maurer, Graz U. of Technology, Austria, and Cliff Figallo, SociAlchemy, USA, for accepting our invitation as keynote speakers.

As we all know, organising a conference requires the effort of many individuals. We would like to thank all members of the Program Committee, for their hard work in reviewing and selecting the papers that appear in the proceedings.

This volume has taken shape as a result of the contributions from a number of individuals. We are grateful to all authors who have submitted their papers to enrich the conference proceedings. We wish to thank all members of our local organizing committee, sponsors, delegates, invitees and guests whose contribution and involvement are crucial for the success of the conference. Also, very specially we would like to thank administrators, professors, and students at the Escuela Politecnica Superior University of Mondragon (MU) for lending us their hospitality, technical support, and co-organizational efforts, in particular Javier Retegi, MU Director, Xabier Sagarna, Director of the IRAUNKOR center for conferences and Continuing Education, and Íñaki Lakarra, Head of Department of Computer Sciences.

Last but not the least, we hope that everybody will have a good time in San Sebastian, and we invite all participants for the next year edition of the IADIS International Conference Web Based Communities 2007.

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Ambrosio Goikoetxea, University of Mondragon, Spain

Program Chair

San Sebastian, Spain
25 February 2006
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KEYNOTE LECTURES

HOW NOT TO BUILD ONLINE MARKETS - LESSONS IN THE DESIGN OF TRADING COMMUNITIES
by Professor Peter Kollock, University of California Los Angeles, USA

Abstract

The design of online communities is one of the most important theoretical and practical challenges we face. Social dynamics and community design are important even in realms that at first seem purely economic or technical. This presentation reports on results from a multi-year study of the social dynamics of online commodity markets. In particular, it examines the many attempts (and failures) to create new online markets for the trading of wholesale standardized goods during 1998-2001.

These failed attempts provide invaluable data on the necessary underpinnings of online trading communities and the social dynamics that drive them. Ignoring the behavioral realities of markets and the necessary roles of trust and cooperation led to designs and technology that in many cases were incompatible with the needs of the market participants.

COMMUNITIES OF IDEOLOGY - HOW VIRTUAL STRENGTH IN NUMBERS IS CHANGING THE WORLD
by Cliff Figallo, SociAlchemy, USA

Abstract

The rewards one gets from a community are the main drivers of one’s commitment to that community. As technology has advanced in power, convenience, global reach and design, rewards are being realized through association with expansive Web communities of shared ideology and mission. The influence of these modern, large-scale Web communities is being felt across the landscape of establishment politics, economics and media. Being a partner with thousands of others in such influential interactive ventures has stimulated today’s version of the network effect, where greater numbers are seen to generate greater value.

In this presentation, twenty years of insider perspective are applied to the evolution of group communication from isolated message boards to today’s global, grassroots, collaborative publishing environment. Weblogs have become hubs for citizen-driven systems of belief and activism around the world, and in this highly politicized infospace, people strongly identify themselves with active communities that conduct investigative research, advance ideological causes, challenge mainstream news sources, and exert noisy influence on governments and international politics. The presentation will consider the question: Are Web communities becoming a new and important organ of world politics?
THE GROWING IMPORTANCE OF E-COMMUNITIES ON THE WEB
by Professor Hermann Maurer, Graz U. of Technology, Austria

Abstract

As the web is changing, e-communities are gaining more and more importance. The formation and maintenance of e-communities is supported by various technologies like wikis, discussion forums and Internet games which we briefly describe in this paper. Some of these technologies are not completely new and have been well known for a long time. We believe that in combination with new technologies and methodologies it makes sense to take a look on how e-communities are used now and will be in the near future. This paper describes an overview which software pieces, methodologies and techno-social behaviours are responsible for the growing importance of the further development of e-communities.

KEYWORDS: wiki, blog, Internet games, file sharing, discussion forums, answer brokering, Web 2.0.
Full Papers
A COMMUNITY-BASED APPROACH TO BLENDED LEARNING IN UNIVERSITIES

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ABSTRACT
In this paper we propose a community-based approach as a fundamental part of a strategy aimed to move a university from a scenario of a plurality of enhanced learning classroom experiences to a successive one where flexible and blended learning are relevant and widely diffused paradigms. Such a transition may take advantage from an institution wide blended learning community where educational knowledge and practices are shared among members. Our approach consists of four steps (consulting, pioneering, growing and evaluating) that can be cyclically executed in order to build such a community. For each step we outline the role that the academic institution plays in the comprised community building initiatives, we discuss organizational and technological issues to be considered towards a flexible learning scenario. The approach has been adopted during a three year project, that is still ongoing, at the Faculty of Engineering of the University of Calabria. We describe such case of study and we present some evaluation results dealing with the approach’s validity.

KEYWORDS
Educational communities, blended learning, community building, universities

1. INTRODUCTION
Nowadays, ICT tools (email, PowerPoint, word processing, blogs, Web resources or EDI services) are commonplace in teaching and learning in universities. Some instructors share digital educational materials using traditional EDI methods or managing individual web space as point of reference for document repository. Some of them also use course management tools, including text-based synchronous chat sessions or text-based asynchronous threaded discussions, for communication and to test interaction with students as complementary experiences in educational practices.

These experimentations are often based on isolated pioneeristic initiatives, but lead to the emergence of spontaneous learning micro-communities, strictly confined to classrooms within the institution. In other words they are essentially anchored in content with the use of synchronous and especially asynchronous discussions within course activities. Such single and spontaneous initiatives are very heterogeneous. On one hand, they make learners and learning managers familiar with the use of new ICT educational tools and generate a relevant social behavior which helps to form a sense of community in each course. On the other hand, they lead to a plurality of “systems” which learners have to interact to during their educational activities within different courses.

In this scenario the academic institution does not play any active role, but it simply makes itself aware of isolated learning micro-communities which rise up inside it thanks to the commitment of some dedicated individuals. However, they constitute a good premise to let the institution move towards a scaled up flexible blended learning scenario by gradually changing its underlying traditional instructional design model and its organizational structure. In such a scenario flexible blended learning practices and their supporting
organizational structures become accepted as part of the institution. They are no longer an “experimental thing”, but they are widely diffused within the institution. 

In order to reach such a goal the institution is required to

• establish a flexible learning policy;
• develop strategic and operational plans;
• make available financial/human resources and support;
• provide and deploy a flexible Learning Management System (LMS).

An adequate flexible learning policy is necessary to extend and promote flexible blended learning and teaching among all institution members in a way such that restrictions and barriers to student choice are minimized and opportunities for interdisciplinary or cross disciplinary studies are maximized. It determines a right balance between central academic coordination and autonomy of faculties or schools while defining norms, like guidelines for a right combination of online and offline components in blended courses, student curriculum requirements, and so forth. Strategic and operational planning are necessary in order to develop and sustain flexible blended learning, according to the established policy. Strategic planning refers to the definition of requirements and objectives and to the management of costs and needed resources. Operational planning refers to non instructional aspects like promotional marketing, learners recruitment, technology maintenance and assessment criteria. Financial and human resources are necessary to implement planning decisions. The institute administration board is required to reassess the existing institutional budget in order to boost ICT tools usage, instructional design and development of flexible blended courses. Professional competencies (technical, administrative, instructional, etc.) are required in order to effectively deploy blended learning across the institute. Support is needed at different levels (Applebee & Sheely, 2004):

• at individual level, for example helping students with technology access and instructors with course design through a blended format;
• at faculty or school level, for example assisting faculties to develop blended learning practices and plans in the context of student-centered curriculum development and review.
• at the cross institutional level, for example providing consultancy in educational planning of cross institutional study.

A flexible LMS is necessary to support different educational activities (web supplemented, web dependent, face-to-face, online, …) as well as professional development and training in the use of student-centered pedagogies in blended learning approaches. A model of such a system has already been proposed in scientific literature (Derntl & Motschnig-Pittrik, 2005). It introduces a systematic way of breaking down complexity in blended learning design and implementation and organizing units and patterns that can be reused, extended and adapted to specific needs. Of course, such an LMS should be progressively integrated with institution legacy business systems for handling student application, enrolment, fee payment, individual progress tracking, and so forth.

Building an institutional wide blended learning community (IWBLC) has been considered as a crucial intermediate step of a strategic path which drives an institution from a set of isolated learning micro-communities to a scaled up flexible blended learning scenario (Volpentesta & Frega, 2005). Such a community consists of a wide group of people (students, professors, administrators, faculty members, …) that work closely together to achieve high academic learning goals through spreading blended learning practices and sharing knowledge about them. It plays a fundamental role in contributing to a wide diffusion of the paradigm of blended learning within the institution while providing high learning flexibility through a gradual stretching of traditional educational processes, models and practices.

This paper describes the bottom-up approach that has been adopted by the Faculty of Engineering of the University of Calabria in order to build an IWBLC. It discusses the role of the academic institution and actions that have been taken in order to support the transition phase from a set of isolated learning micro-communities to an IWBLC. Besides it shows some evaluation results on the contribution of the IWBLC to the expansion of educational practices where ICT is part of the blend, integrating already existing instructional tools within the institution.

The paper is organized as follows:

• Section 2 contains a brief description of backgrounds and basic concepts which we are referring to throughout this paper;
• Section 3 describes a bottom-up approach to realize the transition from a set of isolated learning micro-communities to an IWBLC;
Section 4 is focalized on the approach implementation that has been made at the Faculty of Engineering of the University of Calabria during the past three years. It also presents some evaluation results.

2. BACKGROUNDS AND BASIC CONCEPTS

By using the term technology-enhanced learning we refer to an educational scenario where technology is applied on traditional teaching to enhance content delivery process. The technology usage supplements and is subordinated to traditional face-to-face classes. Therefore, it is confined to be an add-on to the existing dominant educational approach or method (Garrison & Kanuka, 2004). However, it may enhance learner-content interaction, that is the process of intellectually interacting with content for the purpose of acquiring knowledge and understanding (Moore, 1989). By purposefully using web repositories, course knowledge basis or a course management system, learners may construct answers to their own questions and achieve their own learning goals (Scardamalia & Bereiter, 1996).

The introduction of ICT tools may also facilitate connections between people by providing a variety of communication options. The usage of email, chat rooms, threaded discussion forums and peer to peer instant messaging often lead to an enhancement of learner-instructor and learner-learner interactions in a traditional course, seminar or classroom community (Rovai, 2002) for a definition in terms of spirit, trust, interaction and learning. When this happens, we refer to such a community as a technology-enhanced learning micro-community (TELMC). Although communications are more rapid, higher degree of interactivity is higher and remote learning resources may be asynchronously accessible, the content of a course, its basic structure, the communication strategy and the pedagogical model remain relatively constant within the community. For instance, the instructor is only a topic “seeder” in a text-based asynchronous discussion, interaction between students are unstructured, the timing of face-to-face sessions is unchanged, the balance of community and content in a course is not altered (Schwier & Balbar, 2002).

A significant departure from technology-enhanced learning is represented by blended learning. This approach is a deep and complex integration of traditional classroom learning experiences with technology-enhanced experiences. In (Colis & Moonen, 2001), it is simply defined as a hybrid of traditional face-to-face and online learning so that instruction occurs both in the classroom and online. However, ways and patterns that combine those elements are virtually limitless, strictly dependent on context and may substantially differ in their implementation (Dziuban & Moskal, 2001; Martyn, 2003). Blended learning differs from enhanced learning because it prompts heavy redesign of teaching and learning. The technology enhancement is only a component of the whole blending process. Beyond value-added technology integration, a paradigm shift in nature, practices and quality of educational experience must take place. In other words, meaningful blended learning leads to reengineering learning processes and practices in a way such that technology is not only used for content representation, sharing and delivery, but also supports concrete innovative learning scenarios or patterns (Derntl & Motschnig-Pittrik, 2005; Motschnig-Pittrik & Holzinger, 2002).

In a university the flexibility of blended learning is referred to:

- the extent of choice that students have in the definition of their curriculum,
- the capacity to satisfy student needs and demands in terms of locations, delivery and pace of learning,
- the dimension and possibilities offered to students participating in course educational activities (learning resources access, interactions within the course, course orientation selection,…)
- types of support given by the institution to students (news, announcements and timely information about courses and programs management, technical assistance and more in general educational services);
- the use of teaching approaches that loosen both time constraints and campus-based, face-to-face delivery.

Any blended learning model assigns a crucial role to the community comprised in it. According to (Kaplan, 2002), blended learning communities integrate online learning and face-to-face meetings in order to create richer collaborative learning experiences and to strengthen relationships between learners through structured group interactions that employ technology before and/or after a face-to-face learning event. They provide condition for dialogue, critical debate, agreements and usually evolve at institutions to meet that institution’s unique needs (Gabelnick et al., 1990). The sense of community in higher education blended learning environments has been investigated in (Rovai & Jordan, 2004). Such a study provides evidence that
blended courses may produce a stronger sense of community than either traditional or fully online courses. Moreover, blended learning exhibits the ability to facilitate a community of inquiry, that is a community consisting of cognitive, social and teaching presence elements (Garrison & Anderson, 2003). In particular, the importance of the third key element is stressed in (Garrison & Kanuka, 2004). In order to have a meaningful and cohesive blended learning community teaching presence is required to manage the environment, to focus and facilitate learning experiences through analytical learning pattern definition and interactive structured discussion with learners.

An institutional wide blended learning community (IWBLC) is characterized by a cohesive community of people (students, professors, administrators, faculty members, ...) that work closely together to achieve high academic learning goals through spreading blended learning practices and sharing knowledge about them (Volpentesta & Frega, 2005). Community members, both faculty and students, have the opportunity and the responsibility to learn from and help teach each other. In particular, curricular integration experiences occur by linking together course or coursework in a way such that students find greater coherence in what they are learning as well as richer intellectual interaction with faculty and peers, (Gabelnick et al., 1990; Tinto, 1997). The community works to support educational processes, but it also continuously works to improve its ways of working by learning from experience. In this sense it exhibits some traits of a knowledge community, (Senge et al., 2001), or a community of practice (Wenger, McDermott & Snyder, 2002), and it also has positive effect on the continuing development of both educational professionals and organizational assets (de Vries & Kommer, 2004). Technology is used in order to support learning processes or to promote virtual collaboration focused on specific topics. In particular, the institution is deeply involved in developing and deploying a unique LMS as well as encouraging distributed learning approaches. Organizational effort and progressive upgrading of the LMS are continuously carried out in order to enable collaborative learning experiences even through effective interactions between learners and learning managers outside the classroom.

3. A BOTTOM UP APPROACH FOR BUILDING AN IWBLC

Once an institution is in a many isolated TELMCs scenario, its emerging necessity is

- to develop a unique community which incorporates those micro-communities in order to maximize opportunities and benefits for learners and learning managers while minimizing chaos.
- to meet requirements of the whole community by adopting a single LMS which exhibits consistent interfaces and tools and has an organizational impact as smoother as possible.

A bottom up approach for managing the transition to an IWBLC consists of four steps that can be cyclically executed:

1. Consulting with TELMCs: the rationale is to identify basic needs and benefits of an institution-wide blended community as well as requirements of a cohesive LMS capable of supporting it. The institution is required to conduct consultations with key actors of TELMCs in order to drive a discussion about a set of issues related to their educational experiences. The involved participants are required to reflect on their assessment of what is valuable and what could be improved. Results from this consultation constitutes a fundamental contribute for successive steps;

2. Community Pioneering: champions teams are committed to pioneering approaches which could be successively refined, evaluated and shared with other community advocates and institution policy makers. Since no one has yet drawn accurate maps, pioneers learn as they go on and it is unlikely for them to succeed the first time. Anyway, they make an attempt to describe a new territory and the maps they create will make it smooth for a large set of community members to easily migrate to the future. The institution is required to support this kind of experimentations by providing additional resources and giving sufficient time for explorations and failures that are part of mapping a new territory. In particular, an institutional tech team is in charge of developing successive LMS prototypes where each successor is closer to users requirements. This incremental and evolutionary process is ongoing until all features and basic functionalities required by any TELMC are incorporated in a stable LMS;

3. Community Growing: The LMS is deployed throughout the institution and diffusion actions are carried out in order to make its usage as large as possible. A critical mass of LMS users is necessary to let the community grow along the following dimensions:
• **Membership**: attraction of new members and retention of current members through the continuous offer of opportunities for their involvement while overt and implicit attempts are made to establish boundaries (regulations, limitations, appropriateness, etc.);
• **Interaction**: progressive engagement of community members with each other and with courses content in both synchronous and asynchronous environment. The interaction is aimed to solve problems and answer questions while planning, delivering and learning course content;
• **Knowledge networking**: increasing exchange, gathering, organization, and sharing of information, insights and best practices on blended learning within the institution. For example, a knowledge base or an information repository (course materials, lesson plans, labs, assessment criteria, etc.) may be created, reused and evolved by all members of the community.

4. **Evaluating**: Information about the IWBLC is collected and then evaluated. Results help community members to understand how community initiatives develop, offering lessons other members can profit from. They provide ongoing feedback in order to continuously adjust programs and interventions in previous cycle steps. Finally, evaluation of the IWBLC can help to recognize whether the institution is ready to move toward a scaled up flexible blended learning scenario. This can be accomplished by determining coverage and performance indicators of the IWBLC through the analysis of membership cardinality, members interaction and knowledge network extension.

4. A CASE STUDY: THE ICAMPUS.UNICAL PROJECT

In March 2002 the Academic Senate of the University of Calabria decided to support some projects in order to enhance knowledge and learning through the integration of ICT into educational processes within the institution. One of these projects was iCampus.Unical that aimed to build an IWBLC at the Faculty of Engineering through the adoption of the above described bottom-up approach.

Before the beginning of the project, the Faculty of Engineering was in a set of many isolated TELMCs scenario. Therefore, top priority was to proceed to the consulting step in order to gather pre-requirements for a unique LMS and to identify and evaluate habits and behaviours in using technology to enhance learning experiences.

Responses to the consultation questions had been collected in order to determine essential characteristics of TELMCs. Relationships among their members and commonalities, in terms of both needs and opportunities to work together, had been investigated in order to plan an appropriate structure and support which are necessary for an institution-wide blended community to develop. Profitable pathways among TELMCs components (human or not) were also highlighted through an analysis of inter/intra TELMCs relationships.

The following are key issues which had been addressed in the consulting process:
• explore how participants act in TELMCs;
• evaluate the strengths of TELMCs and their relevance in learning processes;
• identify ‘community champions’;
• identify needs and development directions for an IWBLC.

On the technological side, consultation identified common needs for a cohesive LMS which could support an IWBLC. Basic functional requirements of the LMS were referred to three main classes of users: technical system developers/administrators, learning managers (professors, teaching collaborators, faculty advisors, principals…) and learners (mostly students). Users inquiring about their interaction with ICT educational tools pointed out the required grade of accessibility, flexibility/adaptability, extensibility of the LMS in terms of interactive communications, courseware templates, knowledge databases, network functionalities, internet technologies, and, more in general, virtual classroom “facilities”. A tech-developer team was addressed to develop and manage an LMS based on a semi-ready open-source software system (OSS) platform to be successively customized, configured and extended by adding new components or modules (Volpentesta & others, 2004). Such a strategy has been embraced by many higher education organizations (Dougiamas & Taylor, 2003; Arteaga et. al., 2004) and it represents an appropriate solution for an incremental and evolutionary development that can match both low cost investments and full application customization, (Kaderali & Elhert, 2003).
On the organizational side, a key mentor team was addressed to take on the co-ordination and leadership role of fostering the identity of the community as well as defining its culture and values. It was constituted by a selected group of community champions and by some representatives of the institution council board. They were directly involved in remaking some blended learning experiences in their TELMCs by using basic available tools of the LMS platform. In order to let community grow, they gave support and mentoring during the development of three main planned initiatives:

11: Extending champions practices to the institution wide community;
12: Promoting inter-courses and collaborative experiences;
13: Organizing collaboration across academic disciplines in an attempt to achieve curriculum integration.

At the date being the icampus project has partially covered the planned initiatives throughout the stages of the adopted approach (table 1 sketches the overall coverage of the planned initiatives).

Table 1. Evolution stages over planned initiatives; Legenda: ☑ Completed; ☐ Not started; ✨ Scheduled/On going.

<table>
<thead>
<tr>
<th>Stages</th>
<th>Initiatives</th>
<th>Pioneering</th>
<th>Growing</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>– TELMCs practices: identifying &amp; sharing&lt;br&gt;– Unique LMS prototype with basic features</td>
<td>☑️</td>
<td>– Selected practices diffusion&lt;br&gt;– LMS full customization &amp; deployment</td>
<td>– Evaluation of new practices relevance&lt;br&gt;– Evaluation of LMS usage</td>
</tr>
<tr>
<td></td>
<td>I2</td>
<td>– Inter-class pilot experiences&lt;br&gt;– Use of collaborative tools (RSS, blogs)</td>
<td>☑️</td>
<td>– Replicable inter-class experience model&lt;br&gt;– Integration of collaborative tools in LMS</td>
</tr>
<tr>
<td></td>
<td>I3</td>
<td>– Integrated curricular experience&lt;br&gt;– Use of KM tools</td>
<td>☐</td>
<td>– Specific curricula integration&lt;br&gt;– Integration of specific KM tools to support course interdependencies</td>
</tr>
</tbody>
</table>

In what follows we describe the I1 initiative (the only one that was fully completed, at the time being).

**Pioneering stage:** new valuable educational practices were identified and then shared with all TELMCs members. A starting version of the LMS was made available to all community members and then upgraded by including a minimum set of needed functionalities for both learning managers (classroom lifecycle online management, asynchronous messaging and communication management, repository management of teaching material in any digital format, …etc.) and for learners (web download capability of documents and multimedia course material, two way interaction in synchronous and asynchronous mode, …etc.), see (Volpentesta et al., 2004) for details.

**Growing stage:** selected blending learning practices were diffused within the institution as well the usage of the LMS. Both key mentor and tech teams were involved in organizing public demonstration for learning managers, coaching users and giving personal assistance through a helpdesk and gathering course management issues, technical problems, bug notification, suggestions, requirements and so on, to be analysed for further community evolution. The execution of such activities and few monetary rewards, provided by the Faculty Council to motivate learning managers, were addressed to achieve a critical mass necessary for a community building. Customized features were continuously introduced in the LMS in order to fit specific requirements coming from the community (users registration and authentication, back office administration module, LMS database maintenance, news module, SCORM learning objects management, weblogs, RSS syndication, …etc.).

**Evaluation stage:** diffusion of blended learning practices and community size were investigated through an empirical inquiring modality based on quantitative results on the LMS usage. Although a deductive qualitative analysis based on those objective data has poor scientific relevance it nevertheless allows one to track back community behaviors in terms of participation, membership awareness, new and modified kinds of member relationships. An empirical usage analysis was performed to aid in determining both the extent to which individuals were early or late in adopting the LMS into their blended learning practices and the “critical mass”, i.e. a substantial and relatively consistent user base which is necessary for the community to
function and thrive, (Markus, 1990; Rogers, 1995). Analysis outcomes were collected to quantify many indicators. In particular we considered:

- a Coverage Indicator, which measures usage extension inside the Faculty;
- a Services Usage Indicator, which measures the use of the LMS as part of a blend in educational practices.

Tables 2 and 3 describe the main attributes of the above-mentioned indicators (Legend: LM=Learning Managers, L=Learners, AY=Academic Year, Tr=Trimester, AV=Average number, C=Course, F=Faculty).

### Table 2. Coverage Indicator

<table>
<thead>
<tr>
<th>Indicator components</th>
<th>Definition</th>
<th>Metric</th>
<th>Time dim.</th>
<th>Context dim.</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM</td>
<td>LM subscribed</td>
<td>Total number of subscribed LM</td>
<td>AYs 02-04</td>
<td>F</td>
<td>UserDB</td>
</tr>
<tr>
<td>C</td>
<td>Enabled C</td>
<td>Total number of active C</td>
<td>AYs 02-04</td>
<td>FC</td>
<td>Courses DB</td>
</tr>
<tr>
<td>L</td>
<td>L subscribed</td>
<td>Total number of subscribed L</td>
<td>AYs 02-04</td>
<td>FC</td>
<td>UserDB</td>
</tr>
</tbody>
</table>

### Table 3. Services Usage Indicator

<table>
<thead>
<tr>
<th>Indicator components</th>
<th>Definition</th>
<th>Metric</th>
<th>Time dim.</th>
<th>Context dim.</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documents</td>
<td>Material uploaded by LM, available for download by L</td>
<td>Weighed AV of downloads vs. docs dimension</td>
<td>Tr/AY</td>
<td>C/FC/F</td>
<td>LM Docs repository</td>
</tr>
<tr>
<td>Boards</td>
<td>Announcements and notices</td>
<td>Total number of announcements</td>
<td>AY</td>
<td>LM</td>
<td>Announ. DB</td>
</tr>
<tr>
<td>L Works</td>
<td>Uploaded works by L</td>
<td>AV of uploaded works by L</td>
<td>AY</td>
<td>L/C</td>
<td>L Docs repository</td>
</tr>
<tr>
<td>Exercises</td>
<td>Self-evaluation test for L</td>
<td>AV of exercises inserted by LM</td>
<td>AY</td>
<td>LM</td>
<td>Exerc. DB</td>
</tr>
<tr>
<td>Web Links</td>
<td>Web Links posted by LM</td>
<td>AV of web links posted by LM</td>
<td>Tr</td>
<td>C</td>
<td>Web Links</td>
</tr>
<tr>
<td>Forums</td>
<td>Forums on course topics</td>
<td>AV of threads started by LM; AV of L posts for every thread</td>
<td>Tr</td>
<td>C</td>
<td>Forum DB</td>
</tr>
<tr>
<td>Statistics</td>
<td>C access statistics</td>
<td>AV of monthly accesses to courses</td>
<td>Month</td>
<td>C</td>
<td>Logs</td>
</tr>
</tbody>
</table>

### 5. RESULTS AND BENEFITS

A data analysis was addressed to study the process of innovation and change throughout the Faculty. Figures 1 and 2 show that the obtained results reflect the classical model of adoption pattern of innovative technology usage in learning practices, (Rogers, 1995; Jacobsen, 1998). This data is important to measure up the size of the community over time and to characterize chronological milestones in community growing. No significant drop out phenomena were registered in the focused period, on the contrary pioneers and early adopters are still involved in blending processes. However our evaluation didn’t address issues like complementary facilitators or obstacles which have affected blending activities inside the community, as well no critical analysis of innovation “indolence” was faced.

Figure 1. Adoption pattern based on percentage of students on duty from 2nd quarter of 2002 to 1st quarter of 2005; students involved are 6090, almost 91% of total enrolled.
Despite the full exploitation of the document management feature of the LMS, other results have shown that features much more oriented to community reinforcement were poorly understood. The diffusion of blended learning practices is still on going and it needs more time and effort to meet our expectations in flexible blended learning roadmap.

Evident benefits were obtained with the wide usage of the LMS. They may be summarized as follows:

- From a student perspective: a unique source for searching and retrieving educational materials was made available; interactions with instructors or other students were enhanced through new communication services;
- From an instructor perspective: a centralized LMS management exempted teachers from worrying about technical problems and let them concentrate their efforts on improving educational practices and delivery of instructional content;
- From the institution staff perspective: a large amount of useful course data was made available in order to carry out reports or statistics for educational process evaluations.

6. CONCLUSIONS

It is clear that in a few years, universities will be interested and involved in innovating traditional classroom practices and models in order to be competitive on the educational market.

Blended learning has an enormous potential for the transformation of higher education institutions which need to adopt flexible learning paradigms. While benefit and competitive advantages are widely recognized, wide institute involvement and commitment are not easy to achieve without a smooth and progressive approach. As an intermediate stage, we have proposed a bottom-up approach for building an institute-wide blended learning community where members work closely together to achieve high academic learning goals through spreading blended learning practices and sharing knowledge about them. It may aid to drive an institution from a set of single technology-enhanced classroom experiences, where single pioneer instructors begin to introduce ICT as an add-on of traditional learning process, to a final stage where blended learning practices and supporting organizational structures are institutionalized, that is they are integral part of the institution educational system.

This approach has been adopted during the execution of the “iCampus.unical” project at the Engineering Faculty of the University of Calabria. The implementation of its first steps has enabled to build a unique wide community of blended learning practices and this has partially shown its validity. Anyway, further work is needed in order to let the community grow along the dimension of interactivity and knowledge networking. This will let community members have a better awareness of how to contextualize specific contents to be delivered while exploiting upcoming knowledge sharing technologies. Only afterwards, a full evaluation of the approach will be possible and this will be the next step of this research.
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LEARNING MANAGEMENT SYSTEM AS AMBIENT INTELLIGENCE PLAYGROUND

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ABSTRACT
The vision of Ambient Intelligence (AmI) offers the conception of systems and applications that will be sensitive and responsive to the presence of humans. The AmI vision builds on advanced results of interdisciplinary research. The development of AmI environments is a complex task and all their features and functioning can neither be predefined nor forecasted because of different emergent or synergic effects. Learning management systems (LMS), web-based educational applications, can serve as an experimental area where AmI solutions can be developed and tested. The list of possibilities starts with hardware-oriented innovations and goes over particular experiments with AmI algorithms to the evaluation of users’ reactions and responses of the proposed AmI systems.

KEYWORDS
E-learning, learning management system, ambient intelligence.

1. INTRODUCTION
The most profound revolutions are not the ones trumpeted by pundits, but those that sneak in when we are not looking.

(Mark Weiser)

The objective of the paper is to explore the possibility of introducing and evaluating different Ambient Intelligence (AmI) sub-solutions and scenarios and experimenting with them inside particular web-based applications: learning management systems (LMS) that were developed to enable the way of education supported by advanced information and communication technology, known as e-learning.

In the following paragraphs (1) we shall remind the concept of AmI and its dimensions briefly, (2) we shall argue for the suitability of LMS as an experimental area for novel AmI applications and (3) we shall offer a set of perspective research directions that promise to be beneficial both for future LMS-like applications and for AmI environment evolution.

The paper presents partial results of two consecutive research projects, where the first one has been focused on introducing more intelligence and knowledge support into a university environment, and the second one deals with AmI based solutions development focused on supporting decision processes of different types of decision makers. Related results can be found in [Mikulecky and Olsevicova], where AmI scenarios were explored in relation to university education, or in [Mikulecky2005], where some controversial impacts of AmI vision to everyday life were discussed.

2. AMBIENT INTELLIGENCE VISION
The concept of ambient intelligence (AmI) was introduced in the ISTAG report [ISTAG 2001] and interpreted e.g. by [Alcaniz and Rey; Remagnino et al; Bohn et al; Snijders] and others. This concept provides a vision of society of the future, where the people will find themselves in an environment of intelligent and intuitively usable interfaces, ergonomic space in a broad sense, encompassing better, secure
and active living environment around them, capable of aiding them with daily chores and professional duties by recognizing the presence of individuals, reacting to it in a non-disturbing, invisible way, fully integrated into the particular situation. Nearly synonymous concepts of disappearing computing or calm computing express the technology diffused into everyday objects and settings [Russell et al]. From the technological point of view, AmI bears ship to the conception of ubiquitous computing (UbiComp), the term firstly used by Mark Weiser in 1998 [Alcaniz and Rey; Bohn et al]. UbiComp is defined as the use of computers everywhere and is determined by interactions that are not channelled through a single workstation.

The AmI environment is characterized by merging of physical and digital space. It means that tangible objects and physical environments are acquiring a digital representation [Kameas et al]. The AmI environment is considered to host several UbiComp applications.

The AmI artefact (also smart object, smart device) is an element of the AmI environment that has got following properties and abilities [Kameas et al]: information processing, interaction with environment, autonomy, collaboration, composeability, changeability. Building of an AmI artefact from any common object consists of two phases: embedding hardware modules into the object and installing software. Hardware components are especially batteries, sensors, processors, wireless modules and screens. Software components are those of hardware drivers, networking subsystems, operating system, and middleware for integration of artefact in distributed systems. The AmI hardware builds on four components: distributed processing, hierarchical storage, tangible interfaces and ubiquitous communication. [Snijders] presents a three-level hierarchy of devices with different functionalities, designed to solve the energy constraint that is the determinative factor of any AmI application.

Technical features of UbiComp systems and the main tasks to be solved by AmI technological background are summarized e.g. by [Alcaniz and Rey]. The crucial research domains related to the AmI vision are suggested in [ISTAG 2005]. The main areas to be evolved are those of:

- development of necessary hardware, especially
  - smart materials that enable mass storage, emit light, process data, active and passive tagging or access to networks,
  - specific devices for particular applications, with limited processor and hard disk requirements and therefore of low cost,
  - sensor technology bridging the physical world and the cyberworld,
  - interfaces with a good display quality and responsiveness to user input, supporting natural interaction that combines speech, vision, gesture and facial expression,

- defining of new software architectures and appropriate software, mainly
  - 'invisible' file systems, that allow user to access data under the principle of "produce one, present anywhere", but without knowing specific file names, locations, formats,
  - automatic installation mechanisms and migration of programs from one computer to another with ability of self-managing and self-adjusting, but without requiring fundamental changes in configurations,

- working on contextual awareness and personalization of information that is tailored to user's requirements and location observed by networks of sensors and cameras, status tracking, interactions, user modelling etc.,

- working on privacy issues, both theoretically (see [Lessig] for the concept of personal privacy in cyberspace) and practically in sense of encryption techniques to ensure security.

The concept of AmI is strongly motivated by economic aspects – probably economic motivation is the most significant incentive in this area. A discussion about real time or now-economy has been presented in [Bohn et al], where more and more entities in the economic process, such as goods, factories, and vehicles, are being enhanced with comprehensive methods of monitoring and information extraction. The authors point out how two technologies, the ability to track real-world entities and the introspection capabilities of smart objects, will change both business models and consumers' behaviour.

The societal acceptance of AmI vision depends on such features of AmI applications as ability to facilitate human contact, orientation towards community and cultural enhancement, ability to inspire trust and confidence, supporting citizenship and consumer choice, consistency with long term sustainability both at personal, societal and environmental levels, as well as controllability by ordinary people [ISTAG 2002].

The psychological theories of different types of intelligence can help to understand human reasoning, and human interaction with machines. Each individual possesses diverse intelligences (see e.g. logical, linguistic,
musical, spatial, interpersonal and other intelligences provided by [Gardner], or analytic, creative and practical intelligences offered by [Stemberg]) in different percentages. As [Bettiol and Campi] notices, this mixture of intelligences determines the learning style and motivations of each individual, therefore an Aml application must adopt itself dynamically to peculiarities of its users. Other psychological factor that has to be taken into account when designing Aml environments is that people tend to continue their habits, therefore the applications should respect the natural behaviour patterns of humans.

The political impacts of the vision of Aml have their starting point in the resolution adopted at the Lisbon congress of the EU in 2000, on the basis of which the European Commission resolved to secure Europe's leading role in the field of generic and applied technologies for creation of the knowledge society. The new technologies must not be the cause for excluding some groups of citizens from society, but it must ensure universal and equal access to its digital knowledge sources. The most controversial, breath-taking implications of the Aml vision, especially those that seem to attack the freedom of choice of humans, or to increase our dependence on the correct functioning of numerous artificial systems are logically related to its psychological dimension and represent the main barrier that can at least slow-down the acceptance of Aml approach.

3. AMBIENT INTELLIGENCE IN LMS: WHY?

The idea of Aml, still fresh and not too developed, is often communicated through illustrative scenarios that are related to certain domains. General scenarios of Aml applications in context of everyday life were offered in [ISTAG 2001]. Scenarios for a specific domain, the university that represents variable environment where many people interact with numerous systems and devices, were proposed in [Mikulecky and Olsevicova]. Students, teachers, managers, librarians, administrative staff and others need to access information and knowledge from different sources, according their individual needs and in different situations. These information and knowledge-intensive activities are limited by numerous constraints in terms of location, time and availability. University is a good place for demonstration of general Aml scenarios reusing UbiComp principles, push and pull technologies and new types of devices. A bit narrower, but interesting area, where the Aml vision can be examined and where significant results can be achieved, is the field of LMS. Following features of LMS are those that make LMS to be a good arena for fruitfull exploring of the Aml vision:

- LMS enable experiments with different hardware solutions, because e-learning is realized on varied kinds of devices from PCs over laptops and handhelds to mobile phones. The Aml applications build on idea of new devices with innovated architectures and communication protocols and with software developed according new programming paradigms. As new and more sophisticated communicating devices will be invented and constructed, new impulses and new possibilities for more sophisticated, but also more user-friendly LMS usage can be expected.
- LMS are part of environment that consist of different digital and non-digital information systems, their full integration and communication with other systems is then naturally demanded and could be improved through suitable Aml solutions.
- LMS provide wide range of services, such as tools for educational e-content development, sharing and delivery, synchronous and asynchronous communication channels, utilities for evaluation of students’ performance and knowledge, tools for user records management and e-commerce modules. Here, the Aml applications can be involved in form of decision support systems and knowledge-based systems focused on appropriate utilization of educational strategies, scheduling systems or intelligent management of resources.
- LMS are used by good-sized and heterogeneous user groups (students, teachers, e-course designers) who differ in preferences, aims, needs, interests, personalities and experiences. Therefore it is a challenge to personalize all tools and services of LMS, reuse context information for intelligent customization of e-content or apply systems for monitoring of user activities with the aim to obtain and maintain user profiles. The high number of users promises to get relevant and heterogeneous feedback and meet unpredictable situations that would accelerate the development and improvements of particular applications. Also, the users of LMS are mainly students, i.e. people who are expected to be surrounded by the Aml environment in near future. It would be a quite good
opportunity to examine the general response of these people to the AmI solutions and to correct their prospective wrong expectations and misunderstandings.

- In general, LMS provide services anywhere and anytime in the given environment, resembling thus somehow the idea of UbiComp, which seems therefore to be one of proper approaches for further development of LMS.

All the previous arguments, and certainly a couple of others, give us a good reason to experiment with LMS as with an ambient intelligence playground.

4. AMBIENT INTELLIGENCE IN LMS: WHERE AND HOW?

The human contact with LMS that consist of numerous variable activities can be understood from the perspective of optional application of different AmI sub-solutions. Here we present the main areas of meaningful utilization of AmI principles and technologies:

1. User identification and logging
The process of logging to the LMS is a simplification of the task of welcoming user by the environment around him or her. The identification mechanism, that recognizes the presence of individual, can be based e.g. on biometrics or voice recognition and can be enabled by electronic cards, RFID, mobile phones. This process has to involve fast loading of user profile, or the subprofile relevant to the device and the task. The process of logout has to be accompanied with storage of updated profile (if necessary).

2. Context-based services, customization, personalization and omnipresent monitoring
After logging, the presentation of content should be automatically tailored both to the particular user and to the device used for accessing LMS. This tailoring expects processing of data from user profile, deriving of recommendations etc. The context-based services have to build at least on following abilities:
   - to recognize and interpret information and knowledge needs of individuals,
   - to update users’ profiles with respect to information and knowledge needs, that newly appear, or that become irrelevant,
   - to customize information and knowledge delivery to language and format preferences given by user, including optional machine translation,
   - to exchange data with remote systems and external resources, with respect to security and privacy restrictions on both sides of communicating systems.

3. Application of new programming principles and AmI algorithms
The invisible, omnipresent, continuous monitoring of activities of users is one of AmI challenges. As the number of functionalities and tools inside LMS is limited, the limited list of activities performed by users can be expected, too. Nevertheless, the number of combinations of actions, their sequences and outputs mean that the task of their interpretation is non-trivial. There appears the need of new, efficient algorithms for processing terabytes of data collected about users, for updating profiles, for storing maximum data about the user’s context. Ambient programming principles (and languages) should simplify the development of flexible code, enabling parallel and/or distributed processing, independent on specific drivers and compilers, modular enough for optimal modifications and enhancements (see [Verhaegh]).

The number of users in LMS, spaced out in different e-courses allows experiments with AmI solutions in groups of users of different sizes: e.g. experiments with intelligent scheduling of learning activities can start in one e-course with 20 students and then can be repeated inside tens of e-courses with hundreds of students. That is how to obtain relevant data about the impacts of more extensive utilization of certain algorithm or technology in real conditions or of more intensive load of subsystems and their communication channels in situation when the technology comes on its edge.

4. Innovated hardware and new types of devices
Different electronic equipment is used in framework of LMS. Except of PCs there are also other personal digital devices, servers, data projectors, printers or copy machines. AmI applications and UbiComp systems can monitor and manage their functioning, control their communication, manage optimal usage of resources, organize repairs. The remote access to applications installed in centralized client-server model and central storage of data would mean that e.g. students could run programs on any type of device connected to the
university network and anywhere in the university campus, not only in the given computer lab. Printing jobs could be automatically sent to the most suitable printers (e.g. the closest or less loaded). Although the realization of this part of the AmI vision would request investments in a new infrastructure, involving a new communication layer interconnecting different devices, the AmI idea of cheap, narrowly specialized hardware makes the expenses less capital-intensive. In relation to software licenses, the application of pay-per-use model is meaningful.

5. **Intelligent interfaces, processing implicit inputs and interactions**

The interface is one of the most significant aspects of LMS. Intelligent, user-friendly, intuitively usable interfaces are one of the most challenging parts of the AmI research. From a world where one user is sitting in front of a single computer there is a shift to another world, with users living, working, and solving problems in an environment full of interfaces with various degrees of embedded intelligence, from very simple ones up to three-dimensional (3D) virtual worlds. The LMS evolution could clearly benefit from this. As an example of very complex and advanced intelligent user interface we can mention Active Worlds (see [AWEDU]). Active Worlds, is considered to be the most powerful web's virtual reality applications, with possibilities to visit and chat in 3D worlds that are built by other users. The Active Worlds Universe is a community of thousands of users that chat and build 3D virtual reality environments in millions of square kilometres of virtual territory. This can be certainly considered to be an interesting example of an intelligent 3D interface for a LMS evolution. Indeed, there is already a sub-world of the Active Worlds application, called the Educational Universe. It is an entire Active Worlds Universe dedicated to exploring the educational applications of the Active Worlds Technology [AWEDU].

6. **Support of communication inside the community**

Users of LMS are a kind of web community: students of e-course do not need to meet personally anytime, but they share interest in studied domain, they exchange ideas in discussions and chats. The AmI vision is often presented as an approach that will improve the life of an individual, but it should be also seen as something what will facilitate communication and improve interpersonal contacts.

7. **Involving new types of smart learning objects**

Learning in an intelligent environment occurs in a number of different contexts, so it is necessary to evolve LMS at least in the direction of context aware content providing. The learner might be interacting with a piece of knowledge, communicating or collaborating with other learners, using a particular learning path or elaborating the experience gained in the near past. In LMS, learning objects are cohesive pieces of learning material, usually stored in a database or in a digital library of learning objects (see, e.g. [Mikulecky2004]). A learner uses suitable learning objects, and creates time-ordered trails through them. In this context new types of learning objects with increased embedded intelligence could be useful, for instance museum artefacts or exhibits in the role of smart objects cooperating with LMS. Simultaneously, the introduction of the self-organization in computing (see [Staab et al] and its broad exploitation in the AmI area seems to be promising, here for instance in the role of self-organizing artefacts or learning objects. In this context, the idea of collaborating learning objects, that is learning objects capable of mutual communication as well as other important features, as adaptability or self-organization into suitable groups or time-paths, seems to be interesting as well.

8. **Invisible file systems**

Educational e-content stored in LMS is organized in files, traditionally using folder system. The folders and files are shared by e-course designers and teachers. The achievement of well-arranged system and its maintenance is difficult. The concept of invisible file systems would minimize the necessity to remember artificial paths to e-content, the need to construct and share acronyms and file names. Users, who access LMS from different devices, should always meet the same organization of digital e-content.

9. **Affective computing**

Affective computing is supposed to work with emotions of humans. [Alcaniz and Rey] explicitly talk about tutoring systems as typical applications for utilization of student’s emotional states by measurement of psychological signals. Therefore LMS are natural environment where the research in affective computing can be realized.
10. Privacy issues
The task of security and privacy is important anywhere where data about individuals are collected and processed. In LMS, personal data together with study results are stored to be at the disposal of teachers and administrative staff. New methods for protecting data in AmI environments are necessary, and their research should be one of highest priorities for the AmI research. Significant results in this direction certainly can contribute to building trust in new technologies among their potential users.

11. New business models
Commercial providing of LMS services opens the door to application of new business models, reflecting the ideas of real-time economy. Pay-per-use models, offered in relation to software licences, could be applied here, e.g. for getting experiences with its practical realization and with users’ response.

12. Interaction of AmI subsystems
The important fact is that the previously mentioned AmI sub-solutions can interact and can form the full-featured AmI environment. The exploring of this environment, whose all characteristics and total functioning cannot be easily predefined and anticipated, can bring new insights, utilizable in other more complex, less virtual (and therefore more expensive) AmI environments than LMS (e.g. intelligent houses, see [ISTAG 2001; De Carolis and Cozzolongo]).

5. CONCLUSION
The vision of Ambient Intelligence cannot become a reality from day to day. Its full realization can be achieved only through the sequence of simple, less sophisticated solutions, well tested, well proven and well accepted by the target audience. Learning management systems (LMS) that are used by thousands of users can serve as a good experimental area where some initial hardware and software AmI solutions can be realized practically. In the paper we presented the list of reasons that advocate this opinion and the list of directions that can be evolved in near future.

Our further research is devoted (1) to an evaluation of the importance as well as the feasibility of possible AmI solutions, and (2) to stepwise implementation of selected solutions into LMS.

ACKNOWLEDGEMENT
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ABSTRACT
Collaborative and autonomous learning is required for accommodating a variety of learners in education and training. The most convenient media for learning are printed materials and mobile phones, but these require a sophisticated instructional strategy, a well-defined framework and procedure for developing high quality learning. Different types of knowledge representations and five developmental stages of concept, metaphor, image, model and proposition for implementing instructional technology are introduced in this paper.

KEYWORDS
instructional design, collaborative learning, autonomous learning, ubiquitous ICT, knowledge creation, empirical approach

1. INTRODUCTION
The remarkable development of Information and Communication Technology or ICT forces us to restructure industries and change our way of living. This drastic change ends to produce many unemployed people and NEETs, who are obliged to be in such situations mainly caused by discrepancies between their professional competencies and requirements in the labor market. At the same time, the recent development in ICT enables us to explore an entirely new framework for teaching and learning and to shift from teacher-led to learner-centered instruction which is entirely different from conventional teaching in schools and universities. In spite of such perspectives of changing society, the instruction in well established educational institutions is still teacher-dominated and provided to competent students selected through entrance examinations. Some people working in public education are reluctant or even resistant to reform the conventional educational system which was firmly established in the past century. It is indispensable for us to renew professional competencies to keep our lives more stable and reliable for keeping Quality Of Life or QOL at reasonable level and needed to accommodate people who cannot keep pace with this changing and diversifying society. In such circumstances we have to initiate instructional designs based on personal needs and diversified backgrounds at first, and then proceed to national goals that have been agreed upon through democratic consensus.

Ubiquitous ICT such as mobile phones, Personal Digital Assistants (PDA) and microchips embedded in our surrounding environments enable everyone to learn at any-time and anywhere (Ogata 2004a, 2004b). When we plan to implement ubiquitous ICT in a specific instructional situation, we have to take into account a variety of factors relevant to effective learning for diverse learners. We are expected to apply the
abundant scientific findings from past instructional research in designing and implementing instruction, but we often find it difficult to apply previous findings for designing instruction effectively due to diverse learners’ needs and interest. We know very little about ubiquitous learning free from teacher-controlled instruction and we face difficulties in designing lessons suitable for diverse student populations considering their different academic achievements, intelligence, ages, socio-economic backgrounds and countless other factors. Any instruction in a specific classroom is unique and requires technological experience (Flechsig, 1997). This means that any technological profession requires ample experience and support from colleagues and superiors. Complex problems are not solved merely by applying scientific findings, but require technological know-how based on experience. In many cases while developing a course, several preliminary trials and many revisions must be conducted to achieve satisfactory outcomes. This implies that learners’ active learning cannot develop from the mere application of scientific findings, but from intuitive trials and systematic revisions for refining the learning itself. This developmental process requires a systematic procedure for enhancing the professional disciplines involved in collaborative and autonomous learning development.

2. TECHNOLOGICAL APPROACH TO COLLABORATIVE AND AUTONOMOUS LEARNING

The scientific and technological approach for producing modern machinery has resulted in the mass production of cheap and convenient goods for daily life as well as large-scale complex undertakings such as aircraft, tankers, high-rise buildings and even space stations. Computers, the Internet and ubiquitous ICT are also modern technological products resulting from the development of information and communication science and technology. Thanks to high technology-based machinery and facilities, we benefit from the convenience of inter-city and international travel, the rapid transference of information on a worldwide scale and the rise of transnational communities. This contrasts strongly with labor-intensive inefficient traditional manufacture, which often requires costly and time-consuming efforts to produce very simple outcomes. Yet with the proliferation of convenient, mass-produced daily necessities, we are losing traditional, high-quality craftworks rich in character.

The same ICT is now being applied to education. Teaching is still a labor-intensive profession, but it is now entering a more innovative stage in our profession toward more learner-driven learning to cope with the great demands of life-long learning, especially in higher education at the professional level. This requires the urgent development of autonomous learning technology that can accommodate a huge number of learners at low rates of tuition or fees and high quality materials to guarantee effective learning outcomes. In this context new instructional technology should maintain the quality and best features of the conventional instruction, while incorporating the innovative features of mobile or ubiquitous learning.

The theory and practice of introducing ICT in education is entirely different from those of ICT itself. While information and communication science have developed efficiently to accelerate the development of ICT, the present state of educational science and technology is not sufficiently developed enough to accommodate new technologies such as ubiquitous ICT in the educational settings rationally and effectively.

Figure 1. Empirical Approach for Learning Development
Ubiquitous ICT can enhance autonomous learning in today’s completely teacher-led classrooms as well as independent learning away from educational establishment. The technological approach is often confused with the scientific approach due to its objective and generalized features when considered by outsiders’ observers, but the approaches are entirely different from the insiders’ perspective of implementing procedures to achieve final distinct goals. A scientific approach is adopted in order to clarify one’s recognition and to result in new knowledge, while a technological approach emphasizes the importance of subjective prescriptions and prospects, actions to realize them and resulting outcomes. In the latter approach, outcomes should be clarified before or during their adoption and described in visible or tangible form and described in statements of instructional objectives or learning objectives in conventional instructional technology. On the other hand, ubiquitous learning aims to realize a learning process and/or outcomes free from teachers’ control and intervention.

Despite such characteristics, ubiquitous learning should be designed to achieve quality learning outcomes and a high level of learning. How can we describe such high quality learning without alluding to instructional objectives? Figure 1 shows four different approaches to design instruction: (1) a traditional and teacher-led instruction approach based on educational norms/canons, or practical syllogistic derivation from educational norms to actions, (2) the application of a scientific findings approach based on psychology, cognitive science and other social sciences, (3) learning from others’ experiences by relying on colleagues and elders, and (4) an approach featuring intuitive and creative ideas based on our own experiences and tacit knowledge.

The major concern in this paper is to develop a research method for formulating explicit knowledge in the forms of figurative and/or iconic representations as well as statements and/or propositions so that this accumulated experience will be easily communicable, systematically revisable and sharable with other experts. Even though four approaches are distinguished here, a comprehensive approach based on creative ideas and genuine procedures is always essential to design appropriate learning suitable to local requirements and personal needs. We must initiate new ideas or breakthroughs and develop them for instruction entirely suitable for unique learning environment and content. Figure 2 shows two possible procedures, one of which derives from synthesis and the other from analysis, to extract concrete knowledge of models and propositions from analyzing actual learning situations, mainly depending on an empirical approach rather than a science-application approach. In this procedure, we must observe the learning behavior, record and analyze it and evaluate the design process to interpret the effectiveness of learning. Novice teachers prefer to start by making images and then refining them into figurative and/or iconic models. In this process, discussion and critiques are essential to improve their initial ideas and clarify feasible plans. On the other hand, experienced teachers are strongly advised to start by analyzing their own teaching. They may be accustomed to teaching via unilateral lecturing and may find it difficult to transform their teaching style from being teacher-dominant to learner-centered instruction. The knowledge that emerges from analysis should relate closely to the synthetic aspects of instructional design, otherwise it will be useless. After several trials, however, these teachers will begin to express recognition about the lessons and describe their empirical laws in the form of statements and judgmental propositions, sometimes after having conducted lessons by themselves. The author makes a greater effort to develop instructional design technology sharable in expertise than to identify information technology applications in education, believing strongly in the potential for fruitful and creative outcomes from collaborative teamwork.

In this framework, a definite presumption is not a required prerequisite regarding instructional design in the initial stage. Instead, a back-and-forth process between synthesis and analysis focuses on learning
during its implementation. It starts from intuitive ideas, proceeds relying on empirical knowledge and repeats systematic revisions, from which ideas emerge, from our previous experiences and tacit knowledge.

3. A CASE OF PROBLEM SOLVING APPROACH FOR U-LEARNING IN LARGE-SIZE CLASSES

Before we come to the theoretical framework for implementing u-learning in higher education, we should introduce our trials at Bukkyo University, located in Kyoto, Japan. Present instructional technology starts designing instruction from the standpoint of instructional goals which reflect national policies and an emphasis on nation-wide economic prosperity and success in science and technology. Teachers as well as student teachers tend to adhere to such goals without referring to students’ individual needs and requirements. This approach raises complicated issues in our ever-changing and diversifying society. The conventional educational philosophy suggests that small-size classes are preferable and face-to-face interactions are indispensable to maintain quality education and human relationships between teachers and students. Despite such idealistic expectations, however, in practice universities are faced to offer large-size classes in undergraduate courses due to the huge demands for higher education and the high cost of expertise. The framework discussed here does not emerge from theoretical considerations, but from empirical trials repeated for practical implementation of one-semester classes twice a year for the last six years. Adaptation of simple hardware is essential and appropriate for critically effective and inexpensive instruction. In the u-Learning project, we started instruction mainly with printed materials and mobile phones and have tried to work out a premise for autonomous learning suitable to distance learning. Textbook-based instruction helps us focus our efforts critically on instructional design technology for students’ active, creative and collaborative involvement in learning. This approach also requires a well-thought-out strategy in order to develop appropriate instructional materials. At the same time, if we start from discussion and communication with peers and fellow instructors in institutions or at remote workplaces, we find that ubiquitous communication devices such as mobile phones, PDA and portable computers are also useful tools to enhance knowledge creation and refinement inside and outside the classroom, even at students’ distant homes.

The experimental instruction started in 1999 for an undergraduate course entitled ‘Introduction to Instructional Technology’ which accommodated 228 students in a large classroom. According to our preliminary survey of their impressions of teaching, students complained about the one-sided lecture style, boring contents and passive learning nature of conventional instruction. After repeated improvements while teaching twice a year for six years, we have achieved far more satisfactory instruction of active participations for our growing number of students (enrollment accounted to 276 for the Spring Semester 2005). At the beginning of the class, we conduct a survey on their self-perceptions of teaching, images of their school experiences and questionnaires on communication types in order to divide them into small teams of five or six members in the second week. Then they start to play ice-breaking games to become familiar with each other. They proceed to teamwork sessions to create proposal about ideal schools and instructional plans to share with other teams during poster sessions. After the interim presentation session, they start working independently, but continue communicating with each other and collaborating to finalize their personal reports to be submitted at the end of the lesson. An aim of this course is to cultivate the collaborative competencies, communication skills and critical thinking needed to tackle complicated problems in contemporary education.

To cultivate critical thinking competence and promote the right to learn among students is a common ground for designing autonomous learning, but it does not necessarily imply any specific method for instructional development. Today is the right time to explore learner-centered instruction for cultivating discussion competence among students and for promoting autonomous learning rather than passive attitudes in the classroom. There already exists extensive literature discussing on instructional development, but it has not persuade us to change our mental models and frameworks, which are deeply embedded in the current instruction. One possible way to change such theoretical rigidity is to start from actual problematic situations and develop a persuasive framework for active learning among students even in large-scale classes. Designing is the creative process of imaging learning events and actualizing them in reality. The instructional development procedure discussed in the following sections emerged from our successive attempts to make this process more flexible and easier to implement.
4. KNOWLEDGE FOR DEVELOPING COLLABORATIVE AND AUTONOMOUS LEARNING

In the coming knowledge society, learners’ intentions and autonomous learning capabilities will be key in enhancing the right of learning and to accommodating students’ diverse needs. The development of learning technology suitable for autonomous learning at the secondary as well as higher education level is urgently needed to cope with students with diversified academic backgrounds and learning needs. In a Web-based and computer-mediated learning project, most developmental trials start from the implementation of ICT, especially multimedia and broadband technologies in the conventional classroom situation. In this case, the designers’ attention and interests tend to focus solely on technology, not on learning itself. If we approach universal education purely from a high technology standpoint, it is almost impossible to overcome the ICT divides faced by economically deprived people. High technology versus low technology approaches are not a dichotomy, but two extremes which should be linked seamlessly for disseminating universal education. In this context, we should take into account the potential of ubiquitous, inexpensive information technology as an important means and take a first step from the standpoint of knowledge creation and problem-solving to overcome technology divide issues. New trials often require entirely new, innovative solutions unfamiliar to our own and others’ experiences. Even if we adopt ubiquitous facilities, instructional development should follow a systematic and scientific procedure to make the development more effective and acceptable to other experts in instructional development.

Collaborative teamwork is essential to ensure fruitful and creative outcomes from u-Learning. The Japanese educational system continues to feature harsh competition among candidates aiming to go from elementary to secondary to higher education stages. Their learning heavily deviates towards exam preparation and forced competition with their peers. Collaborative teamwork is not fostered and difficult to realize yet, even at the university level. To overcome such a distorted and dissuasive attitude, five principles are emphasized in classes as an example of educational norms: Autonomous learning, Collaborative work, Contributions to teamwork, Responsibility to the team and Respect for other people.

<table>
<thead>
<tr>
<th>Characteristics of knowledge</th>
<th>Tacit knowledge</th>
<th>Explicit knowledge</th>
<th>Characteristics of approaches</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Figurative and iconic knowledge</td>
<td>Formal knowledge</td>
</tr>
<tr>
<td>Scientific approach (recognition oriented)</td>
<td>intuition, cognition, images</td>
<td>figurative models, figures and tables, symbols, pictures</td>
<td>numerical formulae, recognition statements, explanatory propositions</td>
</tr>
<tr>
<td>Technological approach (action oriented)</td>
<td>hunch, intuition, empirical laws, proficiency, senses</td>
<td>images, models, figures, tables, symbols, pictures</td>
<td>empirical statements, judgmental propositions</td>
</tr>
<tr>
<td>Characteristics of knowledge</td>
<td>difficult to express in language</td>
<td>expressible in figures, symbols, pictures and behaviors; inter-subjective; unique, digitized knowledge transferable through network; reusable, sharable and editable</td>
<td>linguistic knowledge; systematized knowledge; knowledge about the past lexicographical structure for understanding methods, procedures and objects; objective, societal, organizational, rational, theoretical, digitized and encoded knowledge transferable through networks; reusable, sharable and editable</td>
</tr>
</tbody>
</table>

*This table was developed by NISHINOSONO following the original table by NONAKA and KONNO(1990)*
Universal education rather than selective streaming and a smooth articulation between different stages of educational life are urgent issues to be tackled in our rigid schooling system. Ubiquitous ICT and collaborative work are expected to be very effective for solving these problems.

In the conventional procedure of designing instruction, we start from specifying instructional objectives and sequencing them, and then take into account other factors such as teaching materials, teaching environment and teaching tools. In this procedure, instructional objectives are usually derived from the national course of study, developed into a sequence of sub-objectives and actualized in the form of instructional materials. Instructional technologies come on the scene after the selection of instructional objectives and their sequential development. On the other hand, when we start from learners’ needs and learning objectives, we cannot anticipate the instructional process and final learning outcomes at the very beginning of the course. We need to appropriate technologies that will allow us to analyze their needs, assess their relevance to instructional contents and develop a learning environment in parallel to evaluation related to educational goals. Saegusa (1964) suggested there are two interpretations regarding technology in education. One interpretation is that educational technology is a branch of educational expertise similar to educational philosophy, educational psychology, educational sociology and so on. Another interpretation is that it is a technological discipline, just like brewing technology, processing technology, medical technology, nursing technology and many other technologies. The latter interpretation gives us a broader view of technology in education. When we approach it from the perspective of learners’ personal needs, the factors under consideration for instructional design are numerous and complex. Fortunately, ICT is a powerful tool to deal with such complex problems and is now applied in almost all disciplines to solve complex problems systematically and to enhance their expertise. We can describe the complexity of learners with a relational database and plan a scheme for future perspectives adapting simulation technology.

In this context, we can borrow ideas from other areas of technological expertise.

From the technological perspective, we can conceive four steps -- metaphors, images, models and propositions -- to create an entirely new instructional process for designing autonomous learning. Creative instructional design proceeds from ambiguous images to concrete procedures, to learning materials and to tangible outcomes. Teamwork requires a framework for creating sharable ideas and common outcomes from diversified participants. Common metaphors provide a framework for generating sharable images, allowing us to proceed to the more concrete process of developing learning activities. In developing the course ‘Introduction to Instructional Technology’ for a large class comprising more than two hundred students, we chose two metaphors as our framework and followed the MACETO model for instructional design and a set of propositions for learning development. The five-stage framework of transferring instructional knowledge and a logo representing five norms for effective team learning are still at the stage of hypothesis and are to be confirmed by further scientific research.

**Concept or Aims:** Collaborative and autonomous learning for large-size class

Any design requires a final goal for effective procedure from ambiguous expectation to concrete outcomes.

**Metaphors:** Brewing technology and paragliding technology

Brewing technology depends on biological changes in fermentation and paragliding technology is based on natural laws of aerodynamics and meteorology. These metaphors suggest relatively passive intervention or facilitation in the changing learning process. Despite such passivity, very careful attention to the learning process and scientific knowledge are required to produce effective outcomes.

**Images:** Images emerge from the metaphors common to instructional designers. We develop many images as figurative elements for designing flexible instruction: we show only two of them here. Images make it easier to arrive at a consensus among instructional designers, material producers and teachers. One author (Nishinosono 1978) adopted this approach in the late 1970s at first time and has further developed it since then to clarify internal structures using figurative representation. (see Figure 6).
**Models:** Models represent more tangible relevant aspects of instruction. The most important model for this instructional design is the MACETO model, which represents meaning (M), actions/activities (A), contents (C), environment (E), tools (T) and outcomes (O). This model consists of two parts: internal conditions and external conditions. Instructional design starts from arranging internal conditions to enable students to learn autonomously. The meaning of learning is of high priority and provides us with an orientation to learning activities as a whole. (see Figure 7)

**Hypothesis:** If we succeed in arranging learners’ internal conditions meaningfully, they can overcome externally difficult conditions and work hard autonomously.

**Propositions:** Instructional design heavily depends on empirical and tacit knowledge and know-how that is difficult to transmit to other instructors through media. To overcome this difficulty, we must train instructors to express their experience in the form of models and propositions. Only five propositions out of the 65 that emerged from one lesson are listed in Table 2 as examples.

<table>
<thead>
<tr>
<th>Table 2. Examples of Instructional Propositions (five propositions out of the 65)</th>
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<tbody>
<tr>
<td>- Transformation from image to key concept, graphic presentation and modeling is indispensable but hard for student teachers to achieve. Modeling is much more difficult than the previous step.</td>
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<tr>
<td>- Realization of autonomous learning requires cultivating students’ heightened attitude towards learning. To cultivate such an attitude, it is effective to require that students complete a framework sheet (MACETO format) each time before they can organize learning by themselves.</td>
</tr>
<tr>
<td>- Alternative strategies of degrees of freedom in learning: 1. When we increase the degree of freedom in learning and give more initiative to students, learning results in a wide range, from excellent to poor, in quality and quantity. 2. When we decrease the degree of freedom in learning and give less initiative to students, learning results in a reliable but mediocre outcome of both less excellent and less poor quality.</td>
</tr>
<tr>
<td>- To manage a large group of students who learn autonomously, it is effective to form groups and clusters of groups, encourage active participation and let them recognize their responsibility towards autonomous learning.</td>
</tr>
<tr>
<td>- To make learning meaningful, it is effective to start the lesson from one’s earlier experiences relevant to instructional contents.</td>
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</tbody>
</table>
In the conventional procedure of instructional design, we start from identifying educational goals, then specify instructional objectives, develop a teaching process, implement instruction and evaluate outcomes. On the other hand, in the case of starting from identifying learners’ needs and motivations, we immediately confront complex problems, so we must proceed to clarifying the meaning of learning, assessing learning outcomes, encouraging learning activities, specifying instructional contents and arranging the learning environment. In this circumstance, teachers are expected to develop their professional expertise, deepen their experience and communicate with colleagues and professionals on the Web, even at a distance, in order to enrich their professional competencies. We need to explore a new means of communication to promote effective sharing of their experiences.

**Hypothesis:** Our experiences with instruction are accumulated tacitly as well as explicitly, of which explicit knowledge can be described in a set of iconic and/or figurative representations and formal propositions to be easily communicated among instructional professionals for enhancing the Right to Learn.

Effective sharing of experiences in practical instruction requires a common framework to conduct research and report the result and other expertise. We start to generate intuitive and creative ideas by referring to the tacit knowledge emerging from our past experience. The concern in this paper is to develop a framework instructional design for a research method for formulating explicit knowledge in the forms of figurative and iconic representations, as well as formal statements and propositions.

### 5. CONCLUSIONS

Considering the diversified backgrounds of learners, team learning is adopted to accommodate such diversity and to allow all those involved in teamwork to display their different talents and capabilities for collaboration. His kind of instruction requires highly developed technology to design complex learning situations. In the process of developing educational courses, there are four possible approaches for applying a rational procedure for instructional development: practical syllogistic derivation from educational norms to actions, application of scientific findings, learning from other’s experiences and refinement of intuitive and creative ideas. Actual instruction is too complex to manage from a single concept. It is impossible to cover the whole process according to only one specific scientific approach. Learning from other designers and practitioners is always very fruitful. At the same time, we often face many entirely unfamiliar situations, but nevertheless have to conduct our instruction. We cannot wait for knowledge to emerge from scientific associations or for information from others’ experiences. In many cases in daily teaching, we start from our intuitive ideas and confirm their validity empirically.

The authors started from intuitive and creative ideas referring to tacit knowledge hard to express verbally but certainly embedded in their own experience and the adopted concept of ‘education as technology’ and they developed a framework of ‘metaphor, image, model and proposition’. In the beginning we may express these ideas in the form of metaphor and iconic representations more easily than in strictly logical statements. It was confirmed in the instructional course that young students were quite familiar with expressing their ideas in non-linguistic ways and started expressing their original ideas, discussing the issues and refining them towards final concrete outcomes, or products of instructional materials, models representing the instructional situation, and logical statements and propositions convenient to revise later or to communicate with their peers in written form. In this process, continuing communication and critiques among students through the Web were indispensable to encourage their active involvement. The authors collected their experiences from the abovementioned courses in the form of statements, judgmental propositions or empirical laws.

Education has become too difficult to tackle by teachers working alone. They need to help each other, obtain public support and communicate personally with students, colleagues and local community. ICTs, including ubiquitous equipment, are very powerful tools to facilitate mutual communication and, in this sense, to contribute to a truly universal education. Nevertheless, it requires us to become more imaginative and creative and to develop scientific procedures in pursuit of a rationale for instructional development in our professional discipline. Thanks to recent technological developments in qualitative and quantitative analysis, we can easily investigate the validity and relevance of empirical knowledge during real classroom instruction. For this purpose, we need to develop a scientific procedure to clarify our experiences and refine them to be able to communicate with each other through international networking.
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REUSING EDUCATIONAL PROCESSES USING A CBR APPROACH

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ABSTRACT
Human works can be resumed as a set of stratified process, especially in educational context. One of the possibilities for improving teaching and learning processes, and consequently, the knowledge flow, is to explore successful past experiences, resulting from the modeling and execution of previous processes. This work presents Thoth, a web-environment which aims at knowledge reuse, during the planning, design and execution of teaching and learning activities. This approach is integrated with a Case Based Reasoning approach, also described in this paper, with workflow systems and the use of ontologies.

KEYWORD
Workflow, reuse, knowledge management, learning, CSCW.

1. INTRODUCTION
In the educational context, we face with continuous modeling and execution of processes. A process is a series of activities, which represent actions or operations, conducing to a goal. We can exemplify the educational context with learning, teaching and scientific scenario.

Human learning does not take place on a single level, but it is a stratified process. This characteristic is worldwide accepted as a didactic principle. The way in which the educational system throughout the whole world is organized is an acknowledgement of this. One cannot send a child to university first. He must start in the first class and then progress year after year to the higher levels of education. Unless he/she has mastered a sufficient amount of the knowledge to form a firm enough base on which to build the knowledge of the following year, he will not make progress in the next class.

Another simple and practical example is the fact that one has to learn to count before it becomes possible to learn to add and subtract. Suppose one tried to teach a child, who had not yet learned to count, to add and subtract. This would be quite impossible, and no amount of effort would ever succeed in teaching the child to add and subtract. This shows that counting is a skill that must be mastered before it becomes possible to learn to do calculations. This means that there is a sequence of activities, a process, which is to be observed in teaching. Certain things have to be taught first, before it becomes possible to teach other things.

Research and scientific organizations have the aim of creating and to disseminating knowledge. The scientific knowledge bears peculiarities that differentiate it from operational knowledge. Whereas the business environment deals with data from administrative procedures and production procedures, the scientific environment works with data originated from the performing of experiments, simulations, calculations and application of mathematical models, being more complex and more unstructured, and with greater need for semantic control. Experiments, simulations, calculations and application of mathematical models can be understood as activities or sub-processes in a scientific context.

For the construction of scientific knowledge, research work is carried out which can be described as a discovery process, an investigation of a fact or confirmation of hypotheses. Scientists plan their research by designing sequential steps that utilize models, data, tools and other artifacts. The better specified and performed the activities contained in each research job are, the better and more reliable the results achieved will be, and, consequently, the better competitiveness of the institution will be.
Success in the performing of the activities depends on several factors, among which, the choice of methods, required competences, the appropriate tools and the interest of the group involved in performing the work. It can be concluded that the use of the past experiences offers a learning opportunity and expedites activity planning and execution. Knowledge about previous research can increase work efficiency and quality so as to allow for successful practices being reused, the notion about how the data had been acquired and previously handled.

A workflow management system, in this environment, aids activity planning and allows for control and coordination of these activities. Besides, the information generated during the planning and execution of the work can be considered as documentation of the activities. However, the workflow system does not have as its objective supporting the collaboration among the professionals, faster knowledge identification and creation, nor facilitating reuse of the best practices. That is the Thoth objective.

The Thoth uses the information recorded in the workflow system with the main purpose of allowing for the reuse of acquired knowledge in the educational activities previously executed, the visualization of information about past activities and collaboration among users. The CBR (Case Based Reasoning) approach is used to reach such aims. The CBR approach takes advantage of the knowledge obtained from previous attempts to solve a similar problem. Similarity is important because scientific activities bear specific characteristics which will be further detailed in next section.

System development has been built from observation of the work made by students, teachers, and researchers at an Hydrology Laboratory and Environmental Studies, which, in this text, we will call it of LabHid (an hypothetical name to respect the blind review).

The paper is organized as follows. The second section describes how an educational work can be reused and why. The third section explains the workflow management system and the way it is used in the educational environment. Section four presents the Thoth and how the CBR was implemented. Finally, section five presents conclusions and future work.

2. REUSING EDUCATIONAL PROCESS

Reusing processes is a manner of reducing errors, improving already known processes and execute processes in a faster way.

We find several approaches related to reuse educational content, as the learning objects, which are defined as any entity, digital or non-digital, which can be used, reused or referenced during technology supported learning. Examples of Learning Objects (LO) include multimedia content, instructional content, learning objectives, instructional software and software tools. In spite of the success of proposals in reuse educational content, little attention was given to reusing educational processes. In this section we will talk about two kind of educational processes: the scientific and the teaching process.

To accomplish their scientific work, a researcher collects and analyses a great amount of data and information from many sources, such as text and spreadsheet documents, database tables, besides executing simulations, and constructing or adapting models. An important phase to completing these activities satisfactorily is planning. During planning, researchers define the strategies to obtain the answers and solutions to the problems which motivated the research.

Planning, in a scientific context, means establishing which and how simulations need to be done; locating, constructing or adapting models and data, defining documents that should be consulted and finally defining adequate sequence for activities which need to be executed. This task is normally complex because of many factors. Sometimes research demands knowledge from different domain areas or a high degree of specialization. The multidisciplinary character makes it necessary to consult information sources from other domains or collaborate with specialists from these domains. In LabHid, for example, the projects are developed with the participation of biologists, engineers, mathematicians, statisticians, sociologists, among others.

Besides, it is common to find a great amount of data and information without use; in these cases, location of more adequate items becomes harder, extra effort being necessary to filter it. On the other hand, little-explored domains have little information, which renders work execution harder, it being necessary to adapt models for the amount and quality of existing data and information. In LabHid, this occurs when a research
work is about a little-explored river or region; in these cases statistical models are needed to adequately the data.

Also, it is important to observe that activities are normally experimental; thus it is possible perform modifications in those activities even when they are already in execution. When unexpected results come from simulations, for example, new activities can be necessary or subsequent activities can be discarded.

In scientific procedures, the reuse of processes, and sometimes only the observation of information about these processes, prevents mistakes to be repeated and allows doubts to be eliminated, providing economy of time and resources.

Related to the teaching context, new teachers receive little guidance about what to teach or how to teach it. Learning to teach well is slow, is a difficult work. Managing a classroom, choosing or creating curriculum, developing sound instructional strategies, accurately assessing student understanding, and adjusting to student needs are complex tasks, and new teachers need time and support to develop the necessary knowledge and skills. However, a way of help novices is the possibility of they watch the experts and develop their craft under guidance. That is, analyze and reuse successful teaching process of experienced colleagues.

3. WORKFLOW MANAGEMENT SYSTEM ON EDUCATIONAL CONTEXT

A workflow management system is used in the control of organizational processes. The workflow technology was conceived for the automation of work, allowing for the reduction of costs through the use of automated tools, in addition to the optimization of transition among the activities in a process and the distribution the necessary resources for process execution [1].

Success in the management of the standard processes in commercial and industrial enterprises motivated the use of these systems in other application areas such as distance learning [2], decision processes [3][4] and scientific work [5][6]; in the latter case, the systems are called scientific workflows.

As explained in the previous section, educational work can be described as a collaborative act to create knowledge and to solve a problem. Besides, complex activities can be decomposed into simpler activities and, in this case, educational work is comprised of a group of processes.

Educational workflow has the function of aiding the control, execution and documentation of scientific work. The differentiation of these systems in relation to the traditional workflows lies in the way that educational activity is accomplished, which demands functionalities not supported by a traditional system. As described in [6], the following aspects should be supported so as to support the scientific activity, but can be interpreted to support educational activity too:

− Incompleteness: educational workflows can be executed even when their definition is incomplete, being built progressively during their execution, they do not need to be entirely defined before they are executed.

− Partial Reuse: educational workflows differ from traditional ones because they are considered as construction blocks, and processes can be grouped to create another process.

− Dynamic modification: educational workflows can be redefined during their execution. For example, when an activity fails, it may be necessary to execute other activities to compensate for the problematic activity or to fall back to a previous activity.

The information recorded in workflow systems show how activities and processes are executed. In educational procedures, the observation of these information prevents mistakes to be repeated and allows doubts to be eliminated, providing economy of time and resources. Our approach, called Thoth, was conceived on the premise that this information is, in fact, an important resource of organizational learning and an important aid for the design and the execution of the educational processes. However, this resource is sub-used due to lack of appropriate interfaces and strategies for search, filtering and visualization [7].

The characteristics of the environment, its processes and activities should be observed to develop these devices appropriately. In a educational context, it is common to modify parameters, strategies and approaches and then re-execute activities. Besides, every time a problem is studied, perception about it changes, because researchers discover more knowledge about it. Thus, each professional tends to execute the activities in a different way, in agreement with his familiarity with the subject studied.
These factors influence directly in the way that activities and processes are stored in the workflow system and also in the way they should be reused. While operational processes obey the paradigm model-instance, where the instances are faithful to the models; modifications are common in the scientific process, which makes each instance represent a different case and offer different opportunities for learning.

4. THOTH

The Thoth has as its purpose allowing for the reuse of the existing knowledge in the educational activities stored in the Workflow Management System. A researcher can use the system to consult and reuse the definition of the model of the past processes performed when he/she plans his/her own activities, to consult information of similar activities during the execution of his own activities, to interact with other users that have participated in the design or execution phases in similar processes and activities.

The Thoth environment is detailed in Figure 1. First the activities are drifted; during these activities, the user can search by past similar processes, see and reuse its information through the interfaces provided by the Process Identification module. The same aid is provided at the moment of activity execution by the Activity Identification module. The differences between these modules lie in the kind of facilities expected at each moment, when planning the educational process needs a global view of the processes, while in the execution time the details of activities must be explored to fully understand the way this was accomplished. In both cases, the user can communicate with the other researchers who took part in the processes or activities being consulted through an instant messaging tool provided by the Collaboration module.

The Similarity-Reasoning module is responsible for the definition of similarity between the processes and between the activities. This is done with the use of the ontology and the results are stored for subsequent use by the search module handling the user’s query. Similarity is necessary because the Thoth uses the CBR (Case Based Reasoning) approach, as explained in the next topic.

![Figure 1. Thoth Environment](image)

![Figure 2. Ontology based model](image)
of the appropriate processes that should be returned. For instance, if one mathematical model succeeds another model, the search can try to locate processes where the models are designed in the same way.

At the moment of activity execution, the comparison with the similar activities previously executed allows for doubts and insecurities about methods, tools and other aspects to be removed. Also, it can be interesting to compare the results of experiments or simulations. However it is important to emphasize that this comparison in execution time is very costly, and it is made only when the user asks for it.

Collaboration enables communication among the users involved in the process being designed and the participants of similar activities already executed. The Thoth provides an instant messaging tool allowing for this communication. Communication allows that issues about some process or doubts raised after the process browse can by debated with an activity performer.

### 4.1 CBR Approach In Thoth

The Thoth uses the CBR approach (Case Base Reasoning) [8] to search for information from activities and processes, which could be useful for the accomplishment of educational work. CBR is a problem solving paradigm which proposes solutions through the comparison of the current case with past experiences, being an approach widely used for recovery of information in knowledge based systems [9].

The case is the central CBR component, this being the representation itself of a past experience, containing the problem description and the solution adopted. A usual CBR’s cycle is composed of four main tasks [8]:

1. The first step is the recovery of cases similar to the current problem, followed by reuse, when the most appropriate case is selected and analyzed by the user. Afterwards, occurs the adaptation corresponding to the necessary modifications for the case recovered to become useful in the solution of the current problem. Finally, the new occurrence is stored with the solution adopted in case database for the future reuse.

2. In Thoth, the approach is performed by raising the analogy between process instances and the cases. As previously affirmed, the approach is necessary because educational activity deals with knowledge which is in constant modification; this volatility changes the vision of the human resources of the organization and, lastly, of the community about the problem studied.

3. The other important aspect that should be analyzed in the use of CBR is the criteria used to determine the similarity among the cases, the workflow instances. The similarity concept is related to the usefulness that a previous case would have in the solution of the current problem, being too complex to be defined [10]. In addition to the similarity definition, usefulness is intuitive and context-sensitive. In the scientific area, usefulness is related to the area studied, to the models used, to the data manipulated, and the data or information created during the process and others.

   So, to enable the recognition of these characteristics, the reasoning process executed in Thoth is accomplished with the aid of ontology which allows for the identification of the concepts related with processes and activities. Ontology allows, in similarity reasoning, for semantic aspects to be identified and considered during the calculations in a computationally-feasible manner.

### 4.2 Classification Process

The approach for classification and search used in Thoth is similar to one the usually found in information retrieval systems [11] [12]. Initially, a classification is done when the characteristics that categorize the processes and the activities are identified. Then, this information is used when a user performs a search.

Classification is done when process information is stored in the Workflow System and it has, as a result, a set of ontology concepts that can be associated to the process being classified. For the identification of these concepts, the analysis of the resources(documents used, manipulated data, etc) attached to each activity from the processes to be executed. This allows for first the activities and then the process being associated with the ontological concepts.

This analysis is possible because the user can identify what ontological terms are related to each resource type. This process is aided by automatic classification strategies. When the resource is a text, the latter could be mined looking for the identification of ontological terms related to it. For other types of attributes, such as images, maps, tables, etc., metadata analysis allows for the same kind of association.

The identified concepts work as process and activity descriptors. The storage of these descriptors is
accomplished in a similarly to the proposal for [13]; in this approach, the descriptors are stored with an id for the classified objects (in the case of Thoh, activities and processes) in a group of database tuples, as can be seen in the figure 2.

4.3 Search Process

The search process starts with the selection of the descriptors as user request or by the automatic capture of these characteristics in a modeled process. During the search, the descriptors are analyzed in order to define the similarity degree with the processes previously executed and stored in the workflow system database.

4.3.1 Similarity Definition

The main activity accomplished during the search is the definition of similarity among the processes, which makes the identification of those that can be useful in the current situation possible. This activity is sensitive to the ontology structure, i.e. to class organization and existing relationship types.

The ontology was built as a hierarchical structure, using hyponymy (is-a relation). Ontology facilitates the representation of activities and processes descriptors and makes the use of most detailed knowledge about the domain in the definition of similarity possible. These characteristics are interesting when there are not enough works linked to the selected descriptors; in these cases, it is possible to seek for similar concepts to the selected descriptors.

Several approaches were analyzed for the similarity definition among ontological concepts for the definition of similar concepts. Two works are selected as a guide for the definition of our strategy: one developed by Rodriguez [14] and the other developed by Bergmann [15]. In both, calculation is performed through the computation of intra-class similarity and of inter-class similarity. Intra-class similarity is calculated through the common properties of the classes compared. These properties can be identified in the immediate super-class that subsumes the classes being compared. Inter-class similarity has the objective of exploring the existent semantics in class hierarchy.

4.3.2 Performing The Search

As result of search requisitions, a SQL query is generated. The query is done on the table that links the ontology with the processes, described previously.

First, the SQL query contemplates only the original concepts selected by the user or identified automatically in the processes. In this case, the query is similar of the one shown in figure 3.

In this example, the user selected that he wanted to visualize processes related with the Rio Paraíba do Sul basin and where the OTEQ model has been used. If the amount of returned processes is not enough, a second search is accomplished. In this case, the query is expanded with the concepts identified as similar through the method explained in section 4.4.1. In this case, the new query would be similar to the one the shown on figure 4.

When he query is executed, the primary keys of each process are captured; thus it is possible to access process information through the construction of appropriate interfaces, as presented in illustration 5. In this interface, visualization of a process and of more relevant information is possible. Through process diagram, it is possible to navigate to the activities, extracting the information wanted. On the left, it is possible to access the artifacts used. It is also possible to identify the participants and send them emails or messages by instant messaging tool.

```sql
select process.id, process.name
from process p, meta_table m1, meta_table m2
where p.Id = m1.Id
and p.Id = m2.Id
and m1.TERM_LABEL = "PARAIBA DO SUL BASIN"
Figure 3. Generated query with original selected concepts
```

```sql
select process.id, process.name
from process p, meta_table m1, meta_table m2
where p.Id = m1.Id
and p.Id = m2.Id
and (m1.TERM_LABEL = "PARAIBA DO SUL BASIN" or m1.TERM_LABEL = "SÃO FRANCISCO BASIN")
and (m2.TERM_LABEL = "OTEQ" or m2.TERM_LABEL = "OTIS")
Figure 4. Generated query augmented with similar concepts
```
5. CONCLUSION AND FUTURE WORK

The Thoth brings a new approach to knowledge reuse in the educational environment, by aggregating a workflow management system, CBR and ontology. Some proposals are found in literature to support non-business work with a workflow system, as for example the BOE systems [16], the WASA systems [17], the conceptual scientific CPSE prototype [18], among others. None of these uses the CBR approach to enable process reuse; the CPSE for instance, allows for visualization of all of the occurrences of a process. The BOE allows for the reuse, but a keyword search is done to locate the process. Moreover, a collaborative module was developed with the purpose of enhancing knowledge exchange among the researchers.

We are focused on the development of classification, similarity reasoning and search strategies. The next step comprises the enhancement of the collaborative module with new functionality to allow for more participation in the design process of the researchers consulted (Collaborative edition of activities and process). Other future work comprises a modification to allow for use with other workflow systems, through the development of a prototype following the WfMC standard [19].

REFERENCES

A CASE STUDY OF INTRODUCING E-LEARNING ACTIVITIES IN THE TRADITIONAL EDUCATION

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ABSTRACT
The demand for both flexibility and quality in learning guide several institutions to explore the efficiency of models for blended learning (combining traditional forms of instruction and online learning). In this work we present the integration of online learning activities in an undergraduate university course, in order to study students’ attitudes and satisfaction in relation to these activities. First results of our research indicate that factors affecting the effectiveness of the hybrid design include: the elimination of any possible technical problems, the organization of learning activities with concrete and understandable learning objectives and the careful management of any change in the students’ assessment methods. The conclusions of this study can be useful for improving the design of hybrid mode learning.

KEYWORDS:
ICT in Higher Education, Blended Learning, Action Research.

1. INTRODUCTION

It is generally accepted within the members of the Academic Educational Community that it is necessary to do whatever possible to help students develop the skills of critical, creative and combining thinking. In particular, there are demands for the university sector to provide for a larger and more diverse cross-section of the population, to cater for emerging patterns of educational environment and to include technology-based practices in the curriculum (Renner, 1995). The prerequisites for learning, which are the quality and quantity of participation and the sense of being a member of a community seeking knowledge and learning, are achieved through the effective integration of the Internet Communication Technologies (ICT). The asynchronous ICT can facilitate simultaneous both independent and cooperative learning experiences (Garrison & Cleveland-Innes, 2003; Swan, 2001). What makes the blended design of learning process particularly effective is its capacity to facilitate the community seeking knowledge (Garrison & Kanuka, 2004).

By the term “hybrid” or “blended” learning we refer to forms of education which combine activities taking place in traditional places (i.e. classroom, laboratory) with the use of synchronous of asynchronous educational activities offered from a distance with the support of synchronous technology (e-learning activities) (Hamburg, Cernian & Thij, 2002). Online learning (e-learning), as with any mode of learning, is judged on its effectiveness to provide quality learning experiences to the target student group (Kirkwood, 1998; Bates, 1997).

The up to the present day available research provides proof that hybrid learning can be equally or more effective and efficient compared with the model of entire e-learning and with the model of completely traditional learning. The students participating in programs of blended learning achieve the same of better learning results besides being more contented with the combining process (Garrison & Kanuka, 2004).

There are research results which prove the improved performance of students who participate in blended classes (Heterick & Twigg, 2003; Twigg, 2003) (e.g. 19 out of 30 researches record improved results while the 11 remaining show no statistically significant difference. At the same time higher scores in the traditional examinations are recorded as well as improved understanding ability, better response to the subject from the
students and greater satisfaction/contentment with this teaching method compared with the traditional one (Heterick & Twigg, 2003), also reported by Garrison & Kanuka (2004).

- All the same it is, of course, obvious that there are problems for the students such as the following ones indicatively:
- The fewer the demands for physical appearance in the class are interpreted for many students as less effort on their part.
- Generally a clear lack of skills concerning the management of learning time on the students’ part is recorded.
- Acceptance of responsibility on the students’ part for the organization of personal self-manageable and self-conditioned/self-defined plan of learning is hard.
- Several students have difficulty dealing with the more advanced technologies.
- Finally a difficulty of understanding the “logic” of the blended organization of the learning is recorded.

In order to deal with the problems mentioned above, we suggest that part of the preparation for the adoption of the blended model be the understanding of how the students evaluate e-learning activities which are offered within the frame of a traditional lesson. To this direction we offer e-learning activities, but at the same time we also record the students’ attitudes, reactions, opinions, suggestions through an appropriate questionnaire.

In this article we support the opinion that the blended organization of education can form the trainees’ proper process of adjustment (besides standing as an example for the realization of combined educational programs in contemporary University) with regard to the learning needs it generates and the scientific-professional skills required by the contemporary academic instruction (Young, 2002). It appears that the blended education emerges as an interesting learning model which could allow educational organizations to help their students adjust from the traditional educational experience, to the e-learning in small, gradual steps so that this change is more easily manageable and comprehensible by them, and the trainees are supported to develop the skills required (i.e. management of free time) (Aycock, Garnham & Kalet, 2002).

2. EDUCATIONAL ACTIVITIES

In this unit we present the educational activities which we organized within the frame of hybrid education in pre-graduate level.

For the implementation of e-learning activities (both synchronous and asynchronous) the BlackboardTM Instructional Management System (IMS), was used (https://blackboard.lib.auth.gr).

Research method: for the investigative study of the activities we followed the model of Action Research (Checkland, P. & Holwell, S., 1998; Leh, 2002). According to the model the researcher participates actively in the materialization of the learning activity interacting with the trainees, recording their views, attitudes and suggestions and readjusting its design taking into account the recorded data. With the organization of these activities we wanted to succeed two targets:
1. offer the students experiences and practice in an e-learning environment as a complement to the theoretical part of the subject and
2. detect, record, understand and evaluate the students’ views and attitudes in relation to the quality of these activities.

The participants were: the teacher (Lecturer), the Teacher’s Assistant (Ph.D. candidate) and two Teaching Assistants as Action Research demands (students) and thirty five students (in pre-graduate level, 7th semester of studies).

We expect that the conclusions of this research will help us to the direction of changing the way of traditional teaching to hybrid (blended) teaching.

2.1 Implementation

We organized e-learning activities within the frame of the course “E-learning with the use of Information and Communication Technologies” (7th Semester of studies) using both synchronous and asynchronous services.

The data analysis, in details, included the following:
A) Winter Semester 2003:

- **Activity 1 – Handing out of learning material:** The learning material (notes, e-presentation, interesting links) were available through the Blackboard™ Instructional Management System (IMS).

- **Activity 2 – Discussion Groups:** Discussion groups were formed (Forum) and the students were asked to participate, pose questions, seek for answers and discuss about their surfing experience in the Blackboard environment.

- **Activity 3 – Teleconferences:** Two synchronous Teleconferences were organized (with the use of the Virtual Classroom service which supports communication based on chat and common projection of sites with the use of Group Browser). In the former the lecturer presented the futures of the Blackboard IMS while in the latter he presented sites relevant to the content of the subject, the information of which he discussed with the participants.

- **Activity 4 – Self-evaluation:** A self-evaluation test was offered including both closed type and open ended questions (short essay).

- **Activity 5 – Evaluation of the activities:** At the end of the course and having experienced all the above, students were asked to complete a survey questionnaire. Results are presented in Table 1.

B) Winter Semester 2004:

- **Activity 1 – Handing out of learning material:** The learning material (notes, e-presentation, interesting/relevant links) were available through the Blackboard IMS.

- **Activity 2 – Discussion Groups:** Three environments of asynchronous discussion (Forum) were created and the students were invited/asked to discuss the topics: “Surfing Experiences in Blackboard”, “Lifelong Learning Institutions” and “Impressions of the Teleconferences”.

- **Activity 3 – Teleconference:** A teleconference was organized under the subject: “e-Universities”. During the teleconference the lecturer (from his office) presented models of organizing e-Universities through the use of a typical chat service and properly prepared animations which were presented to the participants through the use of the Group Browser service. The participants (from their homes or – in cases where that was difficult – from the department’s laboratories) could ask questions and comment on the topics presented. At the end of the teleconference they were asked to record their impressions on the respective asynchronous chat environment (Forum).

- **Activity 4 – Project:** The students were assigned a project on the subject “Virtual Learning Communities”. The instructions on their projects were announced through the Blackboard IMS while a special support teleconference was organized during which the students could address (at certain times) the lecturer’s assistant for answers to their questions and for further explanations. The submission of the project was also held electronically via the Digital Drop Box service of the Blackboard IMS. Further to that, the participants were asked to record their impressions in a group of asynchronous chat.

- **Activity 5 – Self-evaluation:** A self-evaluation questionnaire was handed out about the control of their understanding level during the progress of the course. The participants were asked to answer the questionnaire and then fill in the evaluation questionnaire on all their e-learning experiences.

- **Activity 6 – Activity evaluation:** The students filled in an evaluation questionnaire on all the learning activities.

The basic orientation of the activities which were offered in the two semesters was generally the same, but there were improved differentiations which resulted from the experiences of the first time and from the lecturer’s greater familiarity with the technological environment. The more significant of them were:

- More interactive and participating teleconferences were organized (and not just simple demonstration/presentation of the learning material), with the essential and productive participation of the students.

- The interactive participation of the students was increased with the assisted offer of entrusting projects, help for their preparation and handing through some new additional teleconference activities.

The students’ answers with regard to the experiences from the activities of the blended education they attended are registered in the Table that follows. The data resulting from the second time (semester 2004) are presented in italics, in the second line of every question.
Table 1. Students’ attitudes

(n=41, SA=Strongly Agree, A=Agree, Un=Undecided, D=Disagree, SD=Strongly Disagree)

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA (%)</th>
<th>A (%)</th>
<th>Un (%)</th>
<th>D (%)</th>
<th>SD (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I could always connect to Blackboard IMS login web page without any</td>
<td>66</td>
<td>28</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>important technical problem</td>
<td>42</td>
<td>42</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2 I could always login to Blackboard IMS without any important</td>
<td>86</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>technical problem</td>
<td>56</td>
<td>39</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>3 After logging in Blackboard IMS, I could navigate to various</td>
<td>28</td>
<td>45</td>
<td>21</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>web pages without any important technical problem (e.g. web page</td>
<td>89</td>
<td>36</td>
<td>3</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>transfer delays, system failures)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 I could easily navigate in the Blackboard IMS and locate the</td>
<td>21</td>
<td>48</td>
<td>28</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>information I was looking for. I think it is a very user friendly</td>
<td>33</td>
<td>61</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>environment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 I had no problem downloading files with course material.</td>
<td>52</td>
<td>28</td>
<td>14</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>83</td>
<td>11</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>6 The Discussion Board (D.B.) service is user friendly. I had no</td>
<td>31</td>
<td>52</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>problem to compose and upload my messages</td>
<td>31</td>
<td>56</td>
<td>11</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>7 I consider D.B. as a satisfactory form of communication. I agree</td>
<td>31</td>
<td>24</td>
<td>38</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>that it should be more frequently used to appropriately support</td>
<td>50</td>
<td>33</td>
<td>14</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>various issues in the course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 I believe that D.B. can be used even more efficiently to support</td>
<td>21</td>
<td>45</td>
<td>24</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>the online exchange of ideas that would help participants to</td>
<td>44</td>
<td>42</td>
<td>11</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>elaborate in course material.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 I used the virtual collaboration service without any important</td>
<td>10</td>
<td>14</td>
<td>35</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>technical problems</td>
<td>25</td>
<td>28</td>
<td>8</td>
<td>25</td>
<td>14</td>
</tr>
<tr>
<td>10 I think that using the virtual collaboration environment was an</td>
<td>64</td>
<td>15</td>
<td>18</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>interesting learning experience (ignoring any technical problems)</td>
<td>64</td>
<td>31</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11 I think that the features of virtual collaboration can enable the</td>
<td>49</td>
<td>33</td>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>provision of even more interesting online learning experiences</td>
<td>50</td>
<td>36</td>
<td>11</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>(ignoring any technical problems)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 I took the formative test and I believe that the interface is user</td>
<td>44</td>
<td>34</td>
<td>22</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>friendly. This means that it was clear to me the way I should act</td>
<td>78</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>in order to answer the various questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Statement

SA A Un D SD

SA (%) A (%) Un (%) D (%) SD (%)
I think that such formative tests used sparingly during the course would be very helpful to self assess the level of my knowledge and understanding.

I would prefer to take the course final tests online in an environment such as Blackboard IMS, being appropriately supervised.

I would like to attend courses which make use of online activities than traditional classroom or lab based courses.

I think that closed type questions are adequate for the reliable assessment of students’ knowledge in a course strongly focusing on conceptual knowledge.

2.2 Feedback

We have taken feedback from students on what they thought of the whole module. From their answers it seems that:

- They generally approved of the systematic use of discussion groups (in asynchronous communication)
- The use of teleconference (synchronous action, collaboration) produced significant technical problems, but should they be ignored them the students appear to believe that interesting learning activities can be supported with this action.
- The filling in of the self-evaluation test on the Internet was easy. Moreover, they claim there should be relevant tests for the self-evaluation of the understanding level of the knowledge they get.
- Still, their intense reaction to the option of their being examined through the Internet in the official final examinations on the subject has been recorded, which also remains significant over the next academic year.
- This view of theirs should be rated along with the opinion that the use of closed type-question stereotypes is not the appropriate way to evaluate their knowledge.
- In the end, they seem to be very interested in and support the opinion of attending lectures offering more learning activities through the Internet.
- The interpretation of these data should be processed keeping in mind that the subjects are students at the Computer Science Department and consequently familiar to a great extent with Technology.

3. CONCLUSIONS

All in all, our experience suggests that a great interest on the part of the trainees is registered in e-learning activities. The acceptance degree is higher in case the activities offer the sense of satisfying learning experiences without being influenced from technical problems and support acceptable educational goals such as a better preparation for the evaluation processes on the subject. On the contrary, it has been registered that the trainees do not accept the suggestion that they should be evaluated through technological environments, which probably has to do with the skepticism they expressed in relation to the reliability of the evaluation with the use of cloze questions.

In conclusion we propose that the lecturer interested in integrating activities of blended design and organization should:

- Check the reliability of the technological solutions available in real-term condition of use
- Invest in the good organization of the learning activities the goal of which should be understandable by the trainees, and
• Avoid – in principle – to alter the traditional evaluation methods before obtaining the consent of all parties involved.

REFERENCES


THE STRATEGIC VIRTUAL CORPORATION – AN NEW APPROACH TO BRIDGE THE EXPERIENCE GAP

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ABSTRACT
As the knowledge drain in virtual organizations is much more significant than in traditional companies, an 'experience gap' between virtual corporations and traditional organizations may emerge over time. Hence, the often postulated advantage of the 'best-of-everything'-organization turns to a disadvantage. As a consequence, virtual corporations have to develop strategies to minimize the drain of experience between their different projects. Regarding the four effects of the experience curve there exist several strategies to bridge this gap. On an analytical base, this contribution depicts a new organizational concept for efficient project based collaboration among value creation partners to cope with the problems in virtual organizations such as knowledge drain, financial drain and inefficient learning processes. Referring to the theoretical concepts of virtual corporations, Porters value chain and the approaches of the resource-based-view and the capability-based-view, a new approach for the collaboration among business partners can be derived, which combines the advantage of loose coupled organizations with traditional forms of collaborations. The authors name this new organizational form “Strategic Virtual Organization”.

KEYWORDS
Virtual Corporation, Experience Curve, Experience Gap, Strategic Virtual Corporation

1. INTRODUCTION
Today corporations are confronted by a fundamental and sustainable change of their economic environment. Amongst others, new opportunities and risks face corporations, the competitive situation changes from local to global markets. One result of these increasing dynamism and complexity is the vast emergence of new forms of collaboration among business partners where they share risks, get access to new knowledge and markets and add new competencies (Prahalad, 1994). These developments are supported by the innovations in information and communication technologies (ICT) which enable new forms of inter- and intra-organizational partnerships. These different trends are the economic forces of an ever increasing number of partnerships and electronic markets. Since the 1990th a special form of partnership, which become more and more important in the economy, has been discussed in the scientific literature: the virtual corporation. At the same time knowledge management play more and more a pivotal role in management sciences. However, knowledge management in virtual organizations, in particular gathering of experiences and learning processes, is poorly examined recently (Child, 2005, Wirtz, 2000).

On an analytical base, this contribution depicts a new organizational concept for efficient project based collaboration among value creation partners to bridge problems in virtual organizations such as knowledge drain, financial drain and inefficient learning processes. This will be realized by not only rearrange primary processes in a value creation chain (Porter, 1985), as it is usual in common Virtual Organizations, but foremost by a strict separation of primary and supporting (secondary) function in the value creation process.
2. THE VIRTUAL CORPORATION

The first concept of a virtual corporation was outlined by Miles and Snow in 1984 (Miles and Snow, 1984). They described an electronically linked partnership as a future form of corporations, which they called 'dynamic network organization'. In cause of the intensive use of ICT this form of organization was named virtual corporation in later publications. Especially Davidow and Malone explained this special form of partnership in their seminal book 'The Virtual Corporation' (Davidow and Malone, 1992). As this form of corporation is more flexible than traditional types of organizations (Mowshowitz, 1994) virtual corporations promise to be an appropriate solution for the threats of fierce competition in a globalized and fast changing environment. A general definition of virtual corporations has been pointed out by Byrne (Byrne, 1993): 'The virtual corporation is a temporary network of independent companies, suppliers, customers, even erstwhile rivals – linked by information technology to share skills, costs and access to one another’s markets. It will have neither central office nor organization chart. It will have no hierarchy, no vertical integration.' In addition to this definition, Byrne characterized five key elements of virtual corporations. First key element is the intensive use of ICT which links the partners and replaces contracts by mechanisms of social control and loose arrangements. The second element is opportunism in cause of taking opportunities. The temporary character of cooperation and the absence of contracts enforce this opportunism. Third virtual corporations feature excellence, which can be realized by the combination of the partner’s core competencies. Thus, this 'best-of-everything' organization creates economies of scale and economies of scope (Hofmann, 2001). The cooperation bases upon trust, which is the fourth key element. Finally a virtual corporation is a boundless organization due to the integration of manifold partners such as competitors, customers, and suppliers, the collaboration bases on a so called coopetitive environment (Picot et al., 2003).

Referring to Bickhoff et al. four basic types of virtual corporations can be identified (Bickhoff et al., 2003). (1) The first type depicts a cooperation among partners which is governed by a central corporation. This can be described as a centralized network structure. In fact there exist a hierarchical structure and there are no equal partners in this network, thus this type differs from Davidow’s and Malone’s concept of a virtual corporation but in reality it exists quite often (Child and Faulkner, 1998). (2) The second type describes a virtual corporation that is coordinated by one single partner. This partner offers central services to partners but it has equal rights compared with them. (3) In the third type of virtual corporations, an independent coordinator, which is not directly integrated into the value creation process, the so called 'third party institution', offers central services. In this concept the third party institution is not separated from the production process. (4) The fourth type is determined by a common coordination of all partners. This form of virtual corporation characterizes the idealistic type of a virtual corporation where is no central control.

Virtual corporations feature excellence by combining partner’s core competencies. The main objective of this combination is the configuration of a ‘best of everything’ corporation. This refers to the concept of the value chain which was introduced by Porter (Porter, 1985). The value chain is an approach to reach competitive advantage through optimizing the value chain activities which can be divided in primary and supporting (secondary) activities. Primary activities contain the main business functions, such as inbound logistics, production, outbound logistics, sales and marketing, or maintenance. The secondary activities describe supporting activities, such as administration, (project-) management infrastructure, general management, human resources management, controlling, and government.

By analyzing every single value creation activity in the sense of process management, inefficiencies in the configuration of the value creation chain can be detected. With reference to the concepts of virtual corporation, value chain, resource-based-view and capability-based-view, a new concept, which we define as a “Strategic Virtual Organization”, can be constituted to overcome the deficiencies of existing virtual organizations.
3. THEORETICAL BACKGROUND – A RESOURCE BASED APPROACH

One of the current most influential views in management sciences is the resource based view, which is raised by Penrose (Penrose, 1959) who described a corporation as an accumulation of competencies. Wernerfeldt (Wernerfeldt, 1984) expanded this concept to a research focus next to the traditional competitive based view (Porter, 1985). This concept of the resource based view (Hamel, 1990) emerged in the research field of strategic management since the 1990th. The resource based view is grounded in the perspective that a corporation’s internal environment, in terms of its resources and capabilities, affect strategic action to a larger extent than factor of the external environment do.

The analysis of core competencies of a company stands in contrast to the approach of the competitive based view, whereas competitive advantages gain through specific resources and not through industry structures (Hamel, 1990). The resource based view promises to improve the understanding of strategy formulation in corporations which are dependent on intangible resources, especially knowledge. The discussion about the importance of resources in corporations is mainly influenced by the approach of the resource based view. Promoters of this approach point out that resources are the main drivers to gain a competitive advantage. Teece et al. (Teece, 1997: 512) define resources ‘as firm-specific assets that are difficult if not impossible to imitate.’ These resources can be classified into three categories: (1) Physical capital, (2) human capital, and (3) organizational capital.

Besides the resource based view and the capabilities based view there is the knowledge based view, which stands within the tradition of the resource based view. The recent scientific discussion about the importance of knowledge has been mainly influenced by Nonaka and Takeuchi (Nonaka and Takeuchi, 1995). They focus on the corporation level of knowledge and pointed out, that the success of Japanese corporations base on the efficient accumulation and utilization of knowledge. These corporations are more efficient in generating and saving knowledge than their European and American competitors. The high influence of knowledge in corporations is empirically proved by the experience curve in several contributions (Henderson, 1973).

Venzin, Krogh, and Ross (Venzin et al., 1998) described different categories of knowledge in corporations, such as explicit knowledge and implicit knowledge. Nonaka and Takeuchi (Nonaka and
Takeuchi, 1995) depict that the most important aspect of organizational learning is the management of explicit and implicit knowledge and the process of knowledge creation. The process of knowledge creation contains the combination of knowledge, socialization and the transfer of implicit to explicit knowledge and vice versa. At first this kind of learning takes place at the individual level of the employee then it expands to the team level and finally to the level of corporation (Grant, 1996).

Hence, the process of knowledge creation is of central importance within a corporation. The process of knowledge creation includes the following five main phases: (1) identifying knowledge, (2) generating knowledge, (3) utilizing knowledge, (4) transferring knowledge, and (5) storing knowledge.

The high importance of learning and knowledge management in corporations was already analyzed by Henderson (Henderson, 1973) in the 1960th: The concept of the experience curve was developed by the Boston Consulting Group in 1966 (Henderson, 1993a). This concept describes the coherence between costs and experiences in corporations. Several empirical studies proved that the working time of a special business process decreases with increasing experience which leads to decreasing costs (Henderson, 1973). The described experience curve is made up of the following four effects:

1. Learning-effects on employee’s level have a high impact of the progression of the experience curve. The implicit and explicit knowledge of an employee is increasing through every repeated business process. This knowledge can be used in running and following projects. The individual learning and the learning in teams are important factors in decreasing the experience curve (Henderson, 1993a). Referring to Porters value chain, learning effects can generated as well in primary and supporting functions of the value chain.

2. Specialization on core competences causes increasing experience and thus comparative advantages first of all in primary value chain activities. Moreover, experience and therefore efficiency will increase (Werther Jr., 1999).

3. Investments influence the progression of the experience curve favorably. Traditional corporations invest in production technology and ICT to save costs. Benefits of these investments cause decreasing costs. In virtual corporations it is important to invest in technology which is not bound to a specific project. Therefore, virtual corporations can generate benefits especially with investments in sustainable ICT, which can be used in multitude projects (Mertens and Faisst, 1995). Of course, investments are necessary in both, in primary and supporting functions as well. But the focus of investments is different in the two areas. Investments in primary fields of business will provide the generating of value, in contrast investments at the level of supporting functions often have the main objective to decrease costs, by sharing ICT infrastructure (hard- and software) and by implementing a shared platform for information and communication purposes.

4. Economies of scale describe that increasing output goes along with decreasing costs. Even if virtual corporations rarely produce bulk goods, this effect is still working in new network like organizations such as virtual organizations. Virtual corporations can extend their project capacity by using standardized business processes. Thus, economies of scale emerge in first order on the secondary level of the value chain.

4. LIMITATIONS OF THE VIRTUAL CORPORATION

The suggestion in this contribution is that the four effects which determine the experience curve in general, determine the experience and learning curve in virtual corporations to a large extend, too. However, there are already differences and specific threats which determine the performance of experience curve in virtual corporations. The main differences between virtual corporations and traditional corporation are, on the one hand, the temporal cooperation and, on the other hand, the configuration of autonomous partners (see table1).
<table>
<thead>
<tr>
<th>Organizational dimensions</th>
<th>Integrated corporation</th>
<th>Virtual Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization Structure</td>
<td>Formal and flexible</td>
<td>Flexible Network, flat</td>
</tr>
<tr>
<td>Decisions</td>
<td>Ultimately by fiat</td>
<td>By discussion and consensus</td>
</tr>
<tr>
<td>Culture</td>
<td>Recognizable, encouraging employees to identify</td>
<td>Pluralist, linked by overlapping agendas</td>
</tr>
<tr>
<td>Boundaries</td>
<td>Clear 'us' and 'them'</td>
<td>Variable</td>
</tr>
<tr>
<td>Management</td>
<td>High overhead</td>
<td>Minimal overheads</td>
</tr>
<tr>
<td>Power</td>
<td>From board to officio</td>
<td>Through possession of competencies in demand being the brand company</td>
</tr>
</tbody>
</table>

Due to the project orientation, there exist no stable relations in virtual corporations over a long period. This characteristic causes a loss of experience, when terminating a project and changing the partners. The reasons are the frequent reconfiguration of the partners in a value chain, the loss of project partners and thus, the loss of the knowledge of the player, and the involvement of new partners in the new project. In virtual organization with no focal partner, implicit and explicit knowledge is dispersed and no partner has the entire knowledge within the project. Hence, a retirement of partners leads to a knowledge drain. This effect is observable similarly at retirement of employees in traditional organizations. However, this effect is much more inconsiderable in virtual corporations (Manhart, 1998). Thus, the lost knowledge has to be generated again from scratch. In fact, as Mertens and Faisst explored (Mertens and Faisst, 1995, Mertens et al., 1995), virtual corporations use only a part of the acquired knowledge in subsequent projects. In case of the missing of a central organizational anchor and an integrated knowledge management, which is observable in the most cases of virtual organizations (Behrens, 2000), explicit and implicit knowledge remains decentralized in the partner corporations. Thus, unlike traditional corporations, virtual corporations with no focal partner, who permanently supports the project, can not save this knowledge in higher hierarchy levels or in a central headquarter. Hence, the advantage of the ‘best-of-everything’ organization turns to a disadvantage in this aspect. Every reconfiguration causes a loss of experience. Another disadvantage in the sense of experience curve is the loss of investments caused by the withdrawal of partners as it happens in traditional corporations, too. Thus, new partners have to make investments again. However, it is easier to keep explicit knowledge in traditional organizations, because of the possibility to implement a centralized knowledge management system with standardized ICT and interfaces on the basis of a relatively low fluctuation of staff. Additionally, the lower fluctuation of staff in traditional organizations, in comparison to virtual organizations (Pribilla, 2000), goes along with a lower fluctuation of implicit knowledge. Hence, subsequent projects can base on the former created knowledge. Figure 2 depicts the described aspects by compare traditional corporations with virtual corporations in the context of the experience curve. The experience curve in virtual corporations shows a gap between the end of a project and the start of another project. The succeeding project can not make use of the whole experience and has to gain lost experience again. Additional gains of experience will be lower with every new project. This progression is similar to traditional corporations and will trend to an optimum (Henderson, 1993a). Because of working in projects, the cooperation in virtual corporations is temporary limited (Gray and Igbaria, 2000). This limitation is an important element of cooperation in virtual corporations. On this account Rhode and Won (Rhode et al., 2001, Rohde, 2001) describe it as a fluid organization which links partners, changes their structure, add partners and remove partners. Virtual corporations never exist for a long time. The result is a life-cycle, which can be divided in four basic phases (Mertens and Faisst, 1995): firstly the preparation phase, secondly the phase where the partners get linked together, thirdly the phase of working actively on a project, and fourthly the fade of the virtual corporation. Due to these specific characteristics of virtual enterprises and their typically attributes of their employees, such as flexibility and open mind (Hofmann, 2001), knowledge drain is an eminent threat to these kinds of organizations. As the knowledge drain in virtual organizations is much more significant than in traditional companies, an ‘experience gap’ between virtual corporations and traditional organizations may emerge over time. As a consequence, virtual corporations have to develop strategies to minimize the drain of experience. Regarding the four effects of the experience curve there exist several strategies to bridge this gap.
Table 2. Limitations of Virtual Corporations and Solutions

<table>
<thead>
<tr>
<th>Limitations</th>
<th>Solutions</th>
<th>Organizational concepts from traditional organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination, Establishment/Existence of trust and common culture</td>
<td>Integration of a third party to serve for secondary functions in the value creation process chain</td>
<td>Holding concepts (Henderson, 1993b)</td>
</tr>
<tr>
<td>Communication</td>
<td>Joint ICT infrastructure</td>
<td></td>
</tr>
<tr>
<td>Commitment, drain of partners, lowering switching costs</td>
<td>Concept of “financial stocks”</td>
<td>Franchise concepts (Child et al., 2005)</td>
</tr>
<tr>
<td>Experience curve/learning process in project management and collaboration</td>
<td>Consequent separation of primary and secondary functions</td>
<td></td>
</tr>
</tbody>
</table>

5. THE CONCEPT OF THE STRATEGIC VIRTUAL CORPORATION

A solution to the problems and limitations of governing virtual corporations is the strict separation of the virtual corporation’s value chain in primary and supporting functions (figure 3). The experience gap can be minimized by establishing a focal, independent and permanently partner which is acting as a third party institution and who is concentrated on the provision of secondary functions for the virtual corporation. That implicates a structural turn in the organization of the virtual corporation from type 4 to a kind of “third party institution model” (see sec. 2). As Child et al. stated, a virtual corporation ‘needs a brain and a central nervous system.’ (Child, 2005: 186). Its main task is to ensure the coordination, communication, knowledge management and governance among the partners. Thus, the partners concentrate on core competencies on the level of primary value creation processes and outsource the supporting activities to the third party institution. The third party institutions’ core competence is the management and government of the virtual corporation, particularly process and project management. This central institution allows the partners to use centralized and standardized ICT, to establish a common culture and to establish a knowledge management. ‘For a virtual organization also requires strategic direction.’ (Child, 2005: 174) The task of the strategic management can be provided by the third party institution, too. In other words, the third party acts as another partner in the network who is specialized on supporting functions, whereas the other partners are specialized on specific primary functions.
Additionally a financial stock concept may serve to increase commitment among the partners and to reduce lock-in effects a Strategic Virtual Organization. In such a construction the Strategic Virtual Organization is organized as a joint stock company, where all partners of the virtual organization are linked together by a financial commitment. This strategic financial commitment decreases opportunisms and provide the evolution of trust among the partners. A partner that will leave the pool may easily sells the share to the community or to the third party. These kind of financial concepts are knows in practice, such as in the case of procurement communities, where the partners in the procurement network owns stocks of the focal partner organization. So this financial commitment helps to develop trust among all members of the virtual corporation, and reduce switching cost for the partners, because of the possibility to sell their shares when leaving the network. Finally such a governance concept is may be helpful to develop a shared culture.

To establish a successful collaboration among dispersed partners a technologically integrated ICT infrastructure is helpful. Already in 1996, Upton and McAfee (Upton and McAfee, 1996) defined three criteria on using ICT in virtual corporations. Firstly the partners should be interconnected as flexible as possible, to enable a fast and easy entry or exit of partners. Secondly, the ICT system should be based on standards, to reduce knowledge and experience barriers as well as costs to a minimum. Thirdly the ICT should support all business processes in a virtual corporation and should promote especially management functions, such as communication tools, which are far more important in a virtual corporation, because of the integrating function of such an organizational concept.

6. CONCLUSION

The virtual corporation is a modern organizational construct which allows corporations to face the new challenges in a hypercompetitive environment. The authors describe the advantages of this concept but they also display several disadvantages and limitation, especially the problem of the frequent reconfiguration and retirement of partners. This contribution analyses the existence of an experience gap, existing between different projects. Due to the specific characteristics of virtual enterprises (project orientated, timely limited, etc.) and their employees (flexible, open minded, etc.) knowledge drain is an eminent threat to these organizations. As the paper depicted, the effect is much more significant in virtual organizations than in traditional companies. As a result, an “experience gap” for virtual organizations emerges. Three elements can bridge this gap, the introduction of a third party institution which overtakes tasks in supporting value chain processes, a joint ICT infrastructure, and the strict separation of primary and supporting functions in the project oriented virtual organization. The conclusion leads to a new concept: the Strategic Virtual Corporation. Starting with these insights, further work needs to concentrate on empirical analysis of the experience gap and the concept of the Strategic Virtual Corporation.
REFERENCES


LEARNING ASSET MANAGEMENT KNOWLEDGE FROM TEXTUAL DATA OF ANALYST REPORT AND ACCOUNTING INFORMATION THROUGH TEXT MINING

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ABSTRACT
Text mining, one of the emerging fields of data mining, aims at acquiring useful knowledge from text data. In the asset management in finance task domain, although there exist various text data like accounting settlement or analysts’ reports, few research and development have been conducted. In [Takahashi et al, 2004a] we explored the feasibility to extract valuable knowledge for asset management through text mining using analyst reports as text data. And we found the effectiveness of keyword information. In this paper we make further research of analyst reports. From empirical study on the practical data, we have confirmed the effectiveness of using keyword information and numerical information together: (1) the effectiveness of keyword information is different by the direction of change of earning estimate; (2) the keyword of “Upward (or Downward) surprise in forecast” has strong effect to stock price return.

KEYWORDS
text mining, keyword extraction, analysts’ reports, stock price return, earning estimate revision

1. INTRODUCTION
In recent years, the environment surrounding asset management has dramatically been changing. The rapid progress of telecommunication technologies, such as the Internet, has eliminated the time lag on distributing vast amount of investment information. Although this kind of information contains valuable information for asset management, it is impossible to manually handle all information. It is an important task in asset management to make full use of such information more efficiently and quickly.

The efficient market hypothesis and the rationality of investors are the two key assumptions in the traditional finance theory [Sharp, 1964]. These assumptions require that every investor immediately processes all information and optimizes their actions and that security prices reflect all available information
in the markets. To prove whether market is efficient or not, many studies have been conducted [Shleifer, 2000]. But these studies analyzed the reactions against only numerical information that based on financial statement or analyst reports. Analyst reports, which are one of the important information sources for investors, contain both numerical and text data, which describe the state-of-the-art business conditions of firms. For instance, the text information about such as "business reconstruction" or "business restructuring" are not numerical data but have strong impacts to markets. So, the use of text information of analyst reports is indispensable to analyze financial market.

One of the problems to analyze text information of analyst reports is difficulty of handling text information. In order to solve this problem, text mining, which can analyze large quantities of text data systematically, is very effective method. Text mining aims at obtaining valuable knowledge from enormous amount of text data by analyzing the tendencies and correlation of the contents based on the change histories of the texts and the distribution of the keywords in the text data. An applicable field of text mining is spreading. For example, auto classification of text document, patent analysis and Web mining are interesting domain which text mining is applied for [Spiros 2003].

In financial analysis domain, text mining has begun to use. In [Wuthrich et al, 1998] they predict the movement of the stock indexes in major countries based on the text mining of newspaper articles published on WWW. In [Antweiler et al, 2001] and [Wysocki 1999], they analyze the relation among the text information written on Web bulletin boards and the fluctuations of stock prices. The numbers of literatures of text mining applied to finance are gradually increasing.

So far, we have reported the relationship between text information of analyst reports and stock prices [Takahashi et al, 2004a], [Takahashi et al, 2004b]. In [Takahashi et al, 2004a] and [Takahashi et al, 2004b], we extracted keyword information from titles of analyst reports, and we studied how stock prices move in existence of extracted information. We found that analyst reports contained valuable information that influenced to the stock prices. And we identified the same influence on manufacturing and non-manufacturing industries. We also found that multiple analysts reacted to the same information. As a result of eliminating such duplication of information, we succeeded to extract more valuable information from analyst reports. In this paper, we analyze analyst reports by combining text information with numerical information to extract more valuable information.

The paper is organized as follows. In Section 2, we explain the outline of our research and Section 3 illustrates the result. Then we conclude our discussion in Section 4.

2. OUTLINE OF RESEARCH

This section describes the outline of our research. The conventional asset management has not used text data systematically. This is mainly because there are few definitive methods to extract and evaluate information in text data. In our research, we firstly extract keyword information from analyst reports by morphological analysis and pattern matching. Then, we evaluate the extracted information by supervised machine learning using stock prices as the target concepts.

We construct a knowledge database from analyst reports in the following steps (see Figure 2.1 for the process flow):

1) obtain analyst reports via WWW or e-mails,
2) adjust the differences of the concepts in similar keywords,
3) extract keywords from the reports using morphological analysis and pattern matching,
4) evaluate the extracted information based on the stock price return,
5) store the keywords and the results in the database, and
6) repeat the steps 1 to 5 to construct the knowledge database.
After completing the construction of the knowledge database from the collected analyst reports, we can measure the influence of the report in detail. We use numerical information based on financial statement database to evaluate whether we can get more valuable information or not (Figure 2.2).

3. ANALYSES OF KEYWORDS AND STOCK PRICES

This section describes the result of the experimental analyses we have conducted. In these analyses, we apply the text mining procedure to the titles of analyst reports in order to analyze the influence of the report. We have extracted keywords from the titles of analyst reports. Then we have examined whether there are significant differences in stock price returns caused by the existence of the keywords. The following subsections describe the methods and the results of the analyses.

3.1 Data Used for Analyses

We use all stock data listed in the first section of the Tokyo Stock Exchange in the period from January 1st, 2001 to March 31st, 2003. There are 1,619 firms listed during the period. We classify each firms into manufacturing and non-manufacturing industries based on a definition of Securities Identification Code Committee. Using Thomson Financial Web service, we have obtained 77,256 analyst reports related to the listed firms. And we use the I/B/E/S Consensus Estimates as numerical data. The obtained analyst reports
have characteristic that the analyst coverage in the larger companies is greatly different from the ones of the smaller companies.

### 3.2 Extracting Keywords and Adjusting Differences in Notation

We have extracted keywords from the titles of the obtained reports. As shown in Table 3.1, we classify the extracted keywords into twelve groups after the difference adjusting. We also classify the keywords into three news types: Good, Bad, and Neutral News.

<table>
<thead>
<tr>
<th>NO.</th>
<th>Notation adjusted keyword</th>
<th>News type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increase in profits</td>
<td>Good News</td>
</tr>
<tr>
<td>2</td>
<td>Upward surprise in forecast</td>
<td>Good News</td>
</tr>
<tr>
<td>3</td>
<td>Downward surprise in forecast</td>
<td>Bad News</td>
</tr>
<tr>
<td>4</td>
<td>No surprise in forecast</td>
<td>Neutral</td>
</tr>
<tr>
<td>5</td>
<td>Business restructuring</td>
<td>Good News</td>
</tr>
<tr>
<td>6</td>
<td>Upward earnings revision</td>
<td>Good News</td>
</tr>
<tr>
<td>7</td>
<td>Downward earnings revision</td>
<td>Bad News</td>
</tr>
<tr>
<td>8</td>
<td>Rating &quot;Sell&quot;</td>
<td>Bad News</td>
</tr>
<tr>
<td>9</td>
<td>Rating &quot;Buy&quot;</td>
<td>Good News</td>
</tr>
<tr>
<td>10</td>
<td>Rating unchanged</td>
<td>Neutral</td>
</tr>
<tr>
<td>11</td>
<td>Upgrade of rating</td>
<td>Good News</td>
</tr>
<tr>
<td>12</td>
<td>Downgrade of rating</td>
<td>Bad News</td>
</tr>
</tbody>
</table>

### 3.3 Teacher's Signal

We use stock price returns as the target concepts to measure the influences of the keywords. The influence is measured as a difference of stock price returns before and after the analyst reports has been published. First, we classify the stocks into two groups: Group A, which contains keywords in the report title and Group B, which does not contain them. Next, we statistically test the differences of the average stock price returns between Groups A and B. We employ Welch's test to measure the differences of mean values, since there exists heteroskedasticity in stock price returns between the groups.

### 3.3 Numerical Information

As numerical information, we use change of monthly consensus earning estimate for next fiscal year (CESFY1). CESFY1 is the mean value of analyst’s forecast of next fiscal year earning. So, CESFY1 can be considered as next fiscal year earning estimate that the investors of the market expect on the average. CESFY1 has important information to stock price; especially the change of CESFY1 has a great influence on a stock price. We use change of monthly CESFY1. We classify data into two groups by using whether monthly CESFY1 changes upward or downward revision. We define upward or downward revision of monthly CESFY1 as follows:

- **Upward revision**: \( \frac{(\text{EPS}_t - \text{EPS}_{t-1})}{(\text{abs} (\text{EPS}_t) - \text{abs} (\text{EPS}_{t-1}))} > 0 \)
- **Downward revision**: \( \frac{(\text{EPS}_t - \text{EPS}_{t-1})}{(\text{abs} (\text{EPS}_t) - \text{abs} (\text{EPS}_{t-1}))} < 0 \)

where \( \text{EPS}_t \) : CESFY1 per share in month \( t \)

### 3.4 Analysis of Keywords' Influences

We first describe the effect of keyword information of analyst reports. Figure 3.1 represents how the mean values of stock price returns differ depending on the existence of keywords. As shown in the charts, the market reacts to Good News in positive direction and to Bad News in negative direction. The charts also indicate that the reaction to Bad News is larger than the one to Good News, which means the negative information from analysts has greater impact to the market.
We then have made further analyses on various sub-sets of the data. As a result of the analyses, we find that:
- manufacturing and non-manufacturing industries show similar result as the analysis on entire data,
- large-cap and mid-cap stocks are stably affected by the keywords, and
- small-cap stocks have no influence of the keywords.

3.5 Analysis by combining text information with numerical information

In the previous subsection, we confirmed that analyst reports had important influence to stock price and the effect of analyst reports did not depend on a type of industry, but it depended on a size of firm. In this subsection, we analyze whether this effect will change or not if we use numerical data with text data. We use the change of mean value of analyst’s forecast of next fiscal year earning per share. We classify data into two groups by using whether monthly earning forecast changes upward or downward revision. We define upward or downward revision of monthly earning estimate in subsection 3.3.

First we show the result of using all keywords (Fig 3.2). We first classify twelve keywords shown in Table 3.1 into three news types, Good News, Bad News, and Neutral News and next make same analysis in subsection 3.4.
As shown in Fig 3.2, we can find the same stock price reaction as the result of Fig 3.1; the stock price reacts in positive direction to Good News and in negative direction to Bad News, regardless of whether the earning estimate revision is upward or downward revision.

Next, we use only two keywords “Upward earning revision” and “Downward earning revision”. If an analyst uses the keyword of “Upward (or Downward) earning revision” in his/her report when CESFY1 changes upward (or downward) revision, it means that his/her earning forecast of a certain company is almost the same as market valuation. We show the result of analyses in Figure 3.3. We can see the same result as Fig 3.2. So when an analyst’s opinion is the same as a market, the effect of keyword of “Upward (or Downward) earning revision” hardly is different from that of other keywords.

Then we use other two keywords that are thought to have a strong effect to direction of earning estimate revision, “Upward surprise in forecast” and “Downward surprise in forecast”. If an analyst uses the keyword of “Upward (or Downward) surprise in forecast” in his/her report, it means that his/her earning forecast of a certain company is larger (or smaller) than he assumed previously. We can see a very interesting result in Fig 3.4. When the earning estimate changes upward direction and an analyst uses Good News in his/her analyst reports, the stock price reacts to negative direction. On the other hand, even when the earning estimate...
changes downward direction, if an analyst uses Good News in his/her analyst reports, the stock price reacts to positive direction very strongly. And even if Bad News is found, an effect of keywords is lower when the earning estimate changes downward direction. In other words, we find that an impact of text information of analyst reports is larger when analysts express their opinion opposite to the direction of average earning estimate revision.

4. CONCLUSION

In this paper, we have analyzed the effect of text information of analyst reports through text mining. We have found that analyst’s reports contained valuable information which influenced to stock prices. We have also identified that more valuable knowledge can be extracted from analyst reports by combining text information with numerical information. We have found that the effectiveness of keyword information is different by the direction of change of earning estimate. Especially the keyword of “Upward (or Downward) surprise in forecast” has strong effect to stock price return. And we have found that an impact of text information of analyst reports is larger when analysts express their opinion opposite to the direction of average earning estimate revision.

REFERENCES


GUIDELINES FOR WEBSITE DESIGN FOR ALL USERS

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ABSTRACT
The last five years has seen considerable interest in the use of elearning web resources by lecturers and teachers. Typically these web resources contain a considerable amount of content developed by the individual lecturers and teachers themselves as well as some content acquired or referenced from other external websites. In general lecturers and teachers are not trained in multimedia design and usability. Many reasons exist for this, including cost, time, and lack of awareness. To complicate matters further, students are coming from increasingly diverse backgrounds, including older people and people with disabilities. This paper argues that even a minimal set of guidelines can improve the usability of elearning resources developed by lecturers and teachers. Implementing a minimal set of basic usability criteria can affect considerable results. The paper first presents the suggested minimal set of guidelines and then provides an evaluation of the guidelines based on website usage trials that were conducted with students.

KEYWORDS
elearning usability

1. INTRODUCTION
Web accessibility can be defined as "anyone using any kind of web browsing technology must be able to visit any website and get a full and complete understanding of the information contained there, as well as have the full and complete ability to interact with the website” (Letourneau 2003). The focus is now towards "design for all", the integration of all users into the information society. Integration should include old people, people with disabilities and non-disabled people (Europa 2003).

Unlike a printed document, which is “fixed” in its medium, the look of a webpage depends on various elements, such as the display size, resolution, and color settings, the height and width of the browser window, software preferences such as link and background color settings, and available fonts (Nielsen 2001).

The visual experience for most users is the first thing they experience upon entering a website. Good-looking visuals provide a major opportunity for establishing credibility (Neilsen 2000). If a website is interpreted as being credible, users will trust the website, which means they will use it.

Users interpret websites as being trustworthy or untrustworthy (Cheskin Research 1999). Karvonen and Parkkinen carried out a semiotic analysis on the six most trusted and six least trusted websites (Karvonen and Parkkinen 2000) and identified various elements that contribute to the trustworthiness or untrustworthiness of a website.

Usability is important in website design. Usability is concerned with making systems easy to learn and easy to use (Nielsen 1993). If it is missing the website can alienate or confuse the user and can detract from whatever the website's main message, product or service is (Jessett 2001). Studies carried out by Morkes and Nielsen (Morkes and Nielsen 1997) indicate that users:
   a) Prefer to scan rather than read
   b) Want text to be short and to the point
c) Detest overly hyped promotional writing

Morkes and Nielsen also carried out a study to demonstrate users’ preference for concise web pages (Morkes and Nielsen 1998). They generated two websites that contained the same information. One website had three long pages. The second website had eight concise pages, which were shorter and contained less noise words. When tested on users, the shorter version of the website had a 159% better usability rating than the longer version had.

Various website accessibility issues have been documented. Tables should not be used to arrange content layout. Tables should only be used to represent logical relationships among data (i.e. text, numbers, images, etc) (W3C 1999a). Navigation should be usable without color (Nielsen 2002). Color should not be used as the only indicator of change. Other clues can be provided to users, such as emphasizing a section heading or including an arrow beside the current navigation item.

The literature review above suggests that while there are several sets of guidelines published, there is a need for a minimal set of guidelines to improve the credibility, usability and accessibility of websites. This paper identifies a minimal set of guidelines and then seeks to prove or disprove that the application of this minimal set of guidelines will increase the credibility, usability and accessibility of a website for every user. The minimal set of guidelines will be evaluated using several groups, including users with and without disabilities (W3C 1999b).

2. METHODOLOGY

Three main issues were considered in formulating the minimal set of guidelines for website design:

a) Credibility
b) Usability
c) Accessibility

Particular attention was paid to users with disabilities and the problems they face with website design. Common pitfalls in website design today were identified.

It is important to know the purpose of a website. With regard to web design, the following issues were investigated when devising the minimal set of guidelines.

a) Color
b) Component layout
c) Flash and other animations
d) Images
e) Frames
f) Cascading style sheets
g) Text
h) Tables
i) Navigation

The following were the minimal set of guidelines identified by the authors:

1. Limit the use of images and ensure a text attribute exists for each image.
2. Avoid the use of frames.
3. Component layout should be balanced. Graphics should not overpower text and the page layout should not tilt to one side or the other.
4. Mark up documents with the proper structural elements. Control presentation with style sheets.
5. Text should be concise, scannable and objective. Particular attention should be given to text color, contrast and font style.
6. Ensure that table content makes sense if the content is presented in a de-colonized linear sequence.
7. Provide clear and consistent navigation mechanisms.
8. Use Flash or other animation techniques to enhance the website and add features that can’t be done with static HTML. Do not use Flash just “because you can”.
9. Choose the color scheme carefully to increase the website’s credibility and usability.
3. TESTING THE GUIDELINES

The website used for the study consists of course material for first, second and fourth year students in Dundalk Institute of Technology, which is a third level college in Ireland (DKIT 2005). The study was carried out in March 2004 and March 2005.

The original version (Version A) of the website for the course material was developed without any reference to the minimal set of guidelines (O’Reilly 2004a). The website consisted of:

a) Animations
b) Frames
c) Images without alt text tags
d) Italic type font
e) A five color palette

The second version (Version B) was developed using guidelines 1, 2, 3, 4, 5, 6 and 7 (O’Reilly 2004b). Accessibility and usability issues were the primary research concern. Guidelines 8 and 9, which deal with the appearance and attractiveness of a website were intentionally omitted. The purpose of this was to investigate the participants’ response to a purely functional website. The website consists of:

a) No animations
b) Cascading style sheets
c) Images with alt text tags
d) A two-color palette
e) Roman type upper and lower case font
f) The content of the website remained unchanged

A quantitative analysis was performed on each of the two websites. Two methods of analysis were used:

a) Syntactic analysis
b) Semantic analysis

3.1 Syntactic analysis

The websites were analyzed using WebXACT (Watchfire 2005), Cynthia Says (HiSoftware 2005) and WAVE (WebAIM 2005) to identify how they rated for accessibility. WebXACT, Cynthia Says and WAVE are web accessibility software tools that are designed to help expose and repair barriers to accessibility and encourage compliance with existing accessibility guidelines. Appropriate changes were made to the second version of the website to ensure that it complied with accessibility guidelines.

WebXACT offers prioritized suggestions based on the Web Content Accessibility Guidelines, which are provided by the World Wide Web Consortium’s (W3C) Web Access Initiative. WebXACT allows developers to test webpages and generate summary reports that highlight critical accessibility issues.

Cynthia Says identifies errors in design related to Section 508 standards and the WCAG guidelines. The main purpose of this portal is to educate website developers in the development of Web based content that is accessible to all.

WAVE uses icons to identify errors in design related to Section 508 standards and the WCAG guidelines.

3.2 Semantic analysis

Human perceptions of the website were analyzed. Participants were shown the original version of the website and the version developed using the minimal set of guidelines. The participants’ views were then taken. Participants were made up from the following user groups:

a) Users with disabilities
b) Novice users
c) Experienced users
d) Older users

Participants were randomly chosen from each of the user groups. The participants answered a questionnaire and their results and views were analyzed.
Each user group was represented in the survey. 10% of those surveyed had some form of disability. Disabilities identified were vision impairments, blindness, color blindness and cognitive disabilities. 4% of those surveyed were novice users and 96% were experienced users. 20% of those surveyed were over the age of 45.

The participants were asked to perform five tasks with each of the two versions of the website - ten tasks in total. The first three tasks were familiarization tasks, in which participants were asked to find specific pieces of information on the websites. The last two tasks were a more complex variation of finding a specific piece of information. After performing the five tasks the participants were asked to answer a questionnaire for each website. The questionnaire was formulated so that the questions were clear, concise, neutral and factual.

The survey was carried out with small groups of five participants at a time. In some cases (for example blind participants) the survey was carried out on a one to one basis. This allowed the participant to be observed. The answering of the questionnaire was strictly monitored to ensure that each question was fully understood before it was answered. This helped ensure that the views collected were not retrospective thoughts.

4. RESULTS

The same ten questions were asked for both the initial website (Version A) and the website developed using the minimal set of guidelines (Version B).

<table>
<thead>
<tr>
<th>Questions represented in figure 1 are:</th>
<th>Purpose of each question is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Do you find this website easy to use?</td>
<td>To obtain users’ initial impression of the website.</td>
</tr>
<tr>
<td>Q2. Is this website well organized?</td>
<td>Users have certain expectations when accessing a website. The purpose of this question is to identify users’ views on the website. Does the website have all the features they would expect</td>
</tr>
<tr>
<td>Q3. Do you find this website attractive?</td>
<td>To obtain users’ views on the look of the website.</td>
</tr>
<tr>
<td>Q4. Do you like the colors used?</td>
<td>To obtain users’ views on the colors used.</td>
</tr>
<tr>
<td>Q5. Is there enough use of images on this website?</td>
<td>To obtain users’ views on the use of images on the website.</td>
</tr>
<tr>
<td>Q6. Is there too much text on this website?</td>
<td>To obtain users’ views on the website content.</td>
</tr>
<tr>
<td>Q7. Do animations add to the attractiveness of this website?</td>
<td>To obtain users’ views on the use of animations</td>
</tr>
<tr>
<td>Q8. Is this website user friendly?</td>
<td>Do the users feel their needs have been taken into consideration, when developing the website.</td>
</tr>
<tr>
<td>Q9. Can you find your way around this website easily?</td>
<td>To interpret the navigation on the website. Do the users find it easy to get back to the home page or is it confusing.</td>
</tr>
<tr>
<td>Q10. Is this a high quality website?</td>
<td>To obtain users’ views on the trustworthiness of the website.</td>
</tr>
</tbody>
</table>
Participants were asked to indicate - from the list provided in Table 1 - different possible improvements that could be made to either website. This enabled some subjectivity in the questionnaire and the collection of users' opinions.

Table 1. Participants views on what improvements could be made to the websites

<table>
<thead>
<tr>
<th>Improvements</th>
<th>% Response to website Version A</th>
<th>% Response to website Version B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive text links</td>
<td>15%</td>
<td>18%</td>
</tr>
<tr>
<td>Improved navigation</td>
<td>26%</td>
<td>37%</td>
</tr>
<tr>
<td>Better page layout</td>
<td>23%</td>
<td>37%</td>
</tr>
<tr>
<td>Better use of fonts</td>
<td>42%</td>
<td>48%</td>
</tr>
<tr>
<td>Better use of color</td>
<td>68%</td>
<td>63%</td>
</tr>
<tr>
<td>Better use of graphics</td>
<td>54%</td>
<td>77%</td>
</tr>
</tbody>
</table>

5. CONCLUSIONS

The website designed using the minimal set of guidelines was accessible and usable, but it lacked credibility. Most participants did not like the look of Version B of the website. This resulted in them having an immediate hostility towards the website and its content. The exception to this was the older participants.

The content of both websites was the same, yet a higher percentage of students felt that there was too much text in Version B, as illustrated in Figure 3.
Figure 3. Users responses to the question “Is there too much text on this website?”

The opinions of the older and younger participants seemed to vary a lot. The older participants liked the minimal usage of images and animations in the website's design and the younger participants preferred to see more use of these in the website design. Users have expectations when accessing websites. As the Internet is highly visual, users expect to see a highly visual website. Using the minimal set of guidelines left many participants disappointed with the lack of color, animations and images. If users don't find what they expect in a website they will go to another website. Therefore, it is important that the designer knows the purpose of the website and who the website is aimed at before they implement the minimal set of guidelines.

The purpose of a website is important in determining its design. Although the minimal set of guidelines state not to use frames in website design, participants preferred the use of frames in this website. The blind participants preferred the framed original website. Though it must be noted that these participants had the use of software that enabled them to read frames.

In the case of this website the use of frames is appropriate. The main purpose of this website was to allow students to print their course material for off-line study. Using frames:

- Allowed the students to easily print the area of the screen that they required (i.e. the main body of text). The title and navigation elements did not needlessly take up space on the printout.
- Allowed for easier navigation between webpages on the website. The website designed using the minimal set of guidelines involved significantly more scrolling as the navigation elements disappeared off the screen as the user scrolled down the page.

Depending on the purpose of a website, the use of frames can add to its usability, as was the case with this website. From the results obtained from the survey, the following changes should be made to the minimal set of guidelines:

Guideline 2, which stated, “avoid the use of frames”, should be changed to:

The use of frames can be beneficial in a website that is highly textual. If the use of frames is necessary, then the following should be included:

- NO FRAMES tags that are meaningful
- Frame titles should give a clear indication of the frame’s content
- Be aware of printing and search engine problems
- Provide a non-framed version of the site

If a developer does decide to use frames, they should remain aware that frames make it impossible to bookmark pages and make search engine results useless (Iron Spider 2005). The next generation of web browsers (IE7 and Netscape 8) will overcome the problems associated with frames. Website designers will be able to use the “position:fixed” feature of cascading style sheets (CSS2) to place a layer in a fixed position on the screen, so that the layer does not scroll with the rest of the webpage’s content (Dr. Dobbs Software 2005). This can be used to combine all the advantages of frames while removing all of their disadvantages. The “position:fixed” feature can be emulated in current browsers (Devine 2005).

The hypothesis of the paper was to prove or disprove that the application of a minimal set of website design guidelines would increase the credibility, usability and accessibility of a website for every user. From the results obtained, the use of the minimal set of guidelines has provided a more usable and accessible
website. However, leaving out the guidelines that dealt with attractiveness and look of the website did not provide a website that meets the participants’ expectations and lacked credibility.

Knowing the purpose of a website is important in deciding what design guidelines to use and should be considered before implementing any of the identified minimal set of guidelines.

REFERENCES


SALUTOGENIC COMMUNITY BUILDING

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ABSTRACT

This paper explores a new approach to community building. It is based on the concept of salutogenesis; a proactive approach to community health which seeks preventative measures instead of the traditional reactionary corrective and curative culture of public health care. Increasingly organizations are concerned with sustainable healthy work forces but they often lack a coherent mechanism for doing so. Salutogenesis focuses on coping ability, social cohesion and community development by increasing social capital. This critical-interpretive research is based on data collected in a 9 month ethnographic study of social workers, health professionals and information technologists of a Norwegian-based non-government organization involved in community health promotion. The main aim was to develop a well-formed understanding of the three salutogenic criteria; comprehensibility, manageability and meaningfulness in terms of community building processes. It was found that collaborating, planning (and organizing), and defining (a vision for) the community were the key areas of community building. The other incentive was the adaptation of process philosophy into a coherent conceptual framework. It is an action-based world view and focuses on the context of change and action. My contributions are two-fold; the identification of generic salutogenic practices in community building, and a research framework founded on process ontology. This paper offers an explanatory account of community building at a fundamental level and a non-compositional, non-substance semantico-ontological framework is put to use.

KEYWORDS

Community Building, Information Design, Contextual Semantics, Process Ontology, Methodology.

1. INTRODUCTION

Traditional interpretive research has an information use or passive-recipient view of Information Systems (IS) (Schultze, 2000) and Information Design (ID) (Karabeg, 2003). This view of information is inadequate and misleading (Karabeg, 2003). It is misleading as it results in a ‘paradoxical convenience’ (Karabeg, 2003). On the other hand, information creation or design is vital for transpiring our dynamic and social reality (Karabeg, 2002). Although the object-based world view is structured, it is metaphysically inconsistent (Seibt, 2001). Much of the inconsistency is due to one ontological presupposition. This limited world-view (ontology) causes conflicts in content, structure and therefore, implementation. Not surprisingly, the notion of ‘ontological mismatches’ is widespread. Even though computational ontologies are hierarchical data structures containing some of the relevant entities and their relationships and rules, they remain interpretive propositions based on a particularistic epistemology and are therefore sketchy ‘ontological commitments.’ According to Gruber (1993), ontological commitments “communicate a domain of discourse without necessarily operating on a globally shared theory.” The root problem is the presupposition of a substance ontology. It represents the predominant culture or world-view in IS and public health care for the identification (and eradication) of the objects or causes of ill health. These are the pathogens which may then be cured or corrected by treatment. However, the focus on the one cause (object) of ill health at that instance overlooks the half the continuum of health.

The problem with interpretive IS research is its dependency on particularistic epistemologies and substance ontology. It is a strong form of cultural relativism and it means that all science is nothing more than ethno-science (Spiro, 1986). If we are to accept these suppositions, we cannot purport to draw any valid or nonvacuous generalizations (Spiro, 1986). However, such epistemological relativism is only true in the relativists’ own conceptual framework. In IS research, we are interested in the true ‘nature of being.’ This is
epistemological objectivity. Furthermore, things are only true or objective only if it exists independently of the human mind. This is ontological objectivity and is the antecedent for epistemological objectivity. Accordingly, objective research should begin with ontology. Information Theory is an example if this form of realism. Insofar as we presuppose that information is an objective and mind-independent entity since it can be generated or carried by words (words and sentences) or other products of mind-endowed, reasoning beings (Cambridge Dictionary of Philosophy, pp.435), it is ontologically objective. It is precisely the mind-independent nature of information which gives it such flexibility and versatility in its representation.

Even though process philosophy offers a basis for identifying metaphysical reality with change and dynamism (beyond a world of objects), its acceptance, understanding and use in IS research is limited. In contrast with substance ontology, the fundamental element of the universe is conceptually idealistic, ‘occasions of experience’ (Whitehead, 1929). An alternative view of ‘concrete objects’ is successions of these occasions of experience. As such, process philosophy is an exegesis of the real world as characterized by experience. Since all parts of matter involve mind, they are perceived and understood in human consciousness and not of anything independent of human consciousness. Nonetheless, there are very few examples of the process ontological approach in IS. One reason for maintaining the metaphysically questionable object world-view is simplicity, in modeling and therefore implementation. However, object-based models and design will never capture the essence of our social reality since it negates the social nexus of the cultural, economic and political milieu (Pomeroy, 2000).

Unlike the predominant cultures who celebrate with unreserved euphoric mania ‘the miracle of medicine’ and ‘the free market,’ I am more reserved and critical of the curative, corrective culture of public health care and capitalism, since they are fundamentally part of the same social nexus (Pomeroy, 2000) – object-based or commodity-based world views. There has been a steady decline of the healthy workforce (Tellnes, 2005) and social capital (Putnam, 2000), in spite of the advancements in the free market and medical technology. Since community health is central to all economies, community health promotion and prevention is at the core of the social and economic fabric of any society (Tellnes, 2005). This is precisely why globalizing and urbanization presents a challenge - not only as cultural complexes but also community health. The main problem with globalizing and urbanizing societies is that it causes inequalities in the access to health care and changes the cultural practices of a once healthy lifestyle (ibid.). According to Potapchuk et al (1997), social capital is the binding element of community, and is pervasive in all levels of society. Nevertheless, community health and social capital development initiatives are still targeted at just one level; the individual.

The aim of this research is to develop a well-formed understanding of salutogenesis as an approach to community health promotion and prevention, in situ. The main objective is to determine whether or not the key salutogenic criteria are commensurable with the key community building practices. The other objective is the integration of process ontology into a conceptual framework. This research is based on data collected in a 9 month ethnographic study of a Norwegian-based non-government organization whose objective is to salutogenic community health promotion. The data is collected from the practices of social workers, health professionals and information technologists. At the outset, the critiquing and challenging of the assumptions and practices of the curative, corrective culture meant that this research crosses from interpretive to critical, in its perspective. The purpose of salutogenic community building is to highlight the social inequalities; access to public health care and simultaneously educate people. An ontological approach to IS research is a departure from the naive phenomenological approach which lacks epistemological objectivity. It is thus, a departure from the particularistic epistemology of interpretive research. By resolving some of the deficiencies and inequalities of public health care culture and capitalism, I will extend the knowledge about salutogenesis in community health.

2. THE CONCEPT OF “COMMUNITY”

“Community” has many different meanings. To some, it simply means the local village, whilst to others, “community” means society at large. The disambiguation of the concept of “community” begins with an understanding what kind of entity it is and which rules govern it. “Community” stems from the Latin word ‘communitas’ which means sharing, participation, and fellowship. From this definition, it is quite clear that “community” encompasses much more than people. However, neither dogs nor trees talk about community in the same way that humans do. This means that “community” is a human concept; it is a sociological
construct (Bartle, 2004) - it is a model of how we perceive the world around us. This means that a community is socially organized and therefore, cultural (ibid.). Being a cultural entity, a community is a system of systems composed of things that are learned, transmitted and stored by symbols (ibid.). Though not directly observable, all socio-cultural systems have subsystems or distinguishable parts which may be themselves multi-faceted (ibid.). The six cultural dimensions are Technological, Political, Economic, Institutional (social), Belief-conceptual and Aesthetic-value dimensions (ibid.). Each cultural dimension is mereologically essential.

There are two distinct mechanisms of acquiring culture (Bartle, 2004); enculturation (or socialization refers to the original learning of culture, by a child, to become human) and acculturation (re-learned culture, such as when a person moves to a different society or when a community changes around the individual). With respect to virtual community and community health we are mainly interested in acculturation. Teaching and educating people about health and well-being. What is more, by fostering change in one dimension, like technology, we are necessarily influencing changes in all the other cultural dimensions (ibid.). Since the technological dimension is the most accessible of the cultural dimensions (it is easier to change software than it is to change a religious belief or scientific methodology), it becomes the perfect tool for stimulating cultural and social changes. This is because new technology also requires a new set of beliefs and values, like things will work faster or more efficiently with information technology. Having identified technology as the preferred cultural avenue for influencing social change, we need to explore salutogenesis and the principles of community building.

“Community building is more an orientation than a technique, more a mission than a program, more an outlook than an activity. It catalyzes the process of change grounded in local life and priorities. It addresses the development needs of individuals, families, social groups and organizations. It changes the nature of the relationship between the community and the system outside its boundaries.” (Schorr, 1997)

Social capital is the binding element of community (Potapchuk, 1997) and pervasive in all levels of society (Putnam, 2000). As such, there is a bond between economic, political and human development (Macdonald, 2000). There are two broad levels of social capital (Putnam, 2000); localized and generalized. At the most fundamental level, social capital is the social interactions, and at the broader societal level, it is the civic culture (Potapchuk, 1997). The continuum or ‘ladder of community building’ describes the various levels of social capital (Potapchuk, 1997); Civic Culture, Civic Infrastructure, Community Organization, Social Capital and Social Interactions. Accordingly, community development means fostering the whole gamut of social interactions to the civic culture.

3. SALUTOGENESIS

Salutogenesis is the opposite of pathogenesis (Antonovsky, 1979). It explores well-being rather than disease processes, by focusing on successful coping strategies and health (Lindstrom, 2005). Salutogenesis is a new approach to health promotion and assessment which addresses the increasing inequalities of public health. Salutogenesis, as holistic healthcare, implies maintaining a sense of coherence (SOC):

“global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected.” (Antonovsky, 1979)

The key criteria for a SOC are comprehensibility, manageability, and meaningfulness (Lindstrom, 2005). Comprehensibility means the extent to which you perceive the stimuli that confront you, deriving from the internal and external environments, as making cognitive sense as information that is ordered, consistent, structured, and clear (Lindstrom, 2005). It also implies the perception of predictability and order (Lindstrom, 2005). Manageability means how a person perceives the availability of resources (Lindstrom, 2005). Meaningfulness indicates a persons' emotional sense of purpose (Lindstrom, 2005). Salutogenesis focuses on the origin of health and can be applied across the ladder of community building; to an individual, a group, and at a societal level (Lindstrom, 2005). Salutogenesis is an established concept in community health promotion but it is not as widespread as a concept at the societal level. Consequently, the first step to salutogenic community is education. Since technology was identified as the preferred means of instigating social change, an information sharing portal or knowledge-based, such as a virtual community would be an ideal solution.
4. RESEARCH METHODOLOGY

The methodology is based on a critical and interpretive research perspective. It is interpretive because of the assumption that “community” is socially constructed “through social constructions such as language, consciousness and shared meanings” (Meyers, 1997). However, it is also critical because of the assumption that “social reality” is a social nexus where “people can consciously act to change their social and economic circumstances, critical researchers recognize that their ability to do so is constrained by various forms of social, cultural and political domination” (Meyers, 1997). Consequently, this research is a departure from the traditional research paradigms, as it presupposes the corrective, curative, reactionary approach to public health care by the dominant culture as inadequate.

The problem with traditional interpretive and critical research in IS is that although it strives for epistemological objectivity, it does not start with ontology. Instead, it uses social theories or particularistic epistemologies as the basis. As mentioned previously, ontological objectivity is the antecedent of epistemological objectivity. As such, many IS research is metaphysically vague which may be attributed to the lack of a solid conceptual framework or domain ontology. This is because domain ontologies are acquired in traditional research, instead of being based explicitly on an ontological theory. Nonetheless, interpretive research provides rich insight and sense-making in complex social settings. My criticism ends here even though I would like to deconstruct traditional interpretive research even more. Instead, I will now focuses on the underlying conceptual framework which allows for an analytico-synthetic methodology.

The foundation of the research methodology is a dyadic framework of process ontology and contextual semantics. Whereas compositional substance ontologies purport the ‘real’ world (metaphysical reality) as a world of objects, process ontology characterizes metaphysical reality with change and dynamism (Whitehead, 1929). This process world-view or paradigm is also established in IS development (Schultze, 2001). This research framework starts with an ontological theory to give an objective methodology, as such

Contextual Semantics + Process Ontology > Conceptual Framework > Research Methodology

Unlike the traditional substance ontologies, process ontology offers a superior exegesis of dynamic situations, individuation, universals and persistence (Seibt, 2001). It is also a closer representation of real knowledge, since knowledge is not an object. To be sure, to know of or knowing something is to become aware of with the mind or through one of the senses. That is, to know of something is to perceive of it, since perception and cognition are quintessential to mind-endowed, reasoning beings. In addition, real knowledge is purely internal, of mind, by mentalese. Mentalese is a hypothetical language in which concepts and propositions are represented in the mind without words (Cambridge Dictionary of Philosophy, p.556). According to Seibt (2001), the most fundamental ontological category is ‘free processes.’ As such, the most basic entity may be perceived as processes or actions, as they initiate change and knowledge. Process ontology is one half the rich dyadic conceptual framework. The other half is contextual semantics, exemplified by the Principle of Holistic Contextuality, PHCT (Puntel, 2002):

Only in the context of language as a whole, do sentences have semantic value.

In accordance with PHCT, each sentence is well-formed and meaningful, and expresses an informational content (Puntel, 2002). That is, all actions or processes have a context in which they belong. The conceptual framework is therefore a semantico-ontological framework. This framework offers contextual analyticity in and processual synthesis by virtue of the ontological category of free processes. Since the only valid and nonvacuous categories are subjectless processes, like “it’s raining,” and “it’s snowing,” this conceptual framework focuses on the contextuality of (metaphysical) reality. Moreover, process ontology and contextual semantics are mutually connected, “like two sides of a coin” (Puntel, 2002). The philosophical principles of the dyadic semantico-ontological framework may be organized into an analytic-synthetic schema using

- Contextual Analyticity – what is really going on
- Processual Syntheticity – how is it going on

The analytico-synthetic schema is a self-reflexive methodology and may be used to classify a multi-faceted problem area. That is, analyzing the basic social interactions of community building and salutogenesis, and synthesizing salutogenic community building practices. Using these two basic criteria, I will identify the community building practices, at the most fundamental level and then attempt to synthesize those salutogenic practices with the community building practices. For example, the category of “Information Design” has as a context the purpose of “Designing Information” and as an action “Designing Informatively.” Furthermore, “Designing Informatively” may be seen as a complex of several other processes or actions, such as
“Designing” and “Informing” which have their own context. Although, this may sound simplistic, some complexes may be indeed very complex. Nonetheless, this form of analyticity is entirely consistent within the processual philosophical system, since reality is perceive as nested relations of social nexuses (Pomeroy, 2000).

4.1 Ethnography

In order to get rich insight in to the area of community building and salutogenesis, I have chosen ethnography. Ethnographic research stems from social and cultural anthropology. It is a research method where the ethnographer is required to use the major part of the research period in the field (Meyers, 1997). This is because the ethnographer is supposed to engage wholly into the lives of the subjects they are supposed to be studying in order to be able to place the phenomena studied in their social and cultural context (Meyers, 1997). Although, I was on several occasions a participant observer, I maintained my objectivity by not becoming too actively involved in the practices I was meant to be studying. The other technique I employed to get primary data in this study is passive observation. Other sources of primary data include emails and informal meetings. Due to the nature of the observations, I had to write-up the field notes the evening after the event. Secondary data was collected from an array of internal documents and literature related to salutogenesis and community building. I spent the most part of 9 months in the field (from February to November, 2005) in a Norwegian-based non-government organization involved in community health promotion and prevention. My decision to leave the field was mainly influenced by the need to finish my thesis. Action research may have also been an effective technique for this study, as it evaluates the changes. However, due to the immature phase of the organization, no action was taken beyond the Board – the core of the community. In the next section, I will briefly summarize the organization, the research setting.

4.2 The NCH International Project

NKH Foundation is a Norwegian organization that has as its objective to promote community health using preventative measures, such as salutogenesis. Those measures include an array of cultural activities in natural settings. It is based in a beautiful quiet area by Sem Lake, just west of Oslo. It was founded by Professor Greg Tellnes and has had ongoing success. The NCH International is a Norwegian-based non-government organization and an international effort to meet the challenges of preventative community health by building a global salutogenic community. It is a unique opportunity to study, as it inherently involves community health and community building practices. Since the international body is in its infancy, the main focus of the organization has been the identification of those organizational and international community building goals. One goal is to use technology; a web-based approach to salutogenic community has been identified as the most cost-effective way of implementing social change. The approach was to collectively organize efforts of community health workers, information technologists and representatives from the film and tourism industries into one commonsensical movement. Being an open community, I had access to most of NKH. I was also given access to the Board meetings and other organizational activities, such as the focus groups and seminars. Using my position, as a researcher and participant observer, I developed a good rapport with the rest of the Board by actively contributing. I maintained my involvement over the study period by contributing with my own research ideas and participating in other planning and organizational activities.

Being immersed in the field for such a long period, there was a danger of me bringing my own subjectivity to bear on the research material. I tried to maintain my objectivity by reasoning and rationalizing, as well as switching roles between participant and observer. The ethnographic study extended over a period of 9 months, starting with the NCH International Board Meeting and Focus Group at the NKH Centre in Asker (by Sem Lake), 4th February, 2005 and ending with a board meeting at Frederikk Holts Hus, Ulleval University Hospital, 24th November, 2005. Field notes were taken on-site and written up the following evening. Since I was actively participating, most of the dialogue is paraphrased or in point form. I also collected numerous documents about NKH and NCH International, including internal documents and reports. The nature of my fieldwork meant that I was reflexively making sense of salutogenic community development. That is, participating in salutogenic community development and reflecting about it. I left the field after giving my last research report in a meeting. This decision was influenced by a combination of thesis and family commitments.
5. RESEARCH RESULTS

Table 1. A summary of salutogenic and community building practices.

<table>
<thead>
<tr>
<th>CONCEPTS</th>
<th>CATEGORIES</th>
<th>DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Building</td>
<td>Defining Purpose</td>
<td>Focus groups and seminars to define a vision</td>
</tr>
<tr>
<td></td>
<td>Planning-Organizing</td>
<td>Board meetings and workshops to manage, plan and organize</td>
</tr>
<tr>
<td>Salutogenesis</td>
<td>Meaningfulness</td>
<td>Promoting community health</td>
</tr>
<tr>
<td></td>
<td>Manageability</td>
<td>Planning and organizing resources</td>
</tr>
<tr>
<td></td>
<td>Comprehensibility</td>
<td>Developing social capital</td>
</tr>
</tbody>
</table>

The processes of community building practiced by NCH International is depicted in Table 1. The figure shows the categories and concepts that surfaced from the data analysis. These are the very basic actions and social interactions between the people and the organization but obviously transcend onto higher levels by virtue of the complex processual view of cultural systems and subsystems. However, this is by no means an exhaustive classification. It is general and generic to this community.

5.1 Defining a Vision for Salutogenic Community

NCH International has a board which consists of health and social workers, film and tourism workers and information technologists. Among the health workers is the founding father of NCH. Greg is a medical doctor and a professor of community health at Oslo University Hospital. He has been instrumental in the promotion of community health in Norway over the past decade. Greg is also the president of two organizations; the European Public Health Association and the Norwegian Society of Public Health. The other prominent figure in the board is Dean, who is a professor of Information Science at the University of Oslo. These two are the co-founders of the international body of NCH and have been working on a strategy to realize the potential of salutogenic community building.

All communities exist for a reason. We all acknowledged that there is a deficiency in when it comes to community health prevention and promotion. Although Greg managed to influence many in the public health services, the movement remained parochial. Having realized the parochial nature of NKH, Greg and Dean founded the international body of NCH to put into effect a more generalized movement for developing social capital using salutogenesis. The result was the focusing of the need to develop community health together with the need for a coherent and organized and manageable means of doing so. Social capitalism was identified as a possibility and was explored in the focus group. My field notes include this example from the NCH Focus Group:

After having presented a review of Putnam's book on the decline of social capital, Dean produced another slide where he had sketched just how social capitalism may be modelled; Dean explained synergistic business using a diagrammatic representation of the meeting point between ethical-moral goals, and the economic goal; Dean then followed this by giving an anecdotal account of synergistic business in the United States of America; Dean then explained how technology, in particular virtual community may be used as a portal between the various groups and as a knowledge base. (Field notes, 04.02.2005)

The focus group also facilitated the defining of a vision and a common purpose for the new members of the community and the Board. Since the community was growing it was important to familiarize the new members with the vision and develop a common purpose which included them. Providing such a perspective for the community is salutogenic because it offers meaningfulness. A meaning which is written as an objective of the NCH constitution:

NCH International is an association that has as its objectives to promote the public’s health and safety, sustainable environments, well-being, vitality and peace. (Internal Document: NCH By-Laws)

The workshops and seminars were themselves salutogenic, being held in beautiful and peaceful settings. It mirrors the self-reflexive nature of salutogenesis and community development. Technology is the easiest cultural dimension to implement change in. The other pertinent issue was the use of virtual community. Since technology is an instrumental tool for sharing information, creating knowledge and the most accessible cultural dimension for instigating social change.
5.2 Planning and Organizing Community Development

Whereas most community health initiatives are short lived, the NCH International Foundation has shown a real conviction and commitment to planning and organizing all of the plausible aspects of prevention and promotion. At the outset of my research, I established that NCH International comprehensively managed the organizational and salutogenic plans and goals. Not the least, the development of the salutogenic infrastructure by Sem Lake. Due to the limited nature of NKH resources, the growing community would require a more extensive network and activity centers. The culmination of all the organizing and planning was the drafting of a ‘Proposed Business Plan.’ It was a business model which would provide continuity in the planning process, in addition to salutogenesis and community building. My field notes include this example from the NCH Board meeting:

After planning and preparing for the future meetings and as well as welcoming new members to the board. Frank gave an emphatic proposal for a business model and plan. The proposal included plans for marketing, training, management, support, as well as an arsenal of organizational overview over each organ. All member of the board applauded his work but Greg was skeptical to the business approach. Afterwards the board started to plan the financial side of their work. Where to get funding, etc. (Field notes, 24.11.2005)

It was obvious. With all the plans and different organs of the community, their goals seemed to be achievable. It means that planning and organizing is salutogenic because it offers the notion of being manageable.

5.3 Working Together

It was clear from the outset that working cooperatively was the most equitable way of doing things. The community is socially organized such that there is a more equality in terms of roles and relationships. Planning and organizing allows for more to be achieved, working cooperatively not only allows more but it also facilitates learning and bonding. These two aspects are crucial in any growing community. From the outset, the cooperating members of NCH International directed much of the organizing to develop community leaders, in the private and public sector. Collaboration is a critical measure, since it delegates the power and decision-making authority. Collaboration is also a salutogenic criterion since it is a comprehensive way of approaching social problems. That is, including public and private resources. My field notes include this example from the NCH Board meeting:

[After an intensive and very productive meeting] Anne was given the opportunity to allocate the human resources for the next phase of the business plan. Instead of dictating who does what, Anne cleverly requested that each board member volunteer to do the tasks they wanted to do, accompanied with the person they wanted to work with. The plan was a smashing success, although Dean was skeptical of one minor detail. (Field notes, 24.11.2005)

Acknowledging the inherent difficulties of collaboration is as important as acknowledging its worth. Sharing power and decision-making authority is risky but it is also an emancipatory mechanism which should not be underestimated.

6. DISCUSSION

I have managed to compose a coherent classification of salutogenic and community building practices using the contextual analyticity. I have identified the three generic community building principles; defining a vision for the community, planning and organizing and collaboration, and characterized the key salutogenic criteria; comprehensibility, manageability and meaningfulness. I have also determined that the community building principles are in fact, commensurable with the salutogenic criteria. As these are self-reflexive processes, I used the processual syntheticty to identify the fundamental process in each context. A summary of my findings is tabulated below (see table 2). This table will be discussed below.
Table 2. A summary of salutogenic community building practices.

<table>
<thead>
<tr>
<th>CONTEXTUALITY</th>
<th>CATEGORIES</th>
<th>PROCESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salutogenic</td>
<td>Defining vision/purpose</td>
<td>Meaningfulness</td>
</tr>
<tr>
<td>Community</td>
<td>Planning and Organizing</td>
<td>Manageability</td>
</tr>
<tr>
<td>Building</td>
<td>Collaboration</td>
<td>Comprehensibility</td>
</tr>
</tbody>
</table>

All communities exist for a reason. Defining a vision for the community not only gives it meaning, it also gives the members of the community a sense of purpose. Such a purpose makes membership and participation desirable. Moreover, if community life makes sense emotionally, then well-being is achieved. Well-being and meaning (and the vision of a healthy, vibrant community) sustains commitment to the community which is reciprocated in social cohesion and develops social capital. In this research, it was found that the promotion of the principles of salutogenesis in community health prevents ill-health culture. Since ill-health is harsh to an economy, anyone interested in a healthy workforce should participate.

Planning and organizing are critical to the success of any organization. It is particularly important to organizations where resources are scarce. Salutogenesis is also an important aspect in this sense since the stronger the SOC, the more capable and better we are at coping. In this research, it was found that a strategic approach to community building maintained equality as well as coherence within the community. This made the heavy workload much more manageable, even though it was very demanding. Virtual communities are vital to this process, not only in terms of management but also in terms of support and reciprocation. That is, trust and social cohesion which increases social capital, activates social change, develops human resources, as well as improving economic performance.

Building community means working together; with governments, with the private sector and other organizations. Sharing power and decision-making authority is inherent in collaboration. Even though it is risky, time and energy consuming, it is also understood as an essential feature of community building. In this research, collaboration was practice at all levels. Even though some of the stakeholders disputed, they were able to maintain a more holistic view of what they were doing and how they were going to achieve those goals (in the short and long term). In addition, by focusing on collaboration, trust and the reciprocation of trust in social cohesion was achieved. Once again, collaboration is a self-reflexive way of increasing social capital.

7. CONCLUSION

This paper has presented the findings of an ethnographic study into the community building practices of an organization involved in community health promotion using salutogenesis. A theoretical framework for conceptualizing the community building practices was developed along with an analytico-synthetic methodology. The theoretical framework was developed to achieve ontological objectivity which is the antecedent of epistemological objectivity (the objective of all scientific research). It is based on process philosophy; process ontology and contextual semantics. This research makes a contribution to the understanding of salutogenic community building practices. These were identified as three generic self-reflexive principles; defining a vision for meaningfulness, planning and organizing for manageability, and collaborating for comprehensibility. This research also highlights the fact that technology is the most accessible cultural dimension for instigating change and that virtual community is an important tool. Process ontology is relatively unexplored in IS. The research is also a methodological contribution to IS and ID. It embodies a semantico-ontological scheme of context and action. Salutogenesis is an important concept in community health promotion. It focuses on those processes which foster good health and well-being. Process ontology and contextual semantics has the prospect of providing a suitable and coherent framework and has therefore important implications for IS and ID research. While the theoretical framework needs more work (fleshing out), an understanding that research methodologies should be based on a proper ontological theory is a good starting point.
REFERENCES


“MY FRIEND ONESELF!”: DOCTORS AND PATIENTS ON THE WEB TO ENHANCE SELF-MANAGEMENT OF CHRONIC LOW BACK PAIN

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ABSTRACT
The aim of this paper is to discuss the organization of a virtual community composed of health professionals and patients affected by chronic low back pain. The community was created as part of a pilot study for promoting self-management of chronic low back pain. The paper deals with the theoretical framework behind the development of the community, as well as with the way health professionals and patients interact on a website specifically designed for the project. In the last part of the paper, data collected from an intermediate online questionnaire point to the validity of the study, alongside revealing crucial implications for further applications in the field.

KEYWORDS
Health communication, internet, self-management of chronic low back pain, tailoring, doctor-patient interaction.

1. INTRODUCTION
This paper discusses the organization of a www based community composed of doctors and patients affected by chronic low back pain. This community was created as part of a pilot study financed by the Swiss National Science Foundation (NRP 53) that we conducted between June 2004 and July 2005. Our aim in this study was to promote self-management of chronic low back pain by involving patients in a virtual community. For this purpose, we designed a website, titled ONESELF, and asked a sample of 20 patients all resident in Tessin (CH) to navigate for a period of five months together with a group of 12 Tessin health professionals (rheumatologists and physiotherapists). Patients were recruited from the health professionals involved in the project. To be enrolled they had to have: (1) more than a 3-month low back pain; (2) no “red-flag” symptoms; (3) age 18-65 years; (4) good understanding and writing of Italian. In addition to this, patients had to positively opt for the program. Patients were excluded if they had major disabilities due to factors other than low back pain, and if they had conditions requiring individual medical or surgical treatment, or pregnancy. To take part in the project patients had to sign an informed consent where we also included the Privacy Policy of the website with notification of who was collecting personally identifiable information, how the information was then to be used and with whom it could have been shared. In the pilot phase of the intervention the website could only be accessed by persons involved in the study.
In the following paragraph, having first sketched the theoretical background of our approach, we shall discuss the design of the website as well as the way health professionals and patients interact in the virtual community, while assisted by a content manager. Final remarks based on an intermediate evaluation of the intervention will point to its validity, alongside suggesting further developments of the study.

2. INTERNET AND LOW BACK PAIN: A STATE OF THE ART

In building our virtual community, we attempted to answer some of the problematic aspects encountered by people who search for back pain-related information on the web. Nowadays, the internet is generally acknowledged as an instrument that can offer exclusive multimedia and interactional tools to enhance self-management of a chronic disease such as chronic low back pain [Wantland et al., 2004; Kirsch and Lewis 2004]. Despite this acknowledgement, however, research on the effectiveness of internet based interventions in the area of chronic low back pain shows mixed results. There is evidence that online information can play a positive impact on people affected by chronic low back pain. A randomized study dated 2002 [Lorig et al.] concludes that an e-mail discussion group can positively affect health status, and can have a place in the treatment of chronic recurrent back pain. Similarly, a controlled trial dated 2004 [Buhrman et al.] demonstrates that internet-based self-help with telephone support holds promise as an effective approach for treating disability in association with back pain.

The corpus of studies that stress major limitations of current online applications in the field of back pain is, however, wide. To our knowledge, there is no scientific evidence of successful virtual communities for people who suffer from back pain. As Schulz and Setola [2005] show, websites on back pain are for the most part informative, and do not support users’ interactions. Moreover, the information provided online is itself affected by crucial restraints. Regardless from the AMA’s guidelines for medical information websites [Winker et al., 2000], research highlights the poor quality of information about low back pain, available to typical patient users on the internet [Butler and Foster, 2003; Li et al., 2001]. A more focussed analysis of the information itself points to two other main problems: first of all, information available on the internet has been shown to be risky, insofar as it can lead users to perform wrong exercises with negative implications on their health status. In particular, websites on back pain generally provide users only with generic self-management advice and exercises that lack meta-information on the correct utilization of the contents provided online (or warnings) [Schulz and Setola, 2005]. In addition to this, medical web sites have been generally shown not to provide enough personalized information. Very often the information published online is not relevant to users’ exclusive needs and not appropriate to their cultural background. There is a need to have more tailored information and more tailoring tools for stimulating users’ requests of those information that really spark their interests [Payne and Kiel, 2005; Weissenberger et al., 2004]. This lack of tailored information creates - from the patients’ point of view - an information gap between general knowledge about prevention and treatments, and capacities to develop correct behaviours, or to modify and change eventually wrong ones [Skelton et al., 1996].

In the light of the above framework, there were main challenges to be faced in our study. In order to build a virtual community, we needed to assure an active and proactive presence of health care professionals both to develop the online contents, and maintain daily interactions with users. But assuring this presence was in itself far from being unproblematic. There is no need to stress that there are several difficulties linked to the amount of time that health professionals should devote to projects of medical websites. Doctors are, in fact, increasingly limited by time constraints. Also, during several discussions with health professionals active in Switzerland, we noted that, although the introduction of e-health is expanding, there is still a tendency to see the use of new technologies as causing damaging interference to the doctor-patient relationship. The trend among health professionals is still to link the use of the internet to a depersonalisation of their expertise [Genuis and Genuis, 2005; Broom, 2005; Hart et al., 2004]. In addition to this, we had to establish a virtual community where patients could feel free to ask questions, and make requests, and could receive answers by health professionals in due time. Indeed, especially when patients feel pain, they need prompt answers. All these factors have been addressed in the design and implementation of the website ONESELF.
3. THE WEBSITE ONESELF

3.1 Basic concepts

To organize a virtual community that could join together health professionals and patients affected by chronic low back pain, we rested on two main assumptions:

- A policy of providing tailored information is the best response to enhance patients’ self-management of low back pain. It will lead patients to a more active approach by providing them information which considers their specific contextual situation.

- Sharing experiences on how to manage chronic back pain with other patients, and discuss experiences with health professionals, helps the patient to assess their own situation in a more complete way and increases the patients’ willingness to approach their own situation and attenuate the proper barriers towards an active approach. This applies in particular when communication among patients is assisted by medical advice and others expertise.

In this light, based on the information from a focus group we had with 10 rheumatologists from the Lega Ticinese per la Lotta contro il Reumatismo and 2 physiotherapists, on guidelines from AMA, we designed the website ONESELF for teaching self-care to patients with chronic low back pain. ONESELF was developed as an interactive website that could provide patients with a multitude of treatment information, and encourage them to obtain the kind of information that they desire about their disease. The website was not thought as a diagnosis tool, and never published advices in the form “This is what you must/should do”. Different multimedia materials allowed patients to get up-to-date information about chronic low back pain. Moreover, patients could interact with health professionals who did answer their specific questions. On a more general level, ONESELF was designed to enable patients: 1) to obtain the information they want in a fast way (within 2-3 days maximum); 2) to discuss with health professionals either in a synchronous or asynchronous way; 3) to access the experience of other people with similar diseases.

To promote the tailoring of information, we decided to initially insert only a set of basic contents. Our team of health professionals came to consensus on some key elements on chronic low back pain generally, including its aetiology, the vertebral column, the postures and the physical activity. The materials use simple language to make each point clear, with illustration and graphics to reinforce understanding. After development, we tested the basic contents with sample of patients with different levels of health literacy. All sections of the website were structured so that users could request the information they wanted in addition to the basic contents already published.

3.2 The components of ONESELF

The Library: This section includes educational material on the nature and management of chronic low back pain. The material is in the form of short articles that are supported by relevant pictures and graphics. 5 out of 23 articles published in the five months of the intervention were inserted before inaugurating the website. All the other articles were added later, according to patients’ requests. The Library offers, in fact, an interactive box where patients can write down the specific topic on which they would like to have information.

The Gym: This area contains videos on exercises selected on the basis of the major disabilities reported by people affected by chronic low back pain. Each video is accompanied by a written description of the exercise proposed, and of the way this should be performed. The Gym is maintained by a team of physiotherapists who guide patients in the selection and performance of the appropriate exercises. The physiotherapists can be contacted by patients directly through the box “contact the team” on the homepage of the website.

Forum and chat-rooms: Here patients can meet and interact with both other patients and health professionals. Twice a week, on specific times of the day, a health professional is available online in the chat room and discuss specific topics with patients. The topics of the discussions are selected on the basis of the conversations published in the forum in the week preceding the meeting. Every week patients are invited through the homepage of the chat-room to propose any topics they would like to address.

The experts say that / The specialists answer that: In these two sections of the website, patients find videos and other kinds of electronic materials on topics proposed by health professionals on the basis of
patients’ frequently asked questions during medical consultations. Health professionals report questions collected during face-to-face consultations, but other questions are inserted following issues that have emerged during the forum and chat-room interactions.

**Tell a story:** In this section users can edit their stories and comment on stories presented by other users. The website can be visited at the following address: http://www.oneself.usilu.net. Access is immediate after registration.

### 4. TAILORING HEALTH MESSAGES

All the 12 health professionals who took part in the focus group agreed on developing the contents of the website, as well as on maintaining daily online interactions with users. To minimize the risk of overloading health professionals with work, we subdivided the 5-month period of the intervention in ten two-week periods. Each health professional was then asked to enter the website and answer users' requests mainly on the forum once a day, only for two weeks each. Creation of new texts was also organized in order to minimize health professionals’ duties. Health professionals were only asked to provide the most technical information according to their expertise and specialisation. Full texts were then composed by a linguist who acted as content manager of the website. Before publication, the new texts were sent back to health professionals for final approval. The content manager did a daily control of all the feedback received in order to guarantee that the community was useful to all its members. When new requests by patients were appearing online, the content manager did categorize them and sent them to the health professional/s according to their specialisations. The content manager could block or delete messages on issues considered not appropriate for the community. However, in the five months of the intervention, no message ever caused any sort of problems.

To give readers a better idea of some of the procedure for tailoring the information adopted in our study, we present, here, an example of a contribution published in November 2005. On November 16th, one of the users of ONESELF, after remarking that his job forced him to sit on a chair for several hours a day, asks for some exercises to be done at his/her desk. One of our health professionals, who answered his messages, asked her/him to specify more closely what kinds of ergonomic problems the user had. The user replied immediately. The content manager, who had noted this interaction, asked one of the physiotherapist of the ONESELF team to write a contribution to be published online. Photographs and detailed descriptions of some exercises were prepared within the week. The contribution entitled “Desk-gym” was published on November 24th. Finally, we asked health professionals to act as moderators on the messages posted on the forum of the website: when they thought that a message could have lead to negative effects (in the case of chronic back pain it is rather frequent, for example, that patients influence each other to give up jobs or daily activities), the health professionals did normally reply with a message clarifying eventual wrong approaches, suggestions or beliefs of patient. During the intervention, tailored material was created and published on the website according to the following schedule:

- **Library:** a new article was published weekly for a total of 20 articles written under the supervision of the health professionals. The topics included: physical activity, postures, use of medicaments, chronic pain (in general), management of pain, osteoporosis, fibromialgy.
- **Gym:** a new set of exercises (based on 9 exercises under the categories of stretching, mobilisation and stabilisation) was added every month and a half. The experts say that/ the specialists answer that: a new multi-media document (in the format of video, PdF or audio) was published every three weeks. Topics included: special techniques for exercising and exercises for pain-management (such as autogen-training)
- **Tell a story:** it was updated according to the personal stories sent by users.
- **The chat-room** was inaugurated on 15th December 2004. As it will be pointed out in the conclusion, given the small number of users, this service was not utilized significantly.

As for the forum, in the five months of monitoring 280 messages were inserted by both patients and health professionals. We present in table I some of the messages sent by patients, with examples of answers received (both by other patients - P in the table - and health professionals - HP) and dates of posting. The messages selected represent the main categories of interaction assessed in the forum during the intervention.
## Table I. Categorization of messages posted in the forum of the website

<table>
<thead>
<tr>
<th>Topic</th>
<th>Message</th>
<th>Date</th>
<th>Answer</th>
<th>Sender</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily activities</td>
<td>Although I practice lots of sport, I sit in my office several hours a day. Is there anything I can do to further help my back?</td>
<td>6 April</td>
<td>Try to keep a correct posture: make sure the chair is at the right level; maybe you could put your feet on a little chair. Try to go for a short walk at least every 45’ and avoid turning your neck while using the computer or answering the phone. Let me know whether this is feasible in your work-place.</td>
<td>HP</td>
<td>9 April</td>
</tr>
<tr>
<td>Traditional therapies</td>
<td>What do health professionals think of the issue on VIOX? I did take this medicament for months.</td>
<td>24 March</td>
<td>The case of Viox shows that pain-killers generally should not be taken without caution. They are not sweets. It is fundamental to discuss about it with your doctor and moreover to be precise about doses and types of pain-killers: in high dosage, they can have serious side-effects.</td>
<td>HP</td>
<td>28 March</td>
</tr>
<tr>
<td>Alternative therapies</td>
<td>While surfing on the web, I found an interesting website on alternative therapies. I post the link.</td>
<td>11 January</td>
<td>That is a good website, but consider that alternative therapies do not have scientific validation yet – very often they have placebo effects …</td>
<td>HP</td>
<td>13 January</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Can anyone tell me something on osteoporosis? Is it true that it taking calcium when one is over 50 is not worthy?</td>
<td>23 November</td>
<td>The doctor gives here an explanation of the osteoporosis and then add that it is fundamental to add doses of calcium in the daily diet</td>
<td>HP</td>
<td>24 November</td>
</tr>
<tr>
<td>Smoking and diet</td>
<td>I do not smoke a lot, but I note that smoking a couple of cigarettes a day helps me cope with stress.</td>
<td>22 April</td>
<td>Can’t you find a better way to relax? I do not thing that smoking – even 2 cigarettes a day – helps. Can we work out some other strategies together?</td>
<td>HP</td>
<td></td>
</tr>
<tr>
<td>Physical exercises</td>
<td>I heard about a type of gymnastic called Pilates: is it good for the back?</td>
<td>19 January</td>
<td>The Pilates are good for learning correct postures. But make sure you go to a professional in the field. Many people practice the Pilates without a diploma. In that case, it might be dangerous. The person who teaches Pilates should also have a degree in physiotherapy so that it can understand what is better for your back.</td>
<td>HP</td>
<td>21 January</td>
</tr>
<tr>
<td>Philosophy of life</td>
<td>Do we live in a society that creates invalid people?</td>
<td>3 February</td>
<td>What do you mean with “invalid”? I believe that the society makes us do many things. Is this a problem or a way to become active?</td>
<td>P</td>
<td>7 February</td>
</tr>
<tr>
<td>Stress/relax</td>
<td>Does anyone have a strategy for stress-coping in the office?</td>
<td>7 December</td>
<td>My strategy is to write down all the things I have to do each week, and mark them with P1 (priority one); P2 (priority two) and so forth. And</td>
<td>P</td>
<td>10 January</td>
</tr>
</tbody>
</table>
then I make sure I do things according to these marks!

Pain
My back hurts when I am in bed. Is there anything I can do? The pain is really strong. I never sleep well.
10 February
In your case it is important to understand whether the pain is mechanical or inflammatory. In the first case, in fact, you should visit a physiotherapist. If it is inflammatory, then there are certain medicaments to be taken. But all this should be discussed with your doctors before starting any treatment.
HP 12 February

Feedback
Is anyone interested in having a contribution on the history of back pain (including traditional ways of treating them)?
Message posted by the content manager on December 13
I am very much interested in this topic! Especially because I think that it is an exaggeration to say – as many people say – that low back pain is an illness caused by modern society.
P 13 December

5. RESULTS FROM THE INTERMEDIATE EVALUATION

Evaluation of the effective impact of ONESELF on patients’ pain-related coping – that is the primary outcome variable of our study – is still under elaboration. Yet, data from an intermediate evaluation show that ONESELF was accepted positively by patients. The evaluation was made by collecting data from the monitoring of the website, as well as through an online questionnaire delivered to 18 patients (2 patients out of 20 could not fill the questionnaire) four months after starting the website navigation. In the questionnaire we obtained data on users’ utilization of each specific section of the website and on their self-perceived evaluation of the material published online (in term of comprehensibility and clarity, and utility).

By monitoring users access to the websites using ASPs in VBscript language, we had confirmation that 17 out of 18 patients surfed on the website regularly, for a total of 241 accesses in four month. Apart from the section “Tell a story” and the chat-room (see more on this in the conclusion) that were the less used, patients utilized all the others services of ONESELF on a regular basis. On the basis of a three-point ordinal scale with 1 = low; 2 = good; 3 = very good, 16 out of 18 patients considered the quality and level of comprehensibility of the information provided as very good, while the other 2 as good. As for the self-perceived utility of the website, on the basis of a four-point ordinal scale with 1 = not useful; 2 = less useful; 3 = useful; 2 = very useful, 15 out of 18 patients considered this as useful, 2 as very useful and 1 as less useful (this patient only used the website two times). We include in Table 2 and 3 categories of answers (with indication of the numbers of similar answers received) given by users to explain their qualitative evaluation of the website, as well as categories of answers given on what they would change.

| Pain | My back hurts when I am in bed. Is there anything I can do? The pain is really strong. I never sleep well. | 10 February | In your case it is important to understand whether the pain is mechanical or inflammatory. In the first case, in fact, you should visit a physiotherapist. If it is inflammatory, then there are certain medicaments to be taken. But all this should be discussed with your doctors before starting any treatment. | HP | 12 February |
| Feedback | Is anyone interested in having a contribution on the history of back pain (including traditional ways of treating them)? | Message posted by the content manager on December 13 | I am very much interested in this topic! Especially because I think that it is an exaggeration to say – as many people say – that low back pain is an illness caused by modern society. | P | 13 December |

Table 2. Self-perceived utility of ONESELF

**Why do you think that ONESELF is useful or very useful?**

- It makes me feel better (10)
- It helps me do more exercises at home, without having to go to the gym (5)
- It is my friend (7)
- It has several interesting contributions (8)
- I like the fact that health professionals are there for me (8)
- I can quickly contact an health professionals whenever I need (7)
- It is easy to understand the information it offers and if I have doubts I can ask real doctors (2)
- I feel that I am not alone with my back pain (6)
Table 3. Changes on ONESELF

<table>
<thead>
<tr>
<th>Why would you change of ONESELF?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• I would put more emphasis on new treatments (2)</td>
</tr>
<tr>
<td>• I would like to have more exercises and more frequently (6)</td>
</tr>
<tr>
<td>• I would like to have links to other websites for back pain (2)</td>
</tr>
<tr>
<td>• I would like to meet the other users and the health professionals also personally (2)</td>
</tr>
<tr>
<td>• There should be more users (3)</td>
</tr>
<tr>
<td>• I would leave it exactly as it is (7)</td>
</tr>
</tbody>
</table>

6. CONCLUSION

The present study provides evidence for the feasibility and efficacy of a patient-oriented website such as ONESELF for enhancing self-management of chronic low back pain. For the perspective of this paper it is important to note that, with ONESELF, we have succeeded in creating a community that has been active for the whole five months of the intervention. No patient has ever complained about delays in the expected answers. Moreover, the general feedback has shown that the services available on the website were appropriate for enhancing patients’ requests and interactions. The health professionals involved in the study also confirmed their appreciation for the initiative. Indeed, they all agreed on continuing the experience of ONESELF and exploring it on a larger scale. They did not feel overwhelmed by their role in the project. On the contrary, during the time of the intervention, they became more and more interested in conducting online interactions with users. Moreover, while the health professionals had expressed fears about a deprofessionalisation of their expertise during some discussions before starting the project, during the project they felt that the virtual community of ONESELF could actually become a fruitful enrichment of face-to-face interactions with their patients. Of course, the role of the content manager was crucial in our project, insofar as she coordinated and assured fluency in the online interactions, and paid daily attention to all those factors that, potentially, could have damaged the functioning of the community at a general level.

Our pilot study had, however, some limitations. First of all, since our results concern a small group of patients, further investigations with a larger sample size are needed. Also, although we did exploit the nature of the interactions between doctors and patients, we could not fully investigate interactions among patients. Indeed, patients interact with other patients in the forum, but more interactions would have surely occurred with a larger number of users. The use of the section “Tell a story” and the chat-room were limited by the exiguous number of users. Only 9 stories were published during the interventions and this number did not stimulate patients’ responses. Also, patients who tried to meet others in the chat-room hardly found somebody else. The next step in the evaluation of ONESELF will involve both an extension of the number of users and, consequently, further refinements of the online services offered by the websites and of the modalities of evaluations. At the level of practice implications, the important aspect to underline here is that the experience of ONESELF shows that an online professional presence is perceived positively by patients and creates the basis for a community in healthcare where patients feel benefitted. Moreover, it is compatible with health professionals’ daily duties. However, it is worth repeating, more data are needed on the application of the initiative on a larger scale. It is in fact not clear how it is possible to assure a professionally-monitored website such as ONESELF for larger virtual communities. In principle, one of the strengths of a virtual community is that it could reach wide parts of the population. But an eventual enlargement would imply a rather significant re-organization of the professional team behind the website. We intend to test all these factors in further versions of our study. At present, we hope that our experience will be useful to those working in the same field.

ACKNOWLEDGEMENT

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ENHANCING SOCIAL INTERACTION AND SPREADING TUTOR RESPONSIBILITIES IN BOTTOM-UP ORGANIZED LEARNING NETWORKS

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ABSTRACT
A Learning Network is an ensemble of individual users, institutions and learning resources which are mutually connected through and supported by information and communication technologies. Learning Networks are particularly attractive to self-directed learners, who themselves decide on their learning program as well as on the timing, pace and place of their studies. Such learners may easily become isolated, which is detrimental to their studies. Supporting them is difficult and, if done properly, may rapidly lead to staff overload. This paper discusses ad hoc, transient communities as a means of tackling both problems. It is argued that such communities are well suited to enhance the sociability of a Learning Network and increase learning effectiveness.

KEYWORDS
learning networks, peer tutoring, community building, self-directed learners.

1. INTRODUCTION
A Learning Network (Koper et al, 2005) may roughly be characterized as ‘an ensemble of Learning Network users, institutions and learning resources which are mutually connected through and supported by information and communication technologies in such a way that the network self-organizes and thus gives rise to effective lifelong learning’. It should be noted that the term ‘learning network’ can be used in a number of ways, for example, Harasim (1995) defines learning networks as ‘groups of people who use computer-mediated-communication networks to learn together, at the time, place, or pace that best suits them and is appropriate to the task’. To others they are simply the experiences of students and teachers with the use of computers in learning (C-SALT, 2001). Although all views involve the use of networked computers, there are significant differences. Our view stands apart in that a Learning Network’s organizational, educational and technological characteristics jointly trigger learning of self-directed learners through self-organization (Koper, et al. 2005). And, indeed, studies in other domains show that inductively created organizations can be at least as effective and efficient as top-down designed ones (Bonabeau et al., 1999).

In our conception of a Learning Network, the self-directedness of the learner is taken as the starting point, rather than as an element in a design based on particular instructional principles. A Learning Network thus offers learners opportunities to act that are on a par with the opportunities staff have in traditional, less learner-centered educational approaches. Learners are allowed to create their own learning activities, build their own learning plans, and share their learning activities and their learning plans with peers and institutions. Learner self-directedness, however, may rapidly degrade into learner isolation. Learners who do not feel socially embedded in a community will not flourish, to the detriment of their academic achievement and their perception of academic life. In general, individual success or failure on a learning activity depends on the extent to which learners perceive themselves as participants of a community (Wegerif, 1998).

Self-directed learners are also likely to make extensive demands on tutors. After all, they do not come in cohorts or classes, nor do they have uniform learning paths and goals that may be captured in preset curricula. This learner heterogeneity is bound to lead to a great variety of tutoring requests. Because a social
structure is lacking, self-directed learners cannot easily rely on each other’s help either, which tends to increase the tutor workload even further. What little evidence is available seems to support these arguments (Romiszowski & Ravitz, 1997; Fox & MacKeogh, 2003). Rumble (2001, pp 81, 82) quotes as much as twofold load increases. Generally speaking, an online tutor mainly facilitates student learning processes, a teacher in a traditional setting primarily selects and shares content (Beaudoin, 1990). So in online learning, the tutor is to provide the students timely with feedback regarding their learning process rather than the subject matter or their learning products (Hardless & Nulden, 1999). In practice, however, online tutors are responsible for both the learning process and the learning product. The latter entails activities such as (1) grading, (2) initiating, receiving and responding to messages, (3) collecting and marking assignments, and (4) maintaining and updating course content (Beaudoin, 1990). De Vries, et al. (2005) note that teachers in online and blended learning environments find initiating, receiving and answering questions of students time-consuming. In other words, online tutors receive numerous content related questions that need to be answered. As argued, taken together these responsibilities could easily overload the tutor. It is therefore important to implement techniques that enhance a student’s learning process and yet do not increase, indeed preferably lower, the work load on tutors (Fox & MacKeogh, 2003).

This article proposes that peer tutoring, which is a form of cooperative learning (Griffin & Griffin, 1998), in ad hoc, transient communities, that is, communities that fulfill a specific goal and exist for a limited amount of time, will both enhance the social embedding of Learning Network users and keep the tutor load within bounds or even diminish it. By peer tutoring we mean handing out many tutor related responsibilities, such as providing learner support, to the learners themselves. To make our case for the plausibility of this proposal, we first identify six desirable characteristics of community building (i.e., the social embedding of learners) and of peer tutoring. We then move on to detail what our view of peer tutoring in ad hoc transient communities is all about. This includes a sketch of the technological infrastructure that is needed to support it. Finally, we juxtapose our proposal for peer tutoring in ad hoc transient communities and the desirable characteristics of community learning and peer tutoring that we identified. The issue under discussion is to what extent our proposal does indeed exhibit the desirable characteristics identified. That way, we will be able to answer the underlying question of whether the conception of self-directed learners in a Learning Network is a viable one.

2. LEARNING COMMUNITIES AND PEER TUTORING

2.1 Learning Communities

According to Wenger and colleagues (2002) learning communities are groups of people who acquire new knowledge through cooperation and collaboration. The thriving of such a community depends on its social space, the characteristics of its members and the characteristics of the community as a whole.

A sound social space is characterized by affective work relationships, strong group cohesiveness, trust, respect, belonging, and satisfaction (Kreijns, 2004; Nichani, 2001; Rovai, 2002). Social interaction enhances the emergence of social space. Task-driven interaction, directed towards the completion of assigned tasks, however, could have detrimental effects. When a task entails peer assessment, for example, fear of criticism or reluctance to criticize could interfere with feelings of trust (Rovai, 2002). An individual’s prior expectations of the community could also negatively influence social interaction. According to Brown (2001), individuals who felt that people needed to join voluntarily or felt that face-to-face association was necessary, only developed a sense of belonging and trust if they joined a community voluntarily. So social interaction and, as a consequence, the emergence of social space is facilitated when socio-emotionally driven rather than task-driven interaction is stimulated.

More generally still, three social prerequisites should be met in order for social interaction, in particular cooperation, to occur: (1) any two individuals must be likely to meet again in the future (continuity), (2) all individuals must be able to identify each other (recognizability) and (3) all individuals must be able to know the others’ past behavior (history). If individuals only meet once, they are very much tempted to behave selfishly, which negatively influences the cooperation process. In addition, if individuals are not identifiable
and no history of a person's behavior is available, group members are more likely to act selfishly because they cannot be held accountable for their actions (Kollock, 1998).

The thriving of a community also depends on its inhabitants. First of all, people differ with regard to their experiences with communities. Brown (2001) found that ‘veterans’ showed good community behavior. They were supporting and encouraging peers, sharing knowledge and experiences, reflecting on past learning, and sustaining friendships and/or acquaintances begun earlier. ‘Newbies’, however, depended much less on other group members and were wont to rapidly call for tutor help. They preferred a tight social structure – as in a traditional class - with frequent interaction with and helpful assessment from the tutor. Therefore, it seems wise to populate a community with both veterans and newbies. Because of their experience, veterans model good community behavior to the newbies. Newbies can turn to veterans for support and encouragement, instead of to the tutor. Although this helps to create an online community, veterans need an incentive to continue to interact with newbies. Veterans are inclined to do their ‘duty’ in the beginning but after a while tend to restrict their communication to veterans only, which hinders community building (Brown, 2001).

Second, though most people are trend-followers, but the trendsetters make the difference. Nichani (2001) describes three types of trendsetters: connectors, mavens and salesmen. Connectors form the ‘social glue’ of a community, they are sociable and attentive and rapidly make friends. Mavens are the information experts, they collect and disseminate information. Salesmen are persuaders, they have a tendency to reach out to the unconvinced and persuade them. The absence of trendsetters in a community will negatively influence elementary features such as belonging, trust and social interaction.

Finally and related to the issue of trendsetting, according to Preece et al. (2004) participants of online newsgroups differ in their inclination to either lurk or post in a community. By definition, a lurker belongs to a community but never posts in it. The percentage of lurkers in communities ranges from 0 to 99. So, lurkers appear to make up only 45% of health support communities, while they may account for as much as 82% of software support communities. Reasons for not posting range from 'didn't need to post', 'needed to find out about the group', 'couldn't make the software work', 'didn't like the group' to 'had nothing to offer'. Posters and lurkers join a community for the same reasons. However, posters feel their needs are better met, perceive more benefits and feel a greater sense of membership than lurkers. Partly because posters do not regard lurkers as inferior members, lurking is not necessarily a problem in active communities. Without a critical mass of posters, however, a community will never thrive (Preece et al., 2004).

Communities are characterized by (1) boundaries, (2) rules, (3) monitoring possibilities and (4) sanctioning mechanisms (Kollock & Smith, 1996; Koper, et al., 2004). Successful communities have clearly defined boundaries. These boundaries protect the collective good of the community to outsiders and encourage ongoing interaction because the group members are likely to meet again. In addition, communities have a set of rules that govern the use of common resources and that point out who is responsible for producing and maintaining the collective goods. Community members should be responsible for setting and modifying these rules themselves. As was discussed earlier, individual accountability facilitates cooperation. By monitoring each other's actions in a community, members see whether their fellow members comply with the rules; if so, this will make them more willing to comply themselves. A transparent community with clear boundaries and rules allows group members to sanction the behavior of other group members. This happens mostly by informal social control mechanisms but sometimes more firm measures are necessary. These measures could be as severe as banishment from the group. So, monitoring and sanctioning, if used wisely, are important facilitators of cooperative relations (Kollock & Smidt, 1996).

### 2.2 Peer Tutoring

Fox and MacKeogh (2003) studied the effects of peer tutoring on invested tutor time. Students had to make a synopsis of a relevant article and identify important issues by raising questions. Their work was then put on a bulletin board. Students had to read the synopses posted by their peers and react to it. An online discussion could then follow. Fox and MacKeogh compared this set-up to a face-to-face setting. The tutors in the online situation spent less time than the face-to-face tutors. This did not result in a decrease in knowledge construction: both groups achieved the same learning outcomes. So, the time investment for the online tutors was reduced by implementing peer tutoring while learning effects remained unaltered.

From the perspective of this paper, (face-to-face) peer tutoring has the beneficial side-effect that it provides learners with a reciprocal social support system (Fantuzzo et al., 1989). The highest academic
productivity is reached when the performance of group members is transparent and quantifiable to all other group members (Slavin, 1995). Fantuzzo et al. (1989) report less overall subjective distress for students who followed their peer tutoring strategy and thus were individually accountable. Furthermore, satisfaction with academic life is enhanced by peer tutoring. It also appears to have a beneficial influence on the ‘class’ climate (Gyanani & Pahuja, 1995). Students involved in peer tutoring are more intrinsically motivated and more engaged with the learning environment, have a more positive perception of their learning, and experience less task-related anxiety than students who work independently (Fantuzzo et al., 1989). Besides, cooperation stimulates reflection; the peer interaction improves self-esteem and commitment to work as well as a sense of belonging (Anderson et al., 2000). Anderson et al. (2000) also note that the more time a student spent on a project during a first tutorial, the more committed he or she is to attend subsequent tutorials.

As a further side-effect, peer tutoring may enhance learning or knowledge construction. Although Fox and MacKeogh (2003) failed to find beneficial effects of peer tutoring on learning or knowledge construction, a number of other researchers found that peer tutoring did indeed help tutors and tutees to achieve higher learning outcomes (Fantuzzo, et al., 1989; Gyanani & Pahuja, 1995; King et al., 1998; Wong et al., 2003). Interestingly, research shows that tutors benefit more from peer tutoring than tutees. This derives from such tutor activities as preparing to teach and, most importantly, to actually teach (Fantuzzo, et al., 1989). Therefore, reciprocal peer tutoring is advocated, in which learners take turns in assuming the tutor role and the tutee role (Fantuzzo, et al., 1989; King, et al., 1998; Wong, et al., 2003).

Most reciprocal peer tutoring strategies provide those in the tutor role with a structure that supports them to effectively guide their tutee's learning process (Hummel et al. 2006). Wong et al. (2003) use cognitive tools that supply task specific support to the tutee, diagnosis and comment support to the tutor, and a dialogue structure to both the tutee and tutor to facilitate communication. King et al. (1998) taught their students four types of questions that they could use in the tutor role to guide the tutee: review, probing, hint, and thinking questions. The questions are best used in this order. Finally, Fantuzzo et al. (1989) asked their learners to create ten multiple choice questions with answers and references to where the answers could be found in the learning material. Subsequently, these tests were administered to a tutee, the answers were scored by the tutor and the wrong answers were discussed. According to Fantuzzo et al. (1989) such structured-learning formats and the mutual exchange process involved in peer tutoring are responsible for the beneficial effects on knowledge construction and social interaction.

According to King et al. (1998) such structured-learning formats help shift the dialogue between tutor and tutee to a higher cognitive level, that includes mutual exchange of ideas, explanations, justifications, speculations, inferences, hypotheses, conclusions, etc. Their research confirmed that such high-level discourse facilitates learning through knowledge construction: the structure that offered guidance on questioning and sequencing led to superior knowledge construction; the structure that only offered guidance on questioning led to more knowledge construction than a structure with no guidance. This was confirmed in an 8-week follow-up retention test. Greenwood et al. (1989) also emphasize the importance of high-level interaction for knowledge construction. They carried out a longitudinal study on peer tutoring in a classroom setting and found their students to be more deeply engaged in academic behavior and less engaged in task management behaviors. The students thus achieved higher learning outcomes than students in regular classes.

3. SETTING UP PEER TUTORING IN LEARNING COMMUNITIES

How could Learning Network based peer tutoring best heed the recommendations made in the previous section? We propose to use ad hoc transient communities for this. Any such community is brought into existence to fulfill a particular request, say, answering a content-related question (their ad hoc-ness); it exists for a limited period of time only, until the content question has been answered satisfactorily (their transience). Requests may differ widely; they may concern the learning content or the learning processes; they may imply asking for an assessment, for additional learning materials, and even for information regarding administrative matters (De Vries et al., 2005). The community consists of at least two Learning Network users: exactly one in the role of tutee, and one or more in the role of tutor. Although, common sense tells us that the group size of the community should not be too large (about five people?) the cooperative learning literature does not provide specific guidelines on how to determine the optimal group size. Most of the time no distinction is made between interaction patterns for dyads, small groups (up to six members), and
large groups (seven or more members) although the interaction patterns may differ (Strijbos et al., 2004). However, since the number of inactive group members (i.e. lurkers) increases as group size increases (because of the lessened individual accountability of the group members), the effect of the increased group size on the interaction patterns of the active members may indeed be negligible (Kollock & Smidt, 1996).

Suppose an ideal size has been decided on, a mechanism or a procedure is then needed to actually populate the community. This only applies to the tutors. We assume an ad hoc transient community always to start with some Learning Network user who has a specific request and thus adopts the role of tutee. For the tutor role, suitable peer Learning Network users have to be selected. The lack of classes, cohorts or other readily available, homogenous groups of users makes it hard to identify candidates. Furthermore, even if potential peers could be identified, it wouldn’t do simply to appoint some of them as this would violate the bottom-up character of the Learning Network and the self-directedness of its users. Therefore, a rather sophisticated procedure is needed, first to identify and subsequently to select peer tutors from all the Learning Network users. Here, an example procedure is worked out for a request concerning a content-related question. *Mutatis mutandis* it applies to other kinds of requests as well.

Four different questions have to be answered to identify a suitable Learning Network user:

1. Has he or she sufficient mastery of the content to answer the question (*content competency*)?
2. Is he or she a sufficiently competent tutor to support the tutee (*tutor competency*)?
3. Is he or she eligible to answer the content question (*tutor eligibility*)?
4. Is he or she available to support the tutee within an acceptable timeframe (*tutor availability*)?

Content competency reflects the peer tutor's mastery of the relevant content. A digital portfolio in which the learning activities of a Learning Network user have been logged is the best resource from which to determine this. Tutor competency refers to the ability of a peer tutor to satisfactorily support peers who have questions with regard to content. This information could be acquired by letting tutees rate peer tutors’ past performance. The content competency as well as the tutor competency of a Learning Network user should be visible to all members of the community to assure individual accountability (Slavin, 1995). For the same reason, rating should preferably not be anonymous nor pseudonymous.

Tutor eligibility helps spread tutor responsibilities over all Learning Network users. If content and tutor competency were to be the only factors deciding who becomes a member of a content-related, ad hoc transient community, a run-away effect is bound to occur. First, those who participate often are likely to become better tutors, if only since they are in a position to accumulate points on ratings. Second, assuming a (partial) hierarchical organization of the content, who has progressed furthest will be able to answer most questions. Even worse, since staff people should have superior content and tutor competencies, learners are unlikely ever to become tutors. But this is undesirable both from an economic (not overloading staff) and a pedagogic (having learners learn from tutoring) point of view. To avoid this, a comparison should be made between the tutee's portfolio and the portfolios of the potential tutors. Only those tutors are eligible that are in the tutee’s ‘zone of proximate development’; that is, potential tutors with far superior content and tutor competence should be excluded. Research shows that teaming up tutees with nearest neighbors who have portfolios equal to theirs, is as beneficial for learning as teaming up tutees with nearest neighbors who have better portfolios (King et al., 1998). Finally, tutor availability refers to such practical issues as actual short-term presence in the Learning Network (avoiding absence due to holidays, days off, illness, etc.), or workload (i.e., studying for exams, past participation in the communities). This information could be retrieved from an online calendar that Learning Network users are required to maintain.

So, following our example, a content question has been raised by a Learning Network user and a small number of suitable peer tutors have been identified. Once the peer tutors are members of the community, they should start working on the answer for the content question. This is an ill-structured, collaborative process that should encourage group members each to equally contribute to a final answer (Strijbos et al., 2004). The collaborative process should continue until the tutee is satisfied with the answer thus constructed. At that point in time the ad hoc transient community has outlived its purpose and ceases to exist.

So far, we have been silent on the technical infrastructure that is needed to set up and run ad hoc, transient communities. We will briefly touch upon the most important elements as it helps portray how ad hoc transient communities may function. To be able at all to populate such communities with Learning Network users, user characteristics need to be stored in a repository, at least for as long as they are part of the Learning Network but preferably longer so that they may leave, go to another, similarly equipped network and come back. A permanent, sufficiently rich digital portfolio that is maintained outside of a specific Learning Network would be ideal. Software agents or similar devices are needed to mine these repositories and
compute a Learning Network user's tutor suitability. Ideally also, when asked to answer a question, tutors should not have to start from scratch but be given proto-answers derived from existing text bodies. Proto-answers should be ranked for suitability, using language technologies such as perhaps Latent Semantic Analysis (Van Bruggen et al., 2004). Finally, a system should be available which offers tutee and tutors a collaborative workspace. It should be seeded with the proto-answers and maintain a historical record of the changes that the participants have made. It should also be equipped with mechanisms that alert the participants to new contributions. Systems that combine the functionalities of a wiki, for collaboration (cf. http://en.wikipedia.org/wiki/Wiki), and a blog, for alerting through some kind of RSS-based mechanism, would come close to meeting these criteria (cf. http://en.wikipedia.org/wiki/Blog).

4. CONCLUSION

In the introduction, we argued that the self-directedness of Learning Network users creates at least two problems. First, in so far as self-directedness leads to isolation, it negatively affects students’ academic achievements; second, in so far as it leads to heterogeneity, it increases the workload of tutors. We proposed that peer tutoring in ad hoc, transient communities would solve these problems. A survey of the extant literature taught us six important lessons, which we will summarize here. First, for a social space to emerge, one should establish continuity of contact, recognizability of members, and a historical record of actions. Second, to assure the liveliness of a community, it should be populated with a heterogeneous group of veterans and newbies, connectors, mavens, and salesmen, lurkers and posters. Third, to facilitate cooperation, clear boundaries and a clear set of rules that can be monitored and sanctioned are required. Fourth, peer tutoring increases the time-effectiveness of a tutor as it spreads the tutor workload over peers. Fifth, it also enhances the social embedding of students in a learning environment. Sixth, it promotes higher-order, academic cognitive processes if tutor(s)-tutee groups are supported to structure their interaction. So, to what extent may peer tutoring in ad hoc transient communities help solve the problems of learner isolation and tutor overload?

Recognizability of members can be guaranteed by banning the use of aliases such as screen names; this seems a reasonable demand to make in the context of a network devoted to learning. If one does not want to rule out pseudonymity entirely, users that go by a pseudonym should adopt one that they keep throughout their membership of the Learning Network. A historical record of user actions can easily be maintained by logging all their actions, the most significant of which become part of the user's e-portfolio; continuity of contact during the community’s admittedly short lifetime can be guaranteed (1). The mechanism by which communities are put together guarantees that they consist of exactly one newbie and a few veterans – the tutors. Furthermore, all are by definition posters, although some may behave as lurkers more than others. The happy mix of connectors, mavens, and salesmen, naturally follows from heterogeneity of the Learning Network as a whole (2). The way an ad hoc transient community is formed, sets a clear boundary to it. Furthermore, it obviously operates according to a clear set of rules that, since they make up the design of any ad hoc transient community, are difficult to cheat on (3). By their very design, ad hoc transient communities spread tutor workload over peers (4). Because they require tutors to collaborate on answering the tutee's question, these communities seem likely to facilitate engagement, commitment and a sense of belonging (5). Similarly, this collaboration will probably also promote higher-order, academic cognitive processes (6).

In conclusion then, ad hoc transient communities fulfill some of the expectations because they are designed to do so. This applies to items 1, 2, and 4 in particular. For the other expectations (3, 5 and 6) it is a priori likely that they will, but ultimately it is an empirical question whether they actually do. There is a literature on the notion of swift trust that lends support to item 5 (Meyerson et al. 1996; Coppola et al., 2004). Swift trust emerges in temporary teams whose existence is formed around a clear purpose and common task with a finite life span. Ad hoc transient communities seem to fit this bill eminently. Swift trust fosters a willingness to suspend doubt about whether others, who are ‘strangers’, can be counted on in order to get to work on the group's task. Swift trust thus helps establish engagement and commitment, elements of item 5. For the other items, and ultimately for item 5 too, only experiments can provide answers.

It has been this paper's objective to investigate whether ad hoc transient communities could plausibly help to bring structure to communities of self-directed learners such as found in Learning Networks. We now have established that they are useful, both in that they increase sociability (items 1, 2, possibly 3) and enhance
learning effectiveness (item 4, possibly 5 and 6). But does their use end here? At this juncture, of course, one can only speculate as to what other benefits may be reaped from them. First, the content question and its answer could be stored in a list of frequently asked questions (FAQ). This would benefit future Learning Network users with a similar question. Of course, if an answer is answered by consulting a FAQ, there is no need anymore to establish an ad hoc transient community for it. One has to choose between fulfilling the individual learners' need for a quick and adequate answer and the community's need for increased sociability, from which ultimately the individual users will also profit. This is as much an ethical question (Is it morally defensible to withhold an answer to an individual for the benefit of the whole?) as a practical one (Will users abandon the mechanism of the ad hoc transient community in favor of other, speedier mechanism?).

Second, even though each particular ad hoc community disappears – once the question has been answered the very reason for its inception has vanished - its members could be helped to stay in touch. After all, sociability is a virtue in itself and by allowing the fleeting relationships that have emerged in the ad hoc transient community to last, sociability in the Learning Network as a whole is fostered. At the negative side, when users build up such networks of their own, it becomes gradually less likely that they will make use of the ad hoc transient community as a mechanism to have their questions answered. This has several negative side-effects. For one, if users form their own subgroups in the larger community, they might be less inclined to interact with people outside their little community. This is detrimental to the quality of the peer tutoring as fewer peer-experts are available.

More importantly, even though the tutee may be satisfied with the answer that has emerged from the ad hoc transient community, he or she may still want to learn more about the subject. One way of doing that would be to go and find additional materials in the Learning Network or to ask another question. An alternative approach would be to take out a 'subscription' on similar, future ad hoc communities. Similarity could be defined in terms of the people that are drafted to serve on the future communities but also in terms of subject matter similarity (perhaps measured via Latent Semantic Analysis). The original tutee could then be alerted via for example an RSS-feed, and follow or even contribute as a peer to the discussion in the new community.

No doubt, many more potential uses of the ad hoc transient community mechanism and, no doubt, even more qualms surrounding its use, may be identified. The above examples suffice to indicate the kind of largely speculative discussion that issues from suggesting such uses. It will therefore be our first priority to implement the basic mechanism and carry out pilots with it.

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STRUCTURAL ASPECTS OF ONLINE SOCIAL NETWORKING SYSTEMS AND THEIR INFLUENCE ON KNOWLEDGE SHARING

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ABSTRACT
This paper is relevant to the process view on knowledge management, where the emphasis lies on sharing through interactions between people. This is different from object-based approaches, which concentrate more of the packaging, storage and retrieval of knowledge.

Seeing knowledge sharing as a social exchange process, this paper describes the multi-level structure of existing online social networking systems and how each level or space plays a part in facilitating knowledge sharing. In addition, each level generates a dynamic in relation to the other spaces which, taken together, allow the creation of bottom-up groups and provide feedback information on people’s identities. These spaces, and the interactions between them, provide a framework which increases understanding of knowledge sharing within online social networking systems.

Evidence is presented indicating that more knowledge is shared in groups with a closed membership. Finally, some functional extensions of the group and dyadic spaces are suggested.

KEYWORDS
Social software, online social networking, communities, knowledge sharing, social exchange

1. THE OBJECT AND PROCESS VIEW ON KNOWLEDGE MANAGEMENT

The knowledge management field can be divided according to two streams: the object view and the process view (Alavi & Leidner 2001, Newell et al. 2002, Stemarks 2001, Szulanski 2000). The object view sees knowledge as something which can be packaged, stored and retrieved as is the case for objects in general. Examples of this approach are document management systems, lessons learned databases and best practice databases. Yet arguments of a constructivist nature oppose the object view by pointing to problems of externalization and interpretation of information (Fosnot 1996). Furthermore, the updating of the knowledge artefacts and the motivation for contributing knowledge to the system pose often turn projects based on the object view into failures.

The process view recognizes knowledge as a constantly constructed personal entity and focuses on flows of information between people as a result of the articulation of personal knowledge. Indeed, according to Newell et al (2002), knowledge management is a matter of managing interactions between people. This approach takes into account the constructivist nature of knowledge and recognizes that it is deeply context-specific. Moreover, the process view acknowledges that certain social aspects have to be taken in account in order to manage knowledge. As knowledge exists strictly in humans, it can only be managed by managing humans.

As a result of this focus on inter-personal interaction, communication channels are very important in the process view. The dramatic cost reduction which communication technologies like VOIP and instant messaging have introduced may lead one to expect that knowledge sharing over rich computer mediated communication channels would increase between geographically dispersed individuals. Yet, this does not
take place due to a lack of certain social preconditions between people who have never met face-to-face. This paper explains that online social networking systems feature functionalities which create some of these social preconditions and therefore support knowledge sharing. The promise of such systems is to act as a catalyst to knowledge sharing between spatially distributed individuals. This has its uses in society as a whole, or in large, distributed organizations.

2. SOCIAL PREREQUISITES TO KNOWLEDGE SHARING

2.1 Social Exchange Theory

An important prerequisite for knowledge sharing is a motivated knowledge contributor. Indeed, a problem often encountered in knowledge management projects is that people hoard their knowledge (Davenport & Prusak 1998).

According to social exchange theory (Homans 1958, Blau 1964, Coleman 1990), many transactions between people are governed by an often implicit desire for reciprocation. Aside from situations of altruism and physical coercion, a person (the source) who gives something to another person (the receiver), implicitly expects something in return (Blau 1964). As knowledge sharing events seem to follow the same logic, social exchange theory offers a useful theoretical basis to increase the understanding of motivational issues. As will be explained in the following sections, two main social exchange issues need to be addressed: interest and trust.

Coleman (1990) argues that the source decides whether or not to engage in social exchange based on the probability that a person will reciprocate, the gain expected from reciprocation and the loss expected if the receiver does not reciprocate. Still, when applied to knowledge sharing, it is not clear what loss a source who has contributed knowledge to another person would incur if the receiver does not reciprocate. However, there is a cost of contributing knowledge which applies whether the receiver reciprocates or not. Based on Coleman (1990), I therefore propose the following formula, which the source uses when deciding to contribute knowledge or not:

\[ P \times G - C \]

In this formula, \( P \) is the degree to which the source trusts that the receiver of the exchange will reciprocate, expressed as a probability. \( G \) is the gain experienced from reciprocation. \( C \) is the cost involved in externalizing and transferring knowledge over a communication channel. Due to lack of space, a discussion of the parameters which further define the value of \( C \) is postponed to Coenen (2006).

If the above expression is felt to be positive, the source will tend to engage in social exchange. If the expression is felt to be negative, the source will tend not to provide the good. In most social exchange situations, the different variables in the above expression are not quantifiable but are “felt” by the parties involved.

The remaining discussion in section 2 focuses on elements which influence the first term in the above formula. In the remainder of this paper, knowledge sharing should always be understood as a process of social exchange.

2.2 G: Interest & Identity

In contrast to economic exchange, the nature and value of the good which the receiver is expected to reciprocate after receiving knowledge from the source is vague. Even so, the source is unlikely to give something to the receiver when the receiver does not have something potentially useful to give in return. Such a situation would correspond to a small value of \( G \). Therefore, a degree of interest in the other party is necessary if knowledge sharing is to occur (Borgatti & Cross 2003). A positive interest means the contributor expects a substantial, yet possibly undefined value of \( G \) to result from the exchange.

In order to have an idea of whom one is dealing with, it is necessary to have a means of deducing a person’s identity. A source who is asked for advice by a receiver will be more willing to assist if she has an idea of what the inquirer has to offer. A representation of identity will therefore influence the interest in reciprocity, providing this representation includes information on skills, education, project involvements, etc…
2.3 P: Trust

In an online environment where face-to-face contact is scarce, people can project any identity they want. Users are aware of this and will therefore mistrust the identity of others, which lowers the value of P and increases the possibility that the formula in 0 will be negative.

If a source does not trust that he will be reciprocated after contributing knowledge, the source will be reluctant to engage in the exchange (Blau 1964, Coleman 1990). Trust depends on a history of successful interaction (Coleman 1990). The more successful exchanges have occurred between two people, the higher the trust between these people will be.

2.3.1 Reputation

In a situation where a source and a receiver do not have a history of interaction, both parties can evaluate each other’s trustworthiness based on their reputation. Such reputation is the result of past interactions of both parties with other people.

A positive reputation increases the value of P, in turn increasing the odds that the source will decide to engage in social exchange. In addition, a gain in reputation can also be seen by the source as raising the value of G. This is the situation where an increase in reputation is perceived as a gain in its own right.

Thus, reputation is an important element in bringing about knowledge sharing, as it impacts two elements in the above expression.

2.3.2 Group stability

Not all knowledge sharing takes place between two people. In many situations, knowledge is shared in a group of people around a common practice (Wenger 1998). In such community situations, reciprocation can be expected from any other member of the group. This increases the value of P and makes it more probable that people will share knowledge.

According to Kollock (1999), the stability of the group is an important element which influences the group’s ability to raise P. Membership stability, or the degree to which members of the group stay the same over time, depends on how well the boundaries of a group are defined and defended. A stable group decreases the chances that people will enter the group, take the knowledge and never give anything in return.

Furthermore, stable groups make it easier to enforce group norms. As groups are more stable and their participant get to know each other better, the social network structure of the group becomes denser. This means it will be harder for any member to escape the attention of the other members. Hence, a dense social network structure makes it easier for the members of the group to enforce norms (Coleman 1990). Especially the emergence of norms regarding reciprocation will facilitate knowledge sharing in stable groups (Gouldner 1960).

3. ONLINE SOCIAL NETWORKING SYSTEMS

Section 3 contains a description of online social networking systems, their structure and how they can facilitate knowledge sharing by influencing the elements described in 2.

3.1 Description

An online social networking system aims to expand the social networks of its participants, a social network being a collection of people and relationships between people. As there are different kinds of relationships between people, different types of online social networking systems exist addressing different types of relationships. This is shown in Table 1.
Table 1. Different types of online social networking systems create different kinds of relationships

<table>
<thead>
<tr>
<th>System type</th>
<th>Relationship type</th>
<th>Examples of systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dating</td>
<td>Sexual</td>
<td>MSN dating</td>
</tr>
<tr>
<td>Friendship</td>
<td>Friendship, information sharing</td>
<td>Orkut, Friendster, Yahoo!360, MySpace</td>
</tr>
<tr>
<td>Academic/Business</td>
<td>Friendship, information sharing, collaboration</td>
<td>Academici, Ecademy, Biztribe, OpenBC, Linkedin</td>
</tr>
</tbody>
</table>

Dating systems are probably the most popular type of online social networking systems, but are of limited interest from a knowledge sharing perspective and will therefore not be discussed. Still, they can inadvertently lead to knowledge sharing, as they also foster new social relationships. Social relationships are necessary conduits over which information can flow to achieve knowledge sharing. As was explained in 0, P is increased as more successful exchanges have been experienced. Hence, existing social relations pave the way for possible future knowledge sharing.

After a review of the functionality offered in a number of online social networking systems of the friendship and academic/business type (LinkedIn, Ecademy, OpenBC, Academici, Orkut, Friendster, Yahoo!360, MySpace), I conclude that they are variations on the same multi-levelled structure. This structure is shown in Figure 1 and will be further elaborated in the remainder of section 3. Due to a lack of space, the empirical evidence which has led to this structure cannot be discussed here and is again postponed to Coenen (2006).

Figure 1. Common multi-level structure of online social networking systems and the relation between each level

3.2 Identity Space

People’s representation in the system is achieved through a number of signals which constitute their projected identity. To provide these signals, the user can access his profile at will. In the various online social networking systems, either structured information, unstructured information, or a mix of both is provided as part of the identity space.

Structured information is entered by filling out HTML forms, asking for diplomas, past jobs, hobbies etc. Some systems allow users to add Folksonomy-like tags to their profiles. These tags can be considered a way for the user to meta-tag his identity.

When the profile contains unstructured information, the user is free to say whatever he wishes about himself. This is done using a WYSIWYG interface, allowing the creation of web-based content without prior knowledge of the mark-up languages used to compose such content.

Especially in systems in which unstructured information is part of the profile, a richer image appears of the person on the other side of the internet connection. In this way, relationships can be established based on interest. In addition, the identity provides personal cues which are important in allowing rich communication (Daft&Lengel 1986). Therefore, the information which is provided in the identity space partly serves as a basis for the creation of dyads, as is depicted by the lower-right arrow in Figure 1.
3.3 Dyadic Space

Undirected one-to-one relationships are called dyads in social network analysis literature. A dyad is of a certain type (e.g. “friend of”, “relative of”, “informant of”) and can have a certain strength. When the relationships, existing in a group of people are mapped, a social network emerges, in which people are nodes and dyads are represented by edges, with varying strength.

3.3.1 Network View

Many online social networking systems have publicly accessible network views. In these views, users can oversee the social network and find out who is connected to whom. Generally, a network view contains only limited information on the weight of the edges. This weight is often attributed explicitly by the members of the dyad, as will be explained in section 0.

In the pragmatic context of online social networking systems, the network view is useful to search the system for interesting people in an undirected way. It offers a way to browse the system, by hopping from one user to another over the visible ties. The idea is that the people you know and value in the system may know other people who could be interesting to yourself.

The network view also offers a way to circumvent the cold call problem which occurs when contacting someone you have never met before. People are less willing to help if contact is made through such a cold call, as both $P$ and $G$ are unknown. An introductions mechanism can help to overcome this issue. After ego has found alter to be interesting, he seeks a contact that is well known to both ego and alter. The contact is then asked to introduce ego to alter. Such an introduction can increase $P$, as the source gets more information on the trustworthiness of the receiver. In addition, reciprocation may not be carried out by the receiver, but by the third party who carried out the introduction. This can cause a higher value of $P$.

Still, if alter is more than one intermediate contact away, a chain of introductions has to be arranged. To allow a user to find a path from his existing contacts to a certain alter he wishes to contact, some online social networking systems like LinkedIn and Orkut feature a path detection functionality. Using this function on alter will show a path through the social network which can be used to engineer an introduction towards alter.

Another function of the network view is to increase trust between ego, who is looking for specific information, and alter, as a possible contributor. This occurs when alter finds out through the network view that ego is connected to another person trusted by alter. Relying on other people’s judgement can be enough to trust another person, in a “friends of my friends are my friends” logic. In addition, more risk is involved in behaving badly towards a person who is closely connected to one or more valued contacts (Granovetter 1985, Burt 2001, Donath & Boyd 2004). This makes a relationship between two people who know they share mutual contacts more likely to prosper.

3.3.2 Dyadic Attributes for Identity Feedback

As was discussed in section 0, identity and trust are necessary for knowledge sharing to occur. It is hard for people to trust someone about whom they know nothing. Yet, profile information is not enough to convince other users that the person is who he claims to be and is worth interacting with. Therefore, various online social networking systems contain feedback signals which reinforce the information provided in the identity space, causing increased trust in reciprocation ($P$) and thereby facilitating knowledge sharing (depicted in Figure 1 as the lower right arrow).

The dyadic space, in which users can rate each other, can only be accessed by the members of the dyad. It allows them to attach certain feedback attributes to the relationship. I call such attributes identity feedback signals. Identity feedback is included in the system by co-opting interaction data and making it publicly available. They include:

1. Number of contacts
2. Positive and negative ratings
3. Testimonials

A first kind of identity feedback signal is available in most systems as an indication of the number of confirmed contacts a user has established. A confirmed contact is one where both parties have implicitly or explicitly agreed to be listed in each others network. The higher the number of people who have interacted with you, the less likely it is that your profile contains false information (Donath & Boyd 2004). Indeed,
these people will have interacted with you and will have been able to judge if your identity was truly what you described it to be.

Rating systems are a second type of feedback mechanism. They allow both participants in the dyad to rate each other. This can be done by assigning a score related to a certain characteristic of the user. Most systems allow only positive signals to be attributed, while others also make it possible to flag a certain person as a fraud or assign a negative rating.

Finally, certain systems allow users to write testimonials on each other. As this permits the use of free textual description, this is a rich way of providing feedback on multiple personal characteristics.

The described feedback signals all serve to build the reputation of a user in order to facilitate future information sharing. They therefore influence P. A good reputation will make others more trusting to be reciprocated and therefore more willing to contribute.

3.3.3 Extending the Dyadic Space

Still, most online social networking systems do not provide a weighing of ties in the network view. Weighed ties would offer important additional feedback information, as it is not only the number of contacts, but also the intensity of their interaction which reinforces a user’s identity and increases trust. For example, 200 contacts with which a person has exchanged 2 messages on average offers less guarantees in terms of identity than having the same number of contacts with whom 10 messages have been exchanged on average.

Such weights could be attributed to dyads by tracking the number of messages over the internal messaging module, which is a part of most online social networking systems. These modules allow users to track the messages which have been exchanged between them. Their functionality is almost identical to an email client. The number of exchanged messages could figure as additional identity feedback signals. However, privacy issues should not be disregarded and the user should retain control over what information he chooses to divulge.

3.4 Dyad-Identity Autopoietic Cycle

Reputation, created through identity feedback, increases the chances that other users will want to interact with ego. The dyadic space, through the identity feedback signals it provides, reinforces identity and trust, which, through their impact on P and G, contribute to the creation of new dyads. In Figure 1, this double causality loop is shown as the lower two arrows. This can be considered to be an autopoietic (Varela&Maturana 1980) structure. In such structures, the higher level elements, characterized by a certain degree of closure, help in the creation of the elements of which they are themselves composed. Another autopoietic cycle exists between the dyadic and the group space, as will be explained in section 0.

3.5 Group Space

Many online social networking systems feature the possibility of setting up group spaces. Such spaces feature a limited set of tools for the support of group communication. These are mostly forums, on which users can post messages and where discussions can be hosted. Another feature of the group space in online social networking systems is the membership list. Browsing this list allows other members to get information on the identity of the other group members.

3.5.1 Partitioning

Groups can be seen as the assembly of dyads into a larger whole. A group can start as containing only one dyad. After it has been set-up, the group expands by gradually granting access to new members. Aggregation of dyads in a group structure results in expanding groups, where members add new members who they already know to the group. Thus, the group expands by incorporating new dyads within its boundaries (the upper-left arrow in Figure 1). Especially in closed groups, this seems to be an important way in which membership is expanded.

One possible explanation is that groups, according to Feld (1986), constitute foci, which play an important role in the creation of new dyads.
“A focus is defined as a social, psychological, legal or physical entity around which joint activities are organized. As a consequence of interaction associated with their joint activities, individuals whose activities are organized around the same focus will tend to become interpersonally tied and form a cluster[...] Foci can be many different things, including persons, places, social positions, activities and groups.” (Feld 1986, p1016 & 1018)

Sharing a common focus can cause new dyads to be created. As this is exactly what happens in online social networking systems it can be said that such systems act as foci.

In Feld’s theory, not all foci have the same capacity for creating dyads. As the focus forces more people to interact with each other, the focus is more constraining. Constraining foci are thus more successful at creating new dyads. An example of a constraining focus is a team in an organization, while a party is an example of a much less constraining focus. In the team, people are interdependent and therefore forced to interact. At a party, where much less interdependence exists, chances are lower that people will meet up and engage in some form of social relation.

Size is also an important element in determining the generative capability of a focus. The larger the focus, the more people participate in it. In general, larger foci will be less constraining, as it is more difficult to produce interactions between people in a large group (Feld 1986). As online social networking system are very large foci (most have several thousands active members), they produce relatively low constraint and are therefore, as foci, rather ineffective at creating new dyads.

An important element in Feld’s theory is that under pressure of time, effort or emotion, people will create new foci which allow them to bundle disjoint dyads. This occurs for example when people decide to throw a party bringing all their friends together or when the parents of the husband and the wife are invited to the same Christmas dinner. Existing, disjoint dyads are then made to interact under the influence of a common focus.

Similarly, foci are created in online social networking systems, in the form of group spaces. These groups form around some common topic of interest and support the creation of new dyads (as show by the upper-right arrow in Figure 1), which is the essence of online social networking systems. Therefore, online social networking systems which lack group support miss out on the generative abilities of groups which subdivide the user base in smaller partitions, acting as more constraining foci.

### 3.5.2 Open or Closed Membership

Groups can have an open or a closed membership policy. In an open group, everyone can access the content of the group. In a group with closed membership, one has to apply to become a member.

There is evidence that closed groups generate more knowledge sharing than open groups. Data on all groups in the Ecademy online social networking systems where gathered. After computing the number of messages exchanged per day and per person, the results shown in Table 2 where found.

<table>
<thead>
<tr>
<th>Open</th>
<th>Number of groups</th>
<th>Mean MsgPerDayPerPerson</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>1196</td>
<td>0.0737</td>
<td>0.32701</td>
</tr>
<tr>
<td>no</td>
<td>304</td>
<td>0.2534</td>
<td>1.29872</td>
</tr>
</tbody>
</table>

There were much less closed groups than open groups (1196 open, 304 closed). However, the mean number of exchanged messages per day and per person in open groups was around 3.4 times higher than in closed groups. An independent samples t-test, without assumption on the equality of variance confirmed that this difference in means is significant at 0.983.

As was explained in 0, members may feel the chances of being reciprocated in a closed group as a consequence of generalized reciprocity are higher, increasing P. In addition, a stable user membership will gradually make the members of the group more and more interconnected, enabling the emergence and enforcement of group reciprocation norms. Which one of these supposed causes predominates should be further investigated.

### 3.5.3 Extending the Group Space

In terms of functionality at the group level, most online social networking systems are very limited. Apart from a forum and a list of participants, no further support for knowledge sharing is provided. This could be
improved by further structuring group communication. Indeed, structured communication between many participants does not always occur in an efficient way if left to ad-hoc improvisation. Much can be gained by adding tools which structure communication between multiple parties, like group decision support systems.

In addition, the group can be a conductive environment to the sharing and creation of knowledge. As some authors (e.g. Mednick 1962) claim, creativity can be caused by interconnecting cognitive concepts that where not previously connected. Such concepts can be acquired by fostering rich communication between people from different disciplines and providing tools for knowledge creation. Group decision support systems, wiki’s, foskonomy systems, VoIP conference calls and cognitive mapping tools are all candidates for improving the group spaces of today’s online social networking systems in support of knowledge sharing and creation.

3.6 The Group-Dyad Autopoietic Cycle

As was explained in section 0, groups are created by aggregation of existing dyads, and groups in turn help in the creation of new dyads. Similarly to the dyad-identity autopoietic cycle, it can therefore be said that a second autopoietic cycle exists between the group and the dyadic space.

Whereas many have opposed a literal application of the autopoietic form to social systems, others (e.g. Luhmann 1986) have used it with considerable success in explaining social dynamics. As most classical community platforms do not provide support of the social preconditions to knowledge sharing and social exchange as outlined in this paper, the dynamic introduced by the two autopoietic cycles is less supported in these systems.

Finally, the group-dyad cycle permits the formation of bottom-up groups. If supported by the right set of tools, such communities can provide support for creativity through knowledge sharing and can facilitate emergent knowledge creation.

4. CONCLUSION

In order to support process-based knowledge sharing, some preconditions, pertaining to trust (P) and interest (G), have to be addressed. This is done by online social networking systems in three different layers: the identity space, the dyadic space and the group space.

Two autopoietic cycles exist between these three layers. They introduce a social dynamic which influences P and G and in doing so supports the creation of dyads and groups.

Furthermore, the dyadic and group spaces could be further extended. In the dyadic space, it is important to find additional ways to create weighted edges. This could be done by tracking user communications within the system, but may pose some privacy concerns.

At the level of the group space, it is important to realize that allowing groups to have a closed membership has a positive impact on the amount of knowledge sharing within the group. Also, tools which allow knowledge sharing and collaborative knowledge creation can be beneficial additions to the group spaces of existing online social networking systems.

5. FURTHER WORK

Further work is necessary to study the dynamics taking place in and between the different spaces. Collecting quantitative and qualitative data can provide insight in how people share knowledge within such systems. Harvesting social network data made available by existing online social networking systems can provide insight in the influence of the functionality of the system (e.g. identity feedback) on the evolution of the social network. This can be done through the longitudinal analysis of social network data (Snijders 2005).
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DISTRIBUTED VIRTUAL PRESENCE SYSTEMS FOR THE WEB

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ABSTRACT
This paper describes a virtual presence system for the Web. Virtual presence is a chance for existing communities to extend their reach beyond the community Web site. But it can also create ad-hoc and content based communities. After a short history of virtual presence systems, the paper enumerates requirements for large virtual presence systems for the Web. In addition to general requirements like scalability and privacy protection, the paper also explains more specific requirements. A virtual presence system for the Web should have a flexible URL mapping and can be made protocol independent. The paper proposes a reference architecture for distributed virtual presence systems and postulates design goals. The paper presents the LLuna system, and explains how LLuna meets the requirements. LLuna is a client server system which shows users on Web pages as avatars. It uses the Jabber network as transport and processing infrastructure.

KEYWORDS
Web; Chat; Virtual Presence; Virtual Community; Avatar.

1. VIRTUAL PRESENCE

Today there are many virtual worlds and many virtual spaces. There are virtual worlds for many different purposes. From chat and living oriented to educational worlds and games. There are small ones, like virtual shopping malls and large worlds like online RPG with millions of users. There are unique worlds, which contain all users, and instanced worlds where a fraction of all users lives in their own world instance (often called server or shard). There are old ones like early MUDs (so called multi user dungeons) and new ones with advanced 3D environments.

A common characteristic of most online virtual worlds is that they feature virtual presence. Users are not just in the world. They are at a certain place inside the world. They see each other and interact with their virtual neighbors. While many offer communication media for separated users, there are usually more ways to interact if people are virtually close to each other. Interaction happens in many different ways. From chat, over fighting and trade to more complex actions like virtual weddings, and other parties. People like to meet others in virtual worlds. Very often we can see avatars approaching each other in the virtual world. It is nicer to chat and interact if you are close even in virtual worlds. This has been true since early MUDs. It can be seen million fold every day in current MMORPGs (massive multiplayer online role play game). The notion of being close seems to be almost as important in virtual worlds, as it is in the real world.

But there is one virtual space where millions go every day, without seeing each other: the Web.

1.1 The Web

The Web is not just a collection of linked documents. The Web is a virtual space of millions of virtual places. Each Web site is a virtual place. The Web has no spatial dimensions, but as we surf the Web, we rather use the location metaphor than the document metaphor. Our impression is that we navigate to or go to a Web site rather than opening a hypertext document. And while we are there at a virtual location, there are other people virtually present at the same location at the same time. They are also walking around, jumping from page to page, and reading the same content. But we cannot see them. The Web consists of very much content and
many forms of asynchronous communication. But presence, awareness of other people and synchronous communication are missing.

This gap is closed by the concept of virtual presence for the Web as discussed by Soro (2005). Virtual presence (the term ‘for the Web’ will be omitted) shows people who are at the same Web location at the same time. Once they see each other, they can communicate by chat, voice and video. Virtual presence (VP) is an enabling concept for synchronous interaction on Web pages.

1.2 Presence on Web Pages

In the real world we are used to see people wherever we go. We see them on the street, in shops, and in public and private spaces. We usually ignore people and just pass by. But sometimes we communicate. For example if we meet a friend. In shops we ask the sales person and occasionally we even talk to strangers about a common topic.

We want to enable a similar behavior on the Web. Actually, there is not much required. What we need is just being aware of each other and communication media. Our goal for a virtual presence system is to show users as avatars directly on Web pages. They should be able to move around so that they can approach each other. They see other avatars as long as they are on a Web page. If they change the page or the Web site, then there are other avatars. Each Web page or Web site is a place where people can meet and talk.

1.3 Communities on Web Pages

People who visit Web pages regularly will start to recognize other visitors. They meet on a Web site or page, because they have a shared interest, be it the online newspaper in the morning, a shopping site, the astronomy journal, or a parenting Web site. After some time they may start talking about their common topic and may form a content based community.

Blog (weblog) authors can meet their readers on the blog. They are already communicating by so called traceback links and comments. Rick Robinson, AOL’s VP of Community Products, said in an interview (2002), that “Weblogs, over the last several years, have migrated to replace, in some cases, people’s home pages”. My blog is the place where people can find me. There are people I don’t want to have on my IM buddy list, like my commercial customers. If they want to reach me, then they go to my blog/home page where I am present during work hours.

Virtual presence has also legal and social consequences, like the question of domestic authority on Web pages. It makes collective action possible, by enabling motions like SmartMobs as described by Rheingold (2002) on the Web (then called WebMobs) and rallies on Web pages. Rallies, which are not bound to overload Web servers, but which express political opinion without harming businesses. Rallies, where users see that many other people with a shared interest are there at the same time, not just a blank page which indicates that a DDoS (distributed denial of service) attack by many scripted Web browsers succeeded.

2. HISTORY OF VIRTUAL PRESENCE

We can identify three phases of virtual presence. Virtual presence starts with a first phase of research projects. It continues in a second phase with several Internet start-up companies. Finally there are indications that a third phase has started.

2.1 Phase 1: Isolated Web Awareness

Our notion of virtual presence has developed based on earlier concepts and systems. The idea of being aware of other users, who are reading the same page at the same time originated early in the history of the Web. First projects emerged in 1994. Important milestones were The Sociable Web as published by Donath and Robertson (1994) and Virtual Places by Mass (1995). Virtual Places merged with the Lotus Sametime product where the focus shifted from visitor awareness on Web pages to shared work spaces and instant
message services. The notion of an author's presence on documents remains until today. It has been reinforced by strong IM integration in Lotus Notes.

The CoBrow (Collaborative Browsing) project published by Sidler et al. (1997) started 1996 as a meeting system in online libraries. Then it moved to the more general concept of Web awareness. CoBrow introduced the weighted awareness. Weighted awareness includes multiple parameters in the presence computation. Examples are the link distance between users in terms of the minimum number of hypertext references between their current Web pages, the duration of page visits, and the relation of the pages with respect to the content. CoBrow also created an individual presence for each user as opposed to systems, which created a single presence list for a data resource. Another Web awareness project, WebPlaaces by Maglio and Barrett (1999) even displayed social interactions in communities of Web users.

Technically, these were isolated systems, which relied on Web server modifications or HTTP proxies for information gathering about the virtual location (URL) of the user. A typical client was implemented in Java, which was the only way to show dynamic user interfaces in the context of Web browsers.

2.2 Phase 2: Proprietary Systems

The second phase of Web awareness came during the Internet boom 1999. It was largely driven by startup companies, like Hypernix, NovaWiz, Cyland (product names: Gooey, Odigo, etc.). These companies strived to create and dominate a consumer market for Web awareness. Their systems were centralized and organized like IM (instant message) systems. All clients connected to the server network, which was operated by the providing company. They were using binary clients as user interface and for information gathering. The client showed a textual list (presence list) of peers in a window, which was very similar to the buddy list of IM clients. The major difference was, that the contact list of an IM client is semi static, while the presence list of a Web awareness client is created dynamically.

These systems revealed their single point of failure, when venture capital dried out. Even though the failure had a financial reason, there was no infrastructure to keep the services running. Technical similarities of Web awareness and IM became obvious during this phase. Some developers turned their client into pure IM systems to participate in the IM boom. Large players, which had joined the Web awareness family with co-browsing extensions to their IM products (ICQ Surf, T-Online Messenger), followed the market and stopped pilot projects.

2.3 Phase 3: Open and Distributed

Today, there are active systems, which are based on open standards like WebRogue by Soro et al. and LLuna, our own system. On the other hand, there are currently no proprietary systems.

We believe that the third phase of VP aims at ubiquitous presence on the Web with open standards and distributed systems. The Web is hosted by millions of servers and it is used by a huge number of users. A distributed virtual presence system fits well to the architecture of the Web. It can cope with the load of millions of users and can be as robust as the Web against component and provider failures. In addition, it turned out, that a virtual presence system can use the same server software as existing chat systems. Third phase projects use existing protocols and server software rather than implementing a server for a proprietary protocol.

This information is preliminary, though. Several IM providers built large and robust, but proprietary instant messaging networks. Requirements for a virtual presence network are very similar to IM networks. IM providers could easily integrate virtual presence functions and operate centralized virtual presence systems. They have done so during the second phase.

But there is no centralized proprietary virtual presence network available today. Therefore, we argue, that the third phase of virtual presence is characterized by virtual presence networks, which are distributed and based on open standards. They share these features with the technical foundations of the Web.
3. REQUIREMENTS

We assume, that virtual presence is a useful concept. We also assume, that people want to communicate in the virtual space. Some Web users might be comfortable with browsing privately without the need for communication. But, we see lots of asynchronous communication tools, like forums, shout boxes, and other kinds of presence awareness like user online counters in forums. We also see that people communicate in the real world and in other virtual spaces. We believe, that people want to communicate in the virtual world at least part of the time, once they know, that it is possible. Of course, this will have to be proved by trials with real users.

Backed by implementation and operation experience with several VP systems, from a research project during the first phase (CoBrow), a proprietary 2nd phase system (Cyland), to the current open system (LLuna), we are postulating requirements for a virtual presence system. Each requirement will be followed by design goals and decisions which we implemented in the LLuna project.

3.1 Scalability

We assume that the potential user base for a virtual presence system is a significant fraction of the number of Web users. We do not expect so many users any time soon. But we want to make sure that the system does not break down if it has 10 million users.

We identify two basic services: a virtual presence service and a communication service. The virtual presence service will make people aware of each other. It processes location information and generates presence lists of users at the same location. The communication service handles basic chat communication and initiates advanced communication like VoIP (Voice over IP).

Such large numbers can be handled either by a very strong provider or by a network of federated servers. Lacking a strong financial backing, we chose a distributed architecture. This suits our general conviction, that large systems should be distributed. More importantly: a distributed architecture fits well to the distributed architecture of the Web.

The load will be distributed over multiple VP servers, which constitute the VP network. The question is how to distribute the load. Two strategies come to mind: we can either partition the number of users so, that a VP server handles a fraction of all users. Or we can partition the virtual space, so, that a VP server is responsible for a segment of the Web. Actually we do both. We let clients connect to different servers and partition the virtual space so that a VP server is only responsible for a part of the URL space.

We derive these design goals from the scalability requirement:
- The VP server system should be a network of federated servers.
- There should be no single access point or registration point for clients.

3.2 Presence Information

For the VP system to work we need information. If we want to make people aware of each other, then we need to tell them about the presence of other users. We are creating a VP network that informs every user's VP client about other users at the same location. The VP network needs information about the virtual location (URLs) of users. It matches the information and computes a presence list for each user, which basically contains IDs of other users. Then it forwards the lists to the VP client of the user. The client may then present the list to the user in whatever fashion is suitable. This may be a textual list or a display with graphical avatars.

So, we get many VP clients which talk to a distributed system of multiple VP servers. The VP network creates presence lists. This could be done in a distributed fashion, but the straight forward approach is, that all clients at the same location talk to the same VP server. Effectively, this VP server is responsible for a segment of the Web.

This means, that independent clients must agree on a VP server address for each virtual location without knowing each other. This can easily be solved in a centralized system where a single server is responsible for all locations. They would all talk to a single address. But we plan a distributed VP network. For a given virtual location (a URL) all clients must deduce the same VP server address in order to tell the server that they are there. The solution is, that they ask the Web server for the VP server address. On request by the VP
client, the Web server returns the address of the VP server, which is responsible for virtual presence on the pages of the Web server. By providing the VP server address, the Web server actually controls the virtual presence on its pages. There will be a fallback mechanism, if the Web server does not provide a VP server address.

The requirements of presence information processing lead to these design goals:
- Individual VP servers are responsible for subsets of all URLs.
- Web servers should provide the VP server addresses for their URLs.
- Clients should use common backup rules for VP server addresses.

3.3 Privacy

The VP system works with information about the URL trace of users while they are browsing the Web. This is a very serious subject. The VP network needs the information to work. On the other hand, the user's privacy must be protected. We require, that there will no URLs of users be sent over the network. URL traces must not leave the user's computer. This sounds like a contradiction. But there is a solution.

There is no need to send URLs over the network. What we really need is that all clients on the same URL agree on a common virtual location identifier. The identifier will not be the original URL. The solution is, that VP clients create hashes of URLs with a message digest function like SHA1. VP clients map URLs to location identifiers and send only those over the network. There are more requirements to the mapping, but the important feature with respect to privacy is, that it uses a unidirectional hash function to hide the user's URLs from observers.

There remains the fact, that people are visible to others on the same page. In the real world, we are used to being seen while walking in the public. At the same time, we dislike camera observation of public places, because we don't know who is observing and for which purpose. The same is true for virtual presence. We do not allow for observation of public virtual places. But we reveal our presence to other users who are virtually present. This is the very idea of virtual presence. It is a weaker privacy than without virtual presence. The level of privacy is closer to the one in the real world in order to create awareness similar to the real world.

Privacy requirements demand that:
- URLs do not leave the user's computer.
- Observation should be impossible without awareness of the observer.

3.4 General Architecture

We deduced design goals from scalability, information, and privacy requirements. Before we add more application specific requirements like protocol and URL-mapping features, we will describe the general architecture of the virtual presence system.

![Figure 1. General architecture for a distributed virtual presence system.](image)
Figure 1 shows the information flow in the system. User A enters Web pages with a favorite browser (1). The VP client, which may be built into the browser or a separate program, notices the navigation (2) and requests the address of the responsible VP server (3). The VP client hashes the URL to get the location identifier and tells the VP server that the user enters the location (4). The VP server gets similar requests from many clients and sends back a list of other users at the same location (5). VP client and VP server communicate via a VP transport protocol that will be chosen later. User B with a similar URL talks to the same VP server and gets a presence list like user A (6). Both users are mutually included in the presence lists sent by the VP server.

This is our proposal for the general architecture of a virtual presence system. The next sections will add more detail with respect to the transport protocol and the processing of URLs.

3.5 Location Mapping

As described in the privacy section, URLs are converted into location identifiers using a hash function. But we need more flexibility. We want to be able to merge similar URLs into a single virtual presence location. By combining URLs, we could make visitors of all pages of a Web site aware of each other. Instead of using a simple hash, we introduce a mapping from URL to location identifier. We also generalize the location identifier so that it includes a VP transport protocol selector and the VP server address. The protocol selector allows to make the VP system protocol independent. The client uses a set of mapping rules to derive (a) the protocol selector, (b) the VP server address, and (c) the location identifier from the URL.

We call this triple a location-URL, because it globally identifies a virtual presence location and it contains all information required to communicate with the VP server. The actual notation of the location-URL depends on the protocol. If we use Jabber/XMPP (see Adams 2002) as VP transport protocol, then we get location-URLs like: `xmpp:location-identifier@server-address`, where the combination of location-identifier@server-address is called a Jabber ID (JID).

VP clients map document-URLs to location-URLs. They do so by means of mapping rules. Instead of a VP server address as shown in Figure 1, the client gets mapping rules from the Web server. This has the advantage that the rules may apply to many URLs, eliminating the need for multiple network transactions.

The flexibility of the mapping process is important. We are planning for a large system with many users and many Web sites. The structure of Web sites can be very different. Web site operators may want to combine multiple URLs (pages) into a single location where users can meet, while others might want to split users into different groups by certain URL query parameters (e.g. on Web forums). Other operators might even want to combine multiple domain names into a single location. The mapping process should accommodate very different use cases.

In addition there is the point of domestic authority on Web pages. Communication (chat or VoIP) on the Web site of an Internet shop is comparable to people talking in a real world shop. Thus, it is subject to the domestic authority of the shop owner. In contradiction to Soro (2005) we argue, that Web site owners should be able to control the communication on their pages. Technically, the communication only appears to be associated with the Web site. But if people are used to chat on pages, then the average user will probably assume that the chat content is sanctioned or at least tolerated by the Web site owner.

By providing the URL mapping rules Web site operators can control the mapping process. If they control the mapping process, then they may control awareness and communication of users. They may run their own chat server for their Web pages and they may install software or persons to moderate the communication, if desired and/or required.

The design goals for the mapping process are as follows:
- Allow operators of Web sites to control the mapping for their URL sub-space.
- Let Web sites opt out of virtual presence.
- Allow for hierarchical configuration for file system path based URLs.
- Allow for virtual presence even if the Web site does not provide mapping rules.
- Support commercial virtual presence servers and rented rooms.
- Be extensible to other protocols as virtual presence transport.
- Be easily implemented by Web site operators.
- Allow for load distribution.
In the LLuna system, we implemented a hierarchical mapping using regular expressions and hashes as specified by JEP-0151 (Wolf, 2005). The most important features are, that it allows for very flexible mapping of document-URLs to location-URLs and, that Web site operators control the virtual presence on their pages. Fallback rules step in, if Web site operators ignore virtual presence, which is the normal case in the early phase.

3.6 Using Available Infrastructure

After experience with previous virtual presence projects, we chose to re-use an existing server infrastructure and protocol. Our goal was to implement only the client and use external server software. This decision limits what can be done in the protocol, because the client must comply with the protocol, but if offers several advantages. First of all the project can concentrate on the implementation of a client. More important in the medium term is, that server operators are much more likely to run servers with a wide range of support or even commercial support, than a server we would implement. Existing systems provide operation experience, documentation and an active community, if we choose the right one.

Fortunately there do exist server networks, which provide all we need. Almost any distributed chat network is suitable as a VP network:
- Chat channels names are used as locations identifiers.
- The participant list of a chat channel serves as the presence list.
- All chat systems offer a native chat capability.

Other desirable features are:
- A distributed per user storage facility for arbitrary data to store avatars.
- Extensibility to add virtual presence related features.

We concentrated the search on large chat networks with active open source communities. From these we chose the Jabber network (XMPP) over IRC, because it provides additional services, like server storage. Jabber is an XML based instant message and presence network. The Jabber community developed a variety of protocols, clients, and servers. There are open source implementations and commercial ones of clients, servers, and libraries.

The Jabber network is structured so that a client connects to a server and servers interconnect with each other. Users and chat rooms are identified by so called Jabber IDs (JID). JIDs are similar to email addresses in that they identify a user at a server. Clients send messages to other clients via their home Jabber servers. Jabber offers multi user chat (see JEP-0045 by Saint-Andre, 2005), which can be hosted by dedicated servers. Many servers share the load of client connections and other servers share the virtual presence load and chat conversations.

With the decision to use Jabber as transport infrastructure, the VP network becomes an overlay network on the Jabber network. We profit from the active community. We use and contribute to the protocol development. And there are already thousands of Jabber servers deployed, which can be used for the VP network.

3.7 Presentation

The virtual presence service, is supposed to be constantly used by many users. We want, that users run the VP client all the time while they are browsing the Web and we are expecting many inexperienced users. We therefore strive to make the user interface simple. It should be graphically appealing without taking too much screen space during normal operation.

Since people are meeting on Web pages we propose to show them as avatars directly on the Web browser window as shown by Figure 2. They should be able to move their avatars and virtually approach other people to indicate, that they want to chat. In the LLuna system we let users chat in balloons. Everyone writes into the own chat bubble. The chat conversation is very much like a chat channel in ICQ, IRC or like Web based chats. But the user interface is adapted to the location metaphor.

Technically the VP client is a chat client, which omits the chat window and shows users as avatars. From the users' point of view, we implemented a program, which runs in the background, and as soon as they go to a Web site, it shows an avatar on the page and the avatars of other users, who are at the same Web page at the same time.
4. CONCLUSION

This paper proposes an architecture for virtual presence systems for the Web. The architecture is based on experience with several earlier systems. We regard it as a solid foundation for a large scale distributed VP system. The proposed architecture has been implemented in the LLuna system with Jabber/XMPP as transport protocol. LLuna uses Jabber/XMPP servers and Jabber conference components as VP network. The LLuna client is in the public domain (http://www.lluna.de). It can be used by communities to make their members aware of each other everywhere on the Web. But the main focus are individuals who wish to meet people on the Web pages they visit.

There is a continuous development of new features, but we are very satisfied with the architecture in general and with the choice of Jabber as transport protocol. We are currently working on a VoIP component channels. The goal is that people can go to a Web page and talk into the microphone. Anyone on the same page would hear them without any need for dialing or explicit conference calls.

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INFLUENCE OF FACE-TO-FACE MEETINGS ON VIRTUAL COMMUNITY ACTIVITY: THE CASE OF LEARNING NETWORK FOR LEARNING DESIGN

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ABSTRACT

Virtual communities main feature is the interchange of ideas and points of view around a specific topic, frequently split into several sub-topics. This activity involves participation, both active and passive, and it feeds back the community, keeping it warm and dynamic. On the other hand, thematic face-to-face meetings build and feed existing links between their members and encourage discussions on the topic of the conference. Using the virtual community of Learning Network for Learning Design – LN4LD (OUNL, 2004) and the European project UNFOLD (UNFOLD, 2004) we monitored and analysed several data of actions taken by users, members of this learning network. Both, the virtual community LN4LD and the face-to-face meetings for UNFOLD, are fully focused on the dissemination and adoption of the specification IMS Learning Design and keep a strong shared relationship chasing this common objective.

Between January and June 2005 UNFOLD organized three face-to-face meetings. After the measuring and interpretation of all the data collected along this period, we are able to demonstrate that there is a direct cause and effect relationship between the organization of face-to-face meetings and the increase of registered users and the related actions taken by them inside the virtual community. We hypothesize that virtual communities of non-structured learning get more internal activity when supplemented with face-to-face meetings. This means that the face-to-face relationships increase and make stronger virtual links and they encourage the activity in the learning network.

KEYWORDS
Virtual community, face-to-face meeting, IMS Learning Design, learning network

1. INTRODUCTION. DEFINITION AND FEATURES OF A VIRTUAL COMMUNITY

We define a virtual community like any group of users built around an initial specific theme or activity and that usually keeps an asynchronous communication, but not only, and some sharing of information, opinions and resources, while using an online platform or environment. This communication can be enriched with some punctual face-to-face meetings, like congresses, conferences or training workshops. The term virtual community was first pointed out by Howard Rheingold (Rheingold, 1993) who, in his book Virtual Community, made an analysis and further description of the factors and features that describe a community of non-face-to-face users.

Although in 1993 the World Wide Web was not invented yet, it was born in 1996 by Tim Berners-Lee (Berners-Lee, 2001), there have so far been some services and resources living in Internet, like emailing lists, online chats, peer-to-peer communications or postings. All these facilities were the core of Internet and they will be the base for later virtual communities.

We also could consider the term virtual community as a qualification or extension of another term, community of practice, first pointed out in 1991 by Jean Lave y Etienne Wenger (Lave and Wenger, 1991) with the meaning of a group of people met around a topic of common interest to share ideas and find solutions. Certainly, in the current virtual communities there is no urgent need for the second goal, find
solutions, although people want to interchange their knowledge while discussing certain topics and using facilities and resources.

Additionally, the main features of a virtual community are: a) a member of it feels himself as a part of a wider social statement, b) there is a network of relationships between its users, c) there is a continuous interchange of ideas and contents full of meaning for their users, and d) the relationships between the members of the community keep along the time, building set of interlaced stories (Figallo, 1998; Kwoch and Schwier, 1997). Also, for Hagel and Armstrong (1997) there is a set of drives to create and feed the community, like a) a common objective or interest together with other people, b) the willing to share a personal experience or background or to establish social relationships, c) the willing of enjoying some rewarding new experiences or of living a fantasy, and d) the need of making any kind of transaction.

Internet is not needed at all to build and create virtual communities. For instance, we can take the well-known case of the scientist Robert Boyle, in XVII century, who built something called the invisible colleges (Spratt, 2003). This group of people was formed by several prominent scientist around England and old Europe and share common goals to increase and spread the benefits of the Science, looking for answers to questions that Religion couldn’t provide. Later, in 1660, this group founded a legal association that would become the Royal British Society, usually considered as the oldest scientific society in the World. In these invisible colleges their members devoted to Science as a new philosophy and established contacts and relationships, using mail and periodical face-to-face clandestine meetings. They used these meetings to discuss theoretical and practical hot topics on Science and to make the links between them stronger. Nowadays, these invisible colleges could be the existing virtual communities of private contacts between members of research groups focused on common topics and points of view and certainly beyond of any formal established and official relationship.

Regarding topology, there are communities focused on users (geographical, demographical and thematic ones) and communities focuses on organization (vertical, functional and also geographical ones) (Hagel and Armstrong, 1997). Although all kind of communities are interesting, because of constraints of the case study and looking for defining a clear and limited framework, the ones that we are really interested on are those focused on users and thematic, for practical reasons. This means that a virtual community can focus its activity a) on the development of any product or resource while using collaborative working, such as a piece of software or reports writing, b) on the discussion and sharing of experiences and backgrounds, such as a support on skills or behaviour, c) on the tracking of people, groups or specific initiatives, such as sportive, economical or musical, d) on the sharing of knowledge on very specific issues, such as educational or technical, and e) on the learning of any kind of subject (Pallof and Pratt, 1999; Powers, 1997).

More specifically, we will focus on these two last features: sharing of knowledge and learning of a subject. This means that one member could share knowledge about a specific topic getting some learning in parallel, or the community itself makes a structure and becomes a learning core organizing activities and providing facilities looking for this goal.

Besides, we should stress that any virtual community is not pure while working (Haughey and Anderson, 1998; Harvey, 1995). So, the marriage between collaborative working and learning or the one between sharing backgrounds and sharing experiences, are really usual. On the same way, inside a well-established community a few activity sub-groups could come up a) because of some fine tuning on the topic, b) because of the concentration in a specific channel of communication (sometimes even outside of the facilities and inside the virtual community, like the private email, for instance) or c) because of the raising of a very concrete initiative. Therefore, both the communication flows and the evolution of the contents and definition in the virtual community, could move forward, mutate and be enriched with other topics and parallel activities, fully or partially related to the original drive. These add-ons would be a natural effect of the logical progression in the original group and objectives.

Within this context, we see a non-structure learning (Wells, 2001) as the associative and spontaneous learning coming from a fluent relationship and without any scheduled behavioural pattern between the members of the virtual community. Furthermore, the participation of any user only depends on his/her criteria and understanding and not on any kind of imposition or need of adaptation to any work methodology or to any pre-defined behaviour chasing a didactical or methodological goal. This way, both the virtual communities (P2P, 2001) and the non-formal learning or non-structured learning (Hoffman, 2005) are based on the existing and growing semantic links between their users. In virtual communities, the nodes are the users and also the resources and posts of these ones to the network. In non-structured learning, the nodes are the interconnected information elements getting a knowledge network.
2. THE IMS LEARNING DESIGN SPECIFICATION

The IMS Learning Design Specification, or just IMS LD from now on, was published in 2003 by the IMS Global Learning Consortium (IMS, 2003). This specification is able to represent and encode learning structures for both, single and multiple learners, grouped by roles, like “learner” or “staff” (Koper and Tattersall, 2005; Burgos et al, 2005). A lesson plan can be modelled in IMS LD, defining roles, learning activities, services and several other elements, making a Unit of Learning (UoL). Later, this modelled lesson plan (or UoL) is packaged with the nested resources in a compressed ZIP file and it is published and run in a player. The player will coordinate the teachers, the students, the activities as long as their respective learning processes. A user will take then a role to play with and will carry out the related activities in order to complete a satisfactory Unit of Learning. All together, the Unit of Learning structure, the roles taken and the activities taken build the learning scenario that must be run in an IMS LD compliant system.

IMS LD does not offer a particular pedagogic model or models, but can rather be used to define a practically unlimited range of scenarios and pedagogic models. Because of this it is often referred to as a pedagogic meta-model. Some previous e-learning initiatives have claimed to be pedagogically neutral. IMS LD does not aim for pedagogic neutrality, but seeks to enable pedagogically aware e-learning.

It was developed thinking of e-learning and virtual classrooms, although face-to-face lessons can also be carried out and integrated in a structure created with this specification, meaning learning activities or support activities, fully integrated in blended learning. As long as the final aim of IMS LD is to create full-rich Units of Learning with supporting content that looks for fulfilling learning objectives in order to get the best learning experience, face-to-face meetings or any other possible learning resources are permitted, such as videoconference, collaborative blackboards or any field-work.

3. VIRTUAL COMMUNITIES AND PROJECTS ON IMS LD

In the light of the increasing concern on e-learning issues in the last fifteen years, and moreover on the standardization of the e-learning, several international groups come across a very interesting and hectic activity on research, production and/or dissemination. Specifications like SCORM (ADL, 2000), IMS content Packaging (IMS, 2001) or IMS Simple Sequencing (IMS, 2003a) become a good starting point to structure learning content or any other kind of content. Among them, IMS Learning Design raises as the next logical step forward on learning objects and initiatives, allowing not just the packaging of resources, but also the full modelling of learning scenarios and the application of several pedagogical models (Burgos et al, 2005a).

Using IMS LD, teachers and learning designers are entitled to move their face-to-face lesson plans to online platforms, giving enough warranty on interoperability and re-use of the learning information packages created.

More than thirty international groups and projects around IMS Learning Design or directly related to it show a promising outlook for this young specification. From CopperCore (Vogten and Martens, 2004) as the main engine, to the viewer Reload (Bolton, 2004) or the Player Sled (OOUK, 2005), through half a dozen of editors, it is easy to say that IMS LD is technically supported and raise the interest of the academic sector (Open University of The Netherlands, Open University of the United Kingdom, Universities of Duisburg, Piraeus, Valladolid, Vigo, etcetera) but also of the commercial market (eLive, 8Lem, etcetera)

In addition, the amount of virtual communities growing up around this topic is high and continuously increasing. They are usually hosted by international projects funded by official institutions (UNFOLD, Ladie, Lornet, iClass…) but also by some spontaneous representation coming from active discussion forums like Moodle (Dougiannas, 2004). These actual groups of discussion talk about recurrent topics on e-learning, and improve a healthy critic about features, usefulness and functionalities of the specifications, their theoretical backgrounds and the related applications. These communities show the general interest for specifications in the groups of end-users while improving the online learning and to adapt the face-to-face teaching to virtual platforms (mainly teachers, content providers and learning designers, but also system developers and researchers). Their usual main goal is to make profitable the time and the effort needed to adapt contents and pedagogy into interoperable and re-usable units of learning. Following, the main non-structure learning virtual communities and projects around IMS LD, looking for getting the specification closer to the target group and for a wider and deeper dissemination are: R2R
Among all the projects on IMS LD, the Framework 6 IST Coordination Action UNFOLD becomes the more prominent in terms of dissemination. The key aspect for the development of e-learning is that it supports better learning, but progress depends on the adoption of open standards. So far these have limited e-learning to a relatively simple, single learner, ‘deliver-and-test’ approach, and are a step backwards if considered from a pedagogic perspective alone.

A major advance was marked by the recent IMS Learning Design specification which enables flexible and sophisticated pedagogical approaches to e-learning, by providing support for multiple as well as single learners and their coordination, a wide range of present, as well as future, pedagogical models and learning activities and learning services, as well as content. This way, UNFOLD promotes better e-learning by supporting the implementation and use of pedagogically strong open standards.

The core activity of UNFOLD is to support and facilitate Communities of Practice (CoPs), and so provide a space where people can collaborate to support open standards. As we explained before, Communities of Practice (CoPs) are groupings of people who come together around common interests and expertise, creating, sharing, and applying knowledge within and across the boundaries of tasks, teams and organisations. Currently the define a) System Developers, b) Teachers and Learning Providers and c) Learning Designers. Between all the facilities, one of the main goals of the UNFOLD Project is to organize face-to-face meetings to disseminate as much and good as possible the specification IMS LD.

The third CoP of the UNFOLD Project, Learning Designers, has a separate website available at http://moodle.learningnetworks.org, and called Learning Network for Learning Design (or just LN4LD from now on), becoming the most prominent virtual community on IMS LD. This has been set up as part of the Learning Networks programme being carried out at the Educational Technology Expertise Centre of The Open University of The Netherlands (OUNL). The use of this additional infrastructure enables the project to leverage existing OUNL resources for the support of Learning Design, providing information, tutorials, worked examples of learning designs, and a growing repository of learning design units.

LN4LD is a pilot learning network for those interested in finding, applying and exchanging information about IMS LD. OUNL have created LN4LD to gain early feedback on functional, technical and organisational aspects of creating and maintaining a learning network and to help meet the demand for further information on IMS Learning Design. Moreover, LN4LD is used to investigate mechanisms which stimulate learners to move beyond mere consumption of learning material towards active participation in the creation of learning experiences and to study the relationships between virtual activity and face-to-face events.

There are two important concepts related to the description of LN4LD: a) a Learning Network (LN) is a distributed set of people who interact to create and share learning events while developing their competence in a particular discipline; and b) a learning event, which we refer to as an Activity Node (AN), can be anything that is available to support learning, such as a course, a workshop, a conference, a lesson, an internet learning resource, etcetera. All participants can create new ANs, can adapt existing ANs or can delete ANs, subject to the constraints of the policies which are operation for the learning network.

In terms of user, registered and unregistered ones are distinguished, with registered users having access to the UNFOLD Learning Designers Community of Practice (CoP) and able to place new postings in the LN4LD forums and reply to existing.

Furthermore, registered users can cooperate on solving problems and answering questions concerning IMD Learning Design. Activity Nodes are dedicated to IMS LD topics (for example “IMS LD and meta-
6. PERIOD OF STUDY. LN4LD AND UNFOLD’S EVOLUTION AND DESCRIPTION OF THE MEASURING

LN4LD started in February 2004 as a pilot experiment in the OUNL. Thereby it was seeded with five activity nodes looking for the attraction and stimulation of new users interested in IMS LD and trying to establish an operational base for potential users. In July 2005 LN4LD made a joint venture with the UNFOLD Project chasing a mutual support while sharing some important goals in both. Since then, several online activities have been taken and a few more activity nodes have been added up to nineteen. LN4LD carried out a main experiment between October 2004 and January 2005 on stimulation and encouraging participation inside the learning network that came out with two published papers (Hummel et al., 2005, 2005ª).

For the measuring approached in this paper the period of study goes from January and June 2005 and continues the research activity started before this year and concerning the behaviour of users in a non-structured learning virtual community. The main goal of the present project is to demonstrate that face-to-face meetings encourage participation in virtual communities.

The first experiment carried out in LN4LD showed a core group of 125 registered users with a moderate activity, as Hummel et al. show (2005), and was finished in January 10th, 2005. Afterwards a tracking of LN4LD was made, recording logs and making database back-ups with actions taken and registered users, but never interfering again with any mechanism to improve or modify the behaviour inside the network.

As told before, since July 2004 LN4LD and UNFOLD are interlaced and support each other in the dissemination of IMS LD. The challenge was to measure the influence of the face-to-face meetings of UNFOLD in the virtual community LN4LD without making on purpose any addition to influence the spontaneous behaviour of the community users. For this, we focused our research on the observation and recording of LN4LD joint together with the organization of face-to-face meetings in UNFOLD, during the five months from January to June 2005. In this period, three presence meetings were carried out by UNFOLD in February (Valkenburg, The Netherlands), in April (Barcelona, Spain) and in June (Braga, Portugal) with an averaged attendance of 70 people. Also, some punctual participations in congresses organized by others took place in Paris, Sheffield and Madrid, although these last ones are no significant in the measuring. The promotion of all these events was made inside the related networks and portals of UNFOLD and LN4LD and, mainly, between the already registered users in both communities. In addition, back-ups and readings of specific information concerning the users activity were made monthly in LN4LD and some control measuring were carried out in March the 21st and in June the 27th, right after the first and the last face-to-face congresses in The Netherlands and Portugal.

These measuring monitored several variables: actions taken per activity node, users per date, users access, actions per user and scoring (following the rule defined in Hummel et al., 2005, about encouraging and participation using rewarding systems). Although these four variable were useful, the most effective one showing participation is the first one, actions taken per activity node. Within the nineteen activity nodes of LN4LD users can visit the links, make queries, answer questions, rate posts and add points to the scoring table (although the scoring system has no effect for the current period of study and it was only used before, between October 2004 and January 2005).

We also registered the amount of users during the period (January, March and June) to check the increase or decrease of members and potential contributors to the learning networks.

7. DATA ANALYSIS AND LOGS

In Table 1, the data analysis shows the increase of averaged participation since the last measuring made when the previous experiments on encouraging finished (January 2005). This increase is of 48% of participation between March and June 2005, without log-in records, and of 73%, with log-in records. The basic difference between both variables, without and with log-in records, is that many users jump into the network to check if any news are coming but they don’t go further. Even they don’t check forums or any other activity node although it was only to participate just lurking (Nonnecke and Preece, 2001). Because of this, the amount of
actions including log-in records is not completely significant for our purposes and we don’t include them in our report, although we recorded just in case. Making the comparison with the information backed-up in January the increase is of 594%. Specifically, participation went from 3,750 actions in January to 17,553 actions in March and to 26,028 actions in June, giving an increase of 8,475 actions from March and of 22,278 actions from January.

Table 1. Measuring between January and June 2005

<table>
<thead>
<tr>
<th>Activity Node</th>
<th>Actions March</th>
<th>Actions June</th>
<th>New actions</th>
<th>% of new March</th>
<th>% of new June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Issues with IMS Learning Design</td>
<td>263</td>
<td>395</td>
<td>132</td>
<td>50</td>
<td>56</td>
</tr>
<tr>
<td>Change Proposals IMS LD Specification</td>
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<td>892</td>
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<td>20</td>
<td>20</td>
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<td>Experience a running Unit of Learning</td>
<td>1,319</td>
<td>1,631</td>
<td>212</td>
<td>16</td>
<td>16</td>
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<tr>
<td>Getting started with the IMS LD Specification</td>
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<td>4,294</td>
<td>1,261</td>
<td>42</td>
<td>47</td>
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<tr>
<td>How to modify a Unit of Learning</td>
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<td>1,753</td>
<td>361</td>
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<tr>
<td>IMS Learning Design and Metadata</td>
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<td>1,189</td>
<td>183</td>
<td>18</td>
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<tr>
<td>Online Educa Madrid May 2005 (en castellano)</td>
<td>477</td>
<td>477</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PROLEARN/UNFOLD Hawaii/September 2005</td>
<td>73</td>
<td>73</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Runnable LD Example Units of Learning</td>
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<td>2,582</td>
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<td>91</td>
</tr>
<tr>
<td>Understanding the basics of IMS Learning Design</td>
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<td>7,795</td>
<td>5,754</td>
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<td>UNFOLD CoP Meeting in Barcelona April 2005</td>
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<td>1,085</td>
<td>942</td>
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<td>65</td>
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<td>UNFOLD CoP Meeting in Braga (Portugal) June 2005</td>
<td>263</td>
<td>295</td>
<td>33</td>
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<tr>
<td>UNFOLD hands-on meeting in Valladolid 2005</td>
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<td>3,883</td>
<td>387</td>
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<td>UNFOLD Paris Workshop March 2006</td>
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<td>80</td>
<td>53</td>
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<tr>
<td>UNFOLD Presence at Alt-habl June 2005</td>
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<td>0</td>
</tr>
<tr>
<td>UNFOLD Presence at Campus Virtual June 2005 (en castellano)</td>
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<td>35</td>
<td>5</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>UNFOLD presence at the Online Educa Berlin 2004</td>
<td>263</td>
<td>313</td>
<td>44</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>UNFOLD session at the EADTU 2004 conference</td>
<td>421</td>
<td>421</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>UNFOLD Workshop at EUCERI Conference 2004</td>
<td>153</td>
<td>153</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Without logins</th>
<th>3,765</th>
<th>12,553</th>
<th>26,028</th>
<th>8,475</th>
<th>48</th>
<th>594</th>
</tr>
</thead>
<tbody>
<tr>
<td>With logins</td>
<td>1,393</td>
<td>80</td>
<td>847</td>
<td>1,055</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The Activity Node with a higher increase was “UNFOLD CoP Meeting in Barcelona April 2005” with 638% (143 in March and 1,055 in June) while the most used Activity Node was “Runnable LD Example Units of Learning” with a final sum of 6,252 actions and an increase of 2,983 from March.

In addition, the Figure 1 shows the distribution of actions per activity node and the graphical reading of the previous analysis in March and June. Marked with asterisks are the largest total increase (Runnable...) and the biggest percentage increase (Barcelona...)

Figure 1. Actions taken per Activity Node in March and June 2005
Concerning the amount of registered users, Figure 2 shows a progress from 125 members in January to 304 in March and 495 in June. This means an increase of 243% in March and a cumulative one of 396% in June. All these figures just show a continuous increase of percentages and raw numbers in both, actions taken and registered users.

All these data report underlines our hypothesis of a direct cause and effect relationship between the face-to-face meetings carried out by UNFOLD and the increase of user activity in the virtual community of LN4LD

8. CONCLUSION

The virtual community Learning Network for Learning Design (LN4LD) is an online-exclusive community that provides activity nodes about the specification IMS Learning Design. It was born in February 2004 and launched in June of the same year. Its activity became stronger through the joint venture with the European Project UNFOLD that organizes face-to-face meetings and online chats, also about IMS Learning Design. During January and June 2005 several measuring were made about online participation and user behaviour in LN4LD and the effect of face-to-face meetings, taking the advantage of three international presence meetings, funded by UNFOLD and promoted inside both communities. This process follows the experiment carried out by the authors before January 2005 about encouraging participation inside the same virtual community (Hummel et al., 2005a).

Taking into account two variables, a) user participation, and b) registration of new users, the recorded logs show a clear and exponential progression in both. LN4LD comes from 3,750 actions taken by 125 users in January 2005. After the meetings between March and June 2005, the amount of actions taken increased to 594% and the amount of registered users to 396%. This total figures clearly show the direct relationship between face-to-face meetings and activity inside the virtual community and demonstrate how presence meetings encourage the registration of users and, moreover, the amount of active users. The progress can be also checked between the two control measuring in the period (March and June) with an averaged increase of 48% in actions taken with a maximum of 638% in one specific Activity Node.

In order to suggest the reasons of this clear increase and taking from all the features that we used in the beginning to describe a virtual community (a common objective or interest together with other people, the willing to share a personal experience or background or to establish social relationships, the willing of enjoying some rewarding new experiences or of living a fantasy, the need of making any kind of transaction.), we suggest that the willing of sharing a experience or establishing social relationships (Hagel
and Armstrong, 1997) is the drive most related to the participation in presence meetings as long as face-to-face activity encourages the strength and the frequency of the virtual links. Furthermore, a better and more direct knowledge of the online users via the meetings and the higher chance for synchronous discussions with multi-lateral debates about the same and related topics used in the learning network encourages its use and the interactivity with the rest of members.

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THE SAME BUT DIFFERENT - REVISITING WEB-BASED THIRD PLACES

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ABSTRACT
The third place as a concept was introduced by Oldenburg (1999), who argues that every society is in need of third places, separate from home and work (first and second place), that can serve as informal public gathering places. This paper reports from an ongoing ethnographic study of a Swedish web-based community, and it is argued that the community under study should be regarded as a third place. However, because of its technology dependence it is fundamentally different from those depicted by Oldenburg. Thus, when analyzing an online community one should not settle with being able to recognize it as a third place. One must go one step further, examining how the third place is digitally mediated and experienced in a web-based setting.

KEYWORDS
Web-based communities, third place, technology, ethnography.

1. INTRODUCTION
The claim made by Wellman & Gulia (1995) in the mid nineties that “net surfers don’t ride alone” becomes more and more evident as time goes by. As the number of people with access to the Internet has increased in recent years, the amount of web-based communities has multiplied. An early attempt of categorizing existing “virtual communities” was made by Croon & Ågren (1998). They proposed that contemporaneous communities belonged to one of the four different categories: Community networks, Professional communities, Personal communities or Communities of the third place. Although web-based communities have increased in numbers and complexity, and developed to serve a variety of purposes, the categories suggested by Croon & Ågren still seem to be valid on a general level. In this study, however, the notion of Communities of the third place will be revisited with the purpose of further expanding our understanding of social meeting places online.

The empirical foundation for this endeavour comprises data gathered during two years of ethnographic studies at a large Swedish online community called LunarStorm (LS). In this paper it is argued that while LS shows all the major characteristics of a third place as depicted by Oldenburg (1999), the third place as a metaphor is still not sufficient to describe its functionality or character. Consequently, labelling LS and other similar communities as “Communities of the third place” can become a misleading simplification when trying to understand the features of online meeting places.

2. COMMUNITIES OF THE THIRD PLACE
The third place as a concept was introduced by the sociologist Ray Oldenburg (1999). In his book The Great Good Place he argues that every society is in need of third places, separate from home and work (first and second place), that can serve as informal public gathering places. Places that function as third places have certain characteristics:
Third places exist on neutral ground and serve to level their guests to a condition of social equality. Within these places, conversation is the primary activity and the major vehicle for the display and appreciation of human personality and individuality. The character of a third place is determined most of all by its regular clientele and is marked by a playful mood, which contrasts with people’s more serious involvement in other spheres. Though a radically different kind of setting from the home, the third place is remarkably similar to a good home in the psychological comfort and support that it extends. (Oldenburg, 1999, p. 42)

Oldenburg declares that the occurrences of third places have decreased in western society in recent years. As these public meeting places disappear, the community dependent on them also is weakened. Many of the arguments made by Oldenburg are also echoed by Putnam (2001), when describing the threats against social capital in American society.

In line with Croon & Ågren (1998), Jones (1997) and Rheingold (2000) among others have suggested that virtual community spaces could be regarded as being similar to the third places as described by Oldenburg. If the third places of our (offline) society have vanished, perhaps Internet can re-create “great good places” and provide us with some of the things we long for offline, such as friendship, community and public life (Jones 1997). Croon & Ågren (1998) show how some of the characteristics of Oldenburg’s third place match those of many online communities, which leads them to conclude that it is legitimate to label certain virtual communities as Communities of the third place. In a similar and perhaps even more ambitious way Steinkuehler (2005) tries to find correspondence between the typical characteristics of third places and a massive multiplayer online game (MMOG). By reviewing Oldenburg’s defining characteristics of third places, Steinkuehler argues that the MMOG under study can also function as a novel form of a new third place.

Following the examples made by Croon & Ågren (1998) and Steinkuehler (2005), this present study will include an analysis of a Swedish online community, with the purpose of demonstrating to what extent and in which way it could be regarded a community of a third place.

3. THE CASE OF LUNARSTORM

With more than a million active members, Swedish LunarStorm (www.lunarstorm.se) (LS) is the most popular community site online among young people in Scandinavia. It started as a small-scale project in the late nineties, but has grown enormously, now playing a vital role in the everyday lives of many teenagers in Sweden. The average age among members is 18 and about 70% of all people in Sweden between the ages of 15 – 20 are members. On an average day the site has about 370 000 unique visitors who together write more than 3.5 million text messages (Lunarworks, 2005). A comment made by Rheingold (2005) illustrates the potential impact of LS on Swedish young people:

I can't think of an institution, brand or subculture anywhere in the world that could compare with LunarStorm's mindshare among Swedish youth. [...] The entire population of Sweden is less than 9 million, so LunarStorm's market share is like having 10 million teens out of the USA's 300 million people online in the same virtual community at all times. (Rheingold, 2005)

LS is a multi-faceted environment with several different features to support interaction among community members. Becoming a member is free of charge and as a member you get access to a personal web page with (among other things) a blog, a photo album, a guest book, friends lists and a file repository. In addition, you can visit the nooks of all other members as well as various topic-specific discussion forums. You can send e-mails (lunarmail), participate in competitions, listen to web radio, and much more. For a small fee (around $2) a Club (almost like a sub-community) can be created with additional possibilities of communicating with club members. You can also become a “PRO-member” for a somewhat larger fee (around $20 per year) and upgrade some of the basic features. (A more thorough description of LunarStorm is given in Skog (2005)).

The examination of LS conducted in this paper is based on an ongoing ethnographic study, which started in 2003. Although the outcome of ethnographic fieldwork is hard to predict, it is not completely random. The fieldwork is always initiated by questions that to some degree lead the work and affect the researcher’s attention.

You may tell others you are “just observing” and may satisfy their curiosity, but do not believe for a minute that there is any such thing as “just observing.” A lens can have a focus and a periphery, but it must be pointed somewhere, it cannot “see” everywhere at once. (Wolcott, 1995, p. 96)
While conducting this present study the focus has been put on the member’s experiences of LS. Examples of questions leading this work are; how do members experience LS as a social meeting place? To what extent and in what way are LS an important place in their everyday lives? What are the characteristics of this specific virtual place and how do members perceive them?

The empirical material has been gathered through the use of participant observation and semi-structured interviews with community members. In total, 24 interviews have been conducted with members between the ages of 18 to 46. In addition, numerous spontaneous text-based conversations have been held during fieldwork, generating a substantial amount of data. Thus, the analysis of LS is derived from my experiences of being a member within the community for a period of two years, reflecting on observations and information received while conducting interviews and participating in the ongoing social activities.

4. LUNARSTORM AS A COMMUNITY OF THE THIRD PLACE

This section will consider the defining characteristics of a third place, as proposed by Oldenburg (1999), and their resonance in the LS community. The purpose of this review is to show that LS indeed should be regarded a community of a third place.

Third places exist on neutral ground where people can come and go without obligations. Oldenburg concludes that when compared with the home environment, neutral settings facilitate far more informal relations. Furthermore, friends can be numerous only if they may easily join and depart from one another’s company, as is the case at neutral meeting places. LS demonstrates a good example of a neutral ground. It provides a public meeting venue where people meet and interact with no commitments or obligations. Occasional contacts as well as extended interactions occur spontaneous, typically with no intention other than just having a good time.

And then, considering where I live nowadays, these Internet activities are a great benefit for me. I have my fill of chitchat and being social when I have the possibility and energy for it. (Mary, 46 years old) (Author's translation.)

Thus, using the words of Oldenburg, LS is a neutral ground, albeit digitally mediated, that allow people to meet without being too tangled in one another’s lives.

As well as being neutral, a third place functions as a leveler between people of different social rank and backgrounds. It is an inclusive place that lets all people in regardless of their worldly position. Trying to understand the phenomenon of virtual communities, scholars have discussed whether or not computer-mediated communication (CMC) has a leveling effect when it comes to class, gender and ethnicity. While some argue that many online communities are based on a shared interest and therefore to some extent gather similar people, others emphasize the fact that CMC still should be perceived as an opportunity for people to interact regardless of social status or appearance (Baym, 1998). LS definitely has the potential of leveling differences between members, bringing people together even though perhaps belonging to completely different spheres offline. Even if it is possible to form so called “Clubs” around specific themes where likeminded can have contact, this does not change the leveling character of LS. On the contrary, also in a club created for a specific target group, leveling often takes place.

According to Oldenburg a third place is also defined by having conversation as its main activity:

Nothing more clearly indicates a third place than that the talk there is good; that it is lively, scintillating, colorful, and engaging. (Oldenburg, 1999, p. 26)

At LS, conversation is indeed the core activity. The software environment supports conversation via instant messaging, guest books, scribble boards, discussion forums, diaries, mail, etc. and every day more than 3.5 million text messages are being sent using these tools (Lunarworks, 2005).

A third place is recognized by its accessibility. It is easy to get there and it is typically almost always open. While at other places, time and planning is of importance, the third place just awaits its visitors, offering a relaxing and welcoming environment. Again LS, as well as many other online communities, is always available. If connected to the Internet, one can enter LS any time during the day and from any computer. As the Internet offers access to the WWW around the clock, meeting places like LS always stays open.

Furthermore, Oldenburg argues that the regulars of a third place are of great importance since they create a welcoming environment for newcomers and therefore attract visitors. At any given time, you can be assured
that you will see one or many of the regulars present, giving character to the place and setting the tone of conversation.

All third places have their regulars and the interaction between them adds immensely to the appeal of the place. (Oldenburg, 2001, p. 68)

Since LS is populated by thousands of people any given time during the day, the regulars are not as easy to detect as those present in the cafés, coffee shops or bars mentioned by Oldenburg as typical examples of third places offline. However, they are still there and perhaps they are most visible as owners of “Clubs” or as moderators on different discussion forums.

Yet another characteristic of third places is their low profile. Third places are typically not elegant but plain, creating a nonpretentious homeliness. It is not obvious how this corresponds to the case of LS. Steinkuehler (2005) faces the same obstacle when trying to describe a MMOG as a third place:

Here is the first point on which MMOGs and Oldenburg’s definition of third places differ. […] In other words, MMOGs, even in their earliest incarnations, are extravagant settings for informal sociability rather than plain ones. Why this disparity, if MMOGs are indeed third places? Perhaps the answer lies in the function Oldenburg argues such homeliness serves. (Steinkuehler, 2005, pp. 26-27)

The functionality of homeliness and having a low profile is described by Oldenburg as having to do with not attracting too many strangers or temporary visitors. With crowds of amazed newcomers and onetime visitors continually entering a third place no community will arise. Steinkuehler (2005) argues that although an initial wave of gamers always appears when a new game is released, a smaller group stays over time and becomes the basis for a community. The same argument seems to be valid in the case of LS. Being the most popular and well-known online home in Sweden, some people seem to pass through driven by curiosity. Since becoming a member is easy and free of charge, one can become a member although not planning for extended activity. Thus, some members of LS are onetime or short-term visitors, yet leaving behind a more devoted group of people who contribute to a sustained community.

As one might expect, a third place is also recognized by its playful mood. Although finding all sorts of emotions expressed in guest books or discussion forums at LS, the overall mood is definitely playful and often witty. Although not analyzing a game per se, it seems legitimate to once again repeat a statement made by Steinkuehler:

In essence, while Oldenburg argues for recognition of the playground character of the third place, I argue for the third place character of the new digital playground. (Steinkuehler, 2005, p. 27)

Finally, Oldenburg describes a third place as a home away from home. According to Oldenburg (1999) this characteristic can be assessed using five criteria offered by Seamon (1979): rootedness, sense of possession, spiritual regeneration, being at ease and warmth. A home roots us by providing a center around which we organize our time and everyday lives. We can feel that we possess or control a home-like place although we do not actually own it. It is a place that offers spiritual restoration through partaking in social activities. It is an environment where people can be themselves and express their personality, and it has warmth generated by friendliness and support.

Interviewing long-time members of LS, many of them give evidence to Seamon’s criteria testifying that they indeed perceive the environment as home-like.

On your question about me feeling “comfortable” here my answer is definitely YES! I think I registered the first time in June 2002, but anyway I have been here for several years, and I have followed how the community has developed. I feel VERY comfortable here! =) (Rob, 21 years old) (Author's translation.)

I log on from home, from my parents and parents-in-law, I log on in the morning, before lunch, at noon, in the afternoon and every now and then during evenings. During weekends I am also doing night shifts. I log on between washing up and doing laundry, changing diapers and feedings, leaving and picking up at kindergarten. As you can see, I LIVE here, hiii, I am always here *smiling* (Leiha, 25 years old) (Author's translation.)

Having reviewed the defining characteristics of third places, it now seems reasonable to categorize LS as a community of the third place. As a social meeting place one can argue that it does meet the criteria put forward by Oldenburg (1999). Consequently, in line with Steinkuehler (2005), looking at MMOGs, and scholars like Croon & Ågren (1998), Jones (1997) and Rheingold (2000) who all address online communities in general, this study could conclude that virtual communities should be perceived as potential web-based third places.
5. THE NOTION OF WEB-BASED THIRD PLACES REVISITED

The examination carried out in the previous section showed that LS “qualified” as a third place. However, one could argue that something crucial is missing from the analysis so far: technology. In one sense web-based third places might be regarded as being “the same” as the third places described by Oldenburg (1999). They do meet the necessary criteria and empirical data shows that they also function as third places for many of their members. But since online communities are dependent on information technology, they also become different. In this section primarily the issues of structure and continuous change will be highlighted.

When Oldenburg presents the concept of third places (1999, 2001) he mentions places like cafés, bookshops, hair salons, bars, клубы и т.д. These places are described as rather small and plain. When entering for instance a typical café, you rather quickly get an image of how many visitors there are present and if there are any vacant seats. The physical setting do not offer many choices for action, basically you are expected to sit down at a table. If you have been there before you will soon notice whether or not the regulars are there and perhaps mostly well-known faces surrounds you. The environment is familiar and everything about the place seems to be just the same as last time you entered. Oldenburg states:

Return customers want the familiar and the predictable; they like to anticipate a repetition of pleasant times. They also like to be known and greeted warmly. (Oldenburg, 2001, p. 69)

Looking at LS we see another picture. Entering LS in the afternoon on any given day you might find that 30,000 members are present, interacting via text messages using forums, guest books etc. When you open your guest book you see that a couple of complete strangers have left messages commenting on something you wrote in a discussion forum yesterday. Also you might find comments from close friends that invite you to a newly started club, and with a click of your mouse you enter this new domain and begin presenting yourself to the club owner by typing a message in the club forum. At the same time you perhaps receive a “lunarmail” from the managers of LS telling you about a new feature in the software environment.

Thus, LS is a multi-faceted environment with a complex structure comprising both public and private venues for small or big parties. These venues, although quite different, exist alongside each other and can be entered almost simultaneously. Their borders are invisible yet evident. It takes no effort to switch between different arenas and multiple conversations can be carried out at several different locations at the same time. Although being considered a neutral ground, LS can by its complex structure include both neutral and private or even exclusive areas. In addition, while acknowledging that LS has the potential of acting as a leveler of social rank, new status mechanisms seems to emerge based upon activity at specific venues and technical skills (Skog, 2005).

The public areas of LS attract many people with no real interest in building a community. Compared to a physical setting it is quite easy to enter LS with dubious intentions without being noticed. It seems like everything coexist alongside each other; private and public settings and conversations, friends and antagonists, good and bad experiences, etc.

[To a person without knowledge about LS] I would have described LunarStorm as a gigantic virtual café. There are thousands of different tables where you can sit and at each table you will find other people. […] LS is now so big that you will find many different kinds of people between its walls, which means that “there is someone for us all”? Regardless of what you are looking for on LS, a new friend to meet offline for a walk or a cup of coffee, or a steady relationship with a house, dog and a Volvo, you can find it on LS. […] If you are glad because Djurgården [a soccer team] is in the lead of the Premier Division, or want comfort because your partner has left you, or want to consult with someone before buying a car or a boat, there is someone who sees you and wants to talk to you. Someone who can express opinions, give perspectives or wants to chat with you. Of course you can be cheated, people might use you or play dirty cards at you […] LS is like the rest of the real world. You cannot protect yourself against everything and everyone just because you are sitting behind a computer screen. You got to have good faith in people in general, even if you should not be foolish. (Paul, 21 years old) (Author's translation.)

Not only is the structure of LS complex, it is constantly subject to change. New features are added, new forums created, new clubs initiated. In addition old tools or features within the software environment are given new meanings through innovative use by members. Reviewing the history of LS one can see how the managers and software developers continuously bring about changes to the environment with the purpose of helping the community to grow and stay healthy. New additions to the software environment quickly have bearings on community life and the interactions performed between members.
In this section issues concerned with structure and change has been targeted, but the role of technology could of course be analyzed at length, revealing more details of how the characteristics of web-based third places are connected to the characteristics of technology. However, based on this present study it could be argued that although LS is considered to be a web-based third place, it is at the same time a fundamentally different place than those depicted by Oldenburg (1999, 2001).

6. CONCLUSIONS

In this paper the notion of web-based third places has been examined by using the example of a large Swedish online community. It has been argued that LS indeed could be described as functioning as a third place for many of its members. At the same time LS seems to be a different place than those physical settings portrayed by Oldenburg (1999, 2001). Compared to the third places reviewed by Oldenburg, LS can be seen as the same but yet different. Furthermore, it has been suggested that the reason for this in part can be found in the technology dependency of LS.

Having web-based communities function as third places, raises many future research questions. How do these places develop? In what way are they important as social meeting venues? How do they relate to physical third places? What are their most significant features?

When studying online communities we must not become satisfied about recognizing that they share common features with the generic third place and therefore indeed can be seen as third places. We should also go one step further, examining how the third place is digitally mediated and experienced in a web-based setting. To reach a deeper understanding of online communities and how they can develop to become a “home away from home”, there is a need for further studies that examine the unique characteristics of web-based third places.

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WEB BASED SEMANTIC COMMUNITIES – WHO, HOW AND WHY WE MIGHT WANT THEM IN THE FIRST PLACE

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ABSTRACT
This paper describes an investigation undertaken as part of the FicNet Human-Computer Interaction project into the online amateur fiction community. Working with the community to determine current practices regarding access to the community and created material therein, and related areas of concern, we consider how future technologies such as the semantic web might be used to design applications to support the community. As a first step in this process we gathered opinions, both from members of the community and those outside it. By investigating usage habits and preferences we were able to analyse the requirements of the community and consider the community as it is and what it might become.

KEYWORDS
Community, HCI, Collaborative Standards, Semantic Web,

1. INTRODUCTION

FicNet is a human-computer interaction project focusing on identifying the needs of the amateur online writing community. Issues facing this community come both from outside the community and within. External complaints, witchhunts and legal threats can force sudden relocation or removal of content while lack of resources or loss of interest can disable sites permanently. All of which add additional complications to an already diverse system of differing standards and expectations and vocabularies.

By definition the online amateur writing community exists around the creation of media, mostly text but also illustrations and audiovisual items. Taken altogether amateur fiction probably represents one of the largest online electronic libraries currently in existence. Unfortunately, it is one which doesn’t come with a catalogue and is constantly in flux. While the larger archives are fairly fixed in their position, the smaller archives and personal pages are frequently changing address, going down temporarily for maintenance or due to bandwidth limitations or just vanishing. “Can anyone tell me where to find..?” is a frequent question on many lists as is the popular “Can anyone recommend..?” or “I am trying to find a story that contains...”. A large part of this ever changing nature is attributable to the subject matter and the very amateur nature of the enterprise. What keeps it all together is the community that surrounds it and the interaction within it.

In this paper we consider the user needs and requirements of the community and how semantic services could integrate and improve on the current architecture. Direct interaction with members of the community through observation, questionnaire and interviews was used to gain understanding of the specific difficulties and issues that community members face. Following initial discussions with community members as part of a preliminary assessment, a questionnaire was used to gain greater insight into the issues that had been highlighted. This method was chosen for the initial data gathering because it allowed us to involve a larger section of the community than would have been possible through alternative methods. The results of this
study are detailed below as we consider how future technology might affect the community and therefore how this and similar communities might affect future technology development.

2. THE AMATEUR WRITING COMMUNITY

The amateur writing community is made up of two mostly separate groups – media inspired or fan authors and ‘original’ authors. Of these two, the former are more vocal online because, through necessity, they have eschewed traditional publishing in its official form and thus rely on community published works, or zines, and individual dissemination. While paper based zines still continue to be produced as a means of distribution the ease of electronic publication has lead to a massive migration to the Internet. Equally most fan authors are hobbyist orientated, writing for fun and because of their interest in the source material. They, therefore, are more motivated to freely share their works since that in itself is their main goal. Some ‘original’ amateur authors have also taken advantage of this alternative means of publication with new sites such as LuLu offering “free” print-on-demand services. However for many others their presence within online writing groups is about practicing with the goal of writing professionally. For this reason the FicNet project is mostly concerned with media-inspired authors and their creations although it deliberately tries to avoid excluding original-world authors not least because of the crossover between the two (see Figure 1).

To understand the media-inspired side of amateur writing, or fan fiction, it is necessary to take it in context with the rest of online fandom. It is not about lacking the originality to create new characters and settings but about exploring existing and loved ones. While the stereotypical ‘fan’ is often depicted as a white, male virgin this image has been frequently contested and discredited. This is particularly true for media fans [10, 2], of which fan writers are a part, and media fans online [6, P.134]. The social aspect of these communities have been documented in a number of pre- and early Internet studies for example [10, 2] and in online culture and computer-mediated communication studies looking at online communities [3, 4, 6, 7, 15].

What was clear in the studies that have been done is that online fandom, especially the fan fiction component, has a very strong female presence. Costello goes as far as saying that “the general Internet sample from the most recent GVU survey [1998] is virtually a mirror image of the cyber-fan sample” [6, P.134-5]. This is an interesting contrast to the experience with online fandom detailed by Janis Cortese in [14] where the online fan presence was strongly male dominated and unreceptive to female appreciation of the male members of the Star Trek crew. Given the other findings in this area it might be suggested that rather than demonstrating the typical and unequivocal male bias and double standards as suggested by [14] what this in fact shows was that Cortese was unlucky in her choice of discussion group. While perhaps less obvious there were many communities in existence at that point on the Internet where Cortese’ comments would have been welcomed and where she would have found herself among the gender majority.

The problem here, other than the lack of civility shown by the group she joined, was that as a newcomer Cortese had few clues as to how to navigate the disparate sprawl of related groups and find ones appropriate for her specific interests. Whether this interest would have included the large amount of fan fiction undoubtedly existing and featuring those same crew members about whom she posted we have no way of knowing but the principle and the problem of finding the right group for any given user is the same.

The FOAF ontology (http://xmlns.com/foaf/0.1/) which describes people and their relationships is one of the most popular and ontologies [8] although at least part of this can be put down to the decision
by LiveJournal to automatically generate FOAF files for its many users. While not specifically geared towards communities it does provide a simple way for people with like interests to find each other within the vastness of the Internet. Social networking systems such as Friendster and Orkut are in many ways one of the two main areas within which the semantic web can be seen as having some success (the other being academic settings, especially science and computer science). However while these interest-connected networks may describe a community, common definitions [1, P.10][17] require more self-identification as a group, at the least, for it to be counted as a community.

Analysis of the online amateur writing community (see below) suggests that they would benefit significantly from the advantages that computer readable metadata and the processing of such and the semantic web offers one method to provide this capability. The advantage of the semantic web as a method is that it can be argued that there are enough similarities in terms of structure and social dynamics to those groups for whom semantic tools and services have already been created to allow us to build on this earlier work. In doing so online amateur writing community provides access to a demographic that is often overlooked in computer science, the mature female user, as well as providing insight into what would be required to make an online community into a semantic one.

2.1 Gathering Community Requirements

2.1.1 The Questionnaire

The decision was taken to create an online questionnaire. The reason this method of user response was chosen is because it allowed us to retain the most control of the way that the questions were presented and the ways in which they could be answered [1]. The survey was split into seven parts with some sections aimed at specific participants (see Table 1). An eighth section was added shortly after the questionnaire was made public to allow anonymous feedback and comments since while contact details were made clear they were via e-mail and therefore not as anonymous as the questionnaire. The draft version of the questionnaire was shown to the members of the Fan Fiction Ontology Yahoo Group. At that time the group had just over fifty members drawn mainly from the fan writing community. Changes were made to the questionnaire based on feedback received from those members.

Invitations to participate took the form of posts on LiveJournal, e-mails to persons known to have an interest and post to the mailing lists and bulletin boards of related interest groups. A number of archives and fan sites mostly related to Harry Potter were also contacted with a request that they publicise the survey to their users. Since those contacted directly were mostly adults or adult dominated groups the general Potter archives and websites were contacted in the hope of getting more younger fans. This last received a limited response but at least two archives did post notices. Notices were also posted in a number of places both around the university campus and at other locales where it was thought they might be seen. This was done to solicit opinions from those who were not directly involved in the amateur writing community but had some contact with it via friends or relations and therefore wanted to express their views as a outside observer.

2.1.2 The Response

The questionnaire was put online on December 3rd 2004 and a selected group of volunteers including adults and children were contacted directly to test the system. These tests were done over the following few days and when no problems were found with the technical aspects the questionnaire went officially live on December 7th. The response to the questionnaire was greater than anticipated. When it quickly became clear that over a thousand responses might be reached the decision was made to harvest the first wave of responses after the questionnaire had been publicised for two weeks. This first set of data comprised of 1118 responses of which one was known to have been superseded by a subsequent post from the same person.

The IP address of each response were logged and analysed in conjunction with the answers given and this revealed one duplicate entry beyond the one that was known. The remaining 1116 responses included 4 from prior to the 7th but otherwise spanned the 7th till noon on 21st December 2004. Analysis of the IP address logged as part of the duplication identification process suggested that responses had come from over thirty countries. While America, Great Britain, Australia and Canada ranked the highest of the known contributing nations the international nature of the interest can be seen in the contributions from countries such as Finland.
Russia, Brazil, Singapore, Japan, Estonia, Israel, India and Argentina as well as most of the nations in western Europe.

Table 1. Sections of the Community Requirements Questionnaire

<table>
<thead>
<tr>
<th>No.</th>
<th>Section Description</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Questions related the respondent’s familiarity with amateur fiction online, their age</td>
<td>Everyone</td>
</tr>
<tr>
<td></td>
<td>and the age of adulthood in their region</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Questions related to preferences for story access and display and level of community</td>
<td>Readers</td>
</tr>
<tr>
<td></td>
<td>involvement</td>
<td></td>
</tr>
<tr>
<td>2b</td>
<td>Questions related to access controls</td>
<td>Underage Readers</td>
</tr>
<tr>
<td>3</td>
<td>Questions related to practice regarding story access and display and publishing</td>
<td>Writers</td>
</tr>
<tr>
<td></td>
<td>methods</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Questions related to how people outside the community came into contact with amateur</td>
<td>Interested Others</td>
</tr>
<tr>
<td></td>
<td>writing online</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Questions related to specific sub-types of amateur fiction and opinions on the</td>
<td>Everyone</td>
</tr>
<tr>
<td></td>
<td>access of “adult” content</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Questions related to technical knowledge and ability</td>
<td>Everyone</td>
</tr>
<tr>
<td>7</td>
<td>Questions relating to blocking and filtering amateur fiction and the collection of</td>
<td>Everyone</td>
</tr>
<tr>
<td></td>
<td>personal information</td>
<td></td>
</tr>
</tbody>
</table>

As well as being international the age range of respondents (see Figure 2) went from 10-12 years to over 66, while over 50% fell within the 18-35 group and more than 20% were over 35. This is comparable to that age range found in online fandom in general by Costello [6] although he does not include any under 18s in his data.

2.1.3 Bias

Questionnaires are by their very nature biased because as a surveyor you only hear from those who wish to respond. Despite the range of answers we received they represent a very small fraction of the amateur writing community. As well as the self-selecting nature of the survey some of the bias inherent in this study can be seen as coming directly from the way it was marketed. While this method of viral marketing was a success in that it allowed word of the questionnaire to reach a large number of people but the method of transmission also heavily favoured people who had a community involvement. Since media-inspired writers are more connected to the larger interlocking community structure than other amateur writers there is a immediate bias towards fans and away from original writing groups. Many groups are wary about catering to younger writers and therefore it has been suggested that this as well as other reasons means that they are less involved in the community aspect of online amateur writing and thus are less likely to hear about, and due to Internet safety lectures, respond to a questionnaire request.

Questions on gender were not included as part of questionnaire due to sensitivity within the community about revealing personal data. From Media Studies and Popular Culture research we know that there is a strong female bias among fan writers [10, P.48, 106-116][2]. Costello [6] showed that female fans were more likely to be involved as active social participants including information exchange and fan fiction. As we have already shown there is a large bias towards media-inspired rather than original writers it was assumed before
the questionnaire was released that the majority of those who responded would be female. While there is no way to prove this supposition the tone of many of the responses suggested it was in fact correct. Not least because there was also a noticeable preference for “slash”\(^1\). It is not clear whether this was due to a genuine bias in the surveyed population, a reflection of the online reality or whether this group is more self-identifying since the information was given without being specifically asked for. Since slash stories are most often singled out for mention as transgressive or dangerous the size of the response from this section of the amateur writing community was not considered problematic.

### 2.2 Analysing the Responses

#### 2.2.1 Requirements

It is not possible to detail all of the results of the survey here and the conclusions that were drawn from it. However I will touch on a number of points that became clear and the areas that they opened up for development. Anonymity and privacy were highlighted as areas of concern. The illusion of Anonymity is a fundamental part of the fan fiction community and as previously mentioned the fan fiction community makes up a large percentage of the amateur writing community. People may choose to give up that option but the option to keep “real life” and “fan life” separate is very important to those involved \([10, p.200-202]\)[2, p.207/8].

The same applies, but even more so, to readers. While some details are expected from writers so that feedback can be sent to them readers see no need why their identities should be required of them. Over eighty percent of respondents to the fan and amateur fiction survey gave ‘valid e-mail address’ as the most personal information that a reader or writer should be asked for even on an archive that contained adult material. That eighty percent included fifteen percent who thought no personal information should be asked for from anyone and twenty eight percent who thought only authors should need to provide an email address. A significant percentage of respondents also mentioned the importance of privacy to them.

The problem of privacy is tightly bound with that of identification. If a person is not identifiable then how can one regulate access if required? The increasing use of LiveJournal, JournalFen and other similar electronic journaling systems with their friends and filtering option has created a new layer of options for community members. Standard practice on LiveJournal encourages entries deemed ‘not safe for work’ to be hidden behind a link or “cut”, thus requiring a specific and additional action beyond browsing the page to reveal the material. A survey of nineteen community members carried out as part of a task analysis diary study revealed that approximately forty percent of the volunteers accessed community resources from work with reading journals being mentioned by the majority of that subgroup. However, while some filtering occurs regularly on personal journals which are used for both community and non-community posts it is practically unknown on those journals, community or personal, that are reserved for community interaction. Those that do not wish to restrict adult content within journal communities may require some indication that the requester is an adult but in reality few checks are made, and the benefit of the doubt is given by default. This is one area where conflict can arise between the standards accepted by and within the community and those which external forces wish to impose.

Recently there has been a lot of publicity given to concerns, especially parental, about the accessibility of adult content on the Internet. Nearly two thirds of those who answered the question on the content of what they had written said that they included adult content (by which we mean violence and other similar themes as well as sexual content), almost a quarter occasionally wrote stories they would rate as ‘R’ and over 80% read them. Given this, some addressing of the issue of adult content is necessary. While some concern is reflected from the community the unease is mostly related to younger children being exposed, with nearly a third expressing this in conjunction with the belief that it is either a positive way for teenagers to explore adult issues or unlikely to contain anything they are not already aware of. Almost another quarter expressed concern that parents allowed children who could not be trusted to respond to warnings appropriately to surf unsupervised.

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\(^1\) Stories featuring a same-sex relationship often as a main aspect of the story. The majority of much stories are involve male-male pairings although female-female stories sometimes called femmeslash, femslash or saffic are becoming more popular. While not exclusively so, the vast majority of the readers and writers of such stories are female.
This suggests that while the community believes in taking some steps with over half agreeing additional precautions should be taken with regard to access for story containing adult content they also believe that a large amount of responsibility rests with the reader, and where the reader is a minor with the reader’s parents. When asked what steps would be considered reasonable precaution, metadata attached to the story did not rate nearly as highly as human-readable warnings however this might be related to the generally low knowledge of them (not knowing what ICRA/PICS or equivalent tags were being the most frequently given reason for not including them) despite them being the second most commonly used method after warnings and the low incidence of filter use within the community. There was also some concern expressed about the level of detail on such metadata systems, possibility of stigma and misuse of the filtering system.

Previous initiatives to have community members add some form of increased access control to sites have almost always ended in bitter disputes. While in-community efforts have been received with more welcome than those from external sources anything that suggests possible control or censorship is met with profound suspicion. Misunderstandings at profound levels aggravated by indefinite terminology and the existing debate over the depiction of contentious issues such as underage or extreme relationships, violence, drug use, sexuality and religion have made it difficult to prevent the debate turning into the exchange of immovable extremes. Such issues would need to be addressed before any semantic web system could be given widespread acceptance by the community. However given the willingness to add human-readable metadata it does not seem beyond the bounds of possibility that machine readable data could also be added if it were presented in the right way. While such information can already be added, and in many cases is, lack of information and understanding of the technology on both sides of the debate confuses the issue.

Any applications need to support making clear to the users what the system can and cannot do and where the points of failure may occur. Problems in this area can be seen in the systems currently in use. For example, the Google SafeSearch does not take into account any Platform for Internet Content Selection meta tags [5] that are attached to a website despite these being a World Wide Web Consortium Standard for marking Internet content since 1996 [9, 12, 13]. It could be argued that sites claiming to be child-friendly are not necessarily trustworthy in their assertions but the fact that SafeSurf ignores meta data added by sites with the express purpose of warning for adult content has caused problems between site owners and parents - the one thinking they have taken the necessary steps and the other unhappy with the site still appearing on the supposedly child safe setting. While annoying this is excusable since Google is not designing for a specific community where this is a known problem. As the designs that come out of this project are aimed at a specific user group it is good design to make such things clear so that the community being opened up does not suffer as a result.

From within the community the feeling is strongly towards that of the informed reader making a choice. However the question of what metadata should be available to readers resulted in a very mixed response with some people wanting to know everything before making a decision on whether to read and others only wanting to know the basic bibliographic details (see Figure 3). While there was a match between the metadata desired and the metadata given on the basic details the gap between the two grew on more contentious issues (see Figure 4). From this we can conclude that personalisation would be a very useful feature and, further, allowing people to tailor their options might also help with some of the problems of access noted above.

The most common reason given by authors for not wanting to provide information (other than time constraints) is that of spoiling the plot. This, unsurprisingly, is the same reason given by readers for not wanting to know. This is where the difference between human-readable and machine-readable information might be most useful to the community. One of the respondents to the community requirements survey noted that they wanted to be warned for subjects that they didn't like but wanted to be surprised by those that they did. By allowing for metadata to be used for searching and filtering at a machine level it is possible to provide community members with this capability. For the most part authors want their work to be consumed by the audience for whom it was intended so might be more amenable to adding additional data if they could also specify that it could be hidden. Equally for topics such as character death where there is no clear consensus individuals can decide for themselves whether that information is given to them. As more detailed information becomes the norm then members will even be able to search for or avoid the deaths of particular beloved or hated characters.
Figure 3. Normalised Comparison of Sum of Information Desired and Information Provided

Figure 4. Preferences for Availability of Descriptive Metadata
3. CONCLUSION

The semantic web offers many opportunities that are not otherwise available within this context because, while the community already generates a large amount of human-readable information, it does not also associate machine-readable metadata. This would allow better integration of the distributed systems, improved searching and filtering and more personalised services. These could benefit the experienced user by expending their options and creating new ways with which they could interact with the community as well as aiding the newcomer by easing their introduction into a community which has its own expectations, unwritten rules and obscure terminology.

In this paper we have detailed the methods through which we have extracted user requirements and the main concerns that were raised. The amateur online writing community has many issues which could benefit from the application of semantic services. It represents a large, diverse user group and, further, one which is often overlooked in computing studies. By understanding the issues that the community brings to the semantic web, as well as those that the semantic web brings to the community, we can improve the design of services and identify and deal with problems that would otherwise adversely affect use and the acceptance of this new technology. Many of the problems that online amateur writers face are those faced by all online communities. By working with the community to find possible solutions on the micro scale we take a step, however small, to solving some of these problems on the macro scale. Unfortunately many of those problems have their roots in the offline world and until those are resolved, a process that thousands of years of human history has yet to manage, the best that can be hoped for is a temporary compromise.

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WEBLOG RECOMMENDATION USING ASSOCIATION RULES

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ABSTRACT
Weblogs are web sites where one or several authors publish their opinions about current events. Even in Spain, there are several thousands, and it is often difficult to find a weblog that meets one's interest. Recommendation services thus become, if not a need, at least a convenience. In this paper we propose automatic extraction of association rules from the results of a survey as a means to recommend to weblog readers other weblogs about related topics, based on the results of a survey. We examine different support/confidence thresholds, and study resulting rules; as a result, we find novel relationships between weblogs, that would not have been found through other means.

KEYWORDS
Weblog, cyberculture, computer communications, virtual communities, media, social relationships, web sites.

1. INTRODUCTION

Information and services offered by the Internet and the World Wide Web (WWW) have grown very fast over the last few years. WWW has become an indispensable medium for up to one billion users around the world.

Among all communication services that Internet offers, one of the fastest growing are weblogs (abbreviated blogs) (Blood, 2000; Winer, 1999). Weblogs are web sites where one or more authors publish their opinions about current events, offer comments about other sites or others authors’ opinions. These sites also offer high reader-interaction degree, allowing him/her to publish their comments about original author’s opinions.

Some of most popular Spanish blog hosting sites, such as Blogalia (http://www.blogalia.com), contain tens thousands of stories and hundreds of thousands of comments. Browsing among so much information is no easy task, even more when blogs are often updated several times a day, and generic search engines (Google, Yahoo, Altavista, etc) do not update their indices so frequently. Another drawback of current search engines is that they perform only string searches; they not include any semantic information. For example, a searching “Granada” (which, in Spanish, is the city of Granada, in Spain, several other Granada cities all over
the world, and a pomegranate, and a grenade) will give a list of web pages about tourist information, explosives or fruits. That means, it is difficult to find which weblogs is talking about a particular topic one is interested in. Disadvantages like that, motivate study of new technologies to generate better results in web knowledge extraction (web mining), specifically from weblogs.

This paper is based on applying automatic association rules extraction algorithm. That data mining algorithm, help us to find weblogs not evident associations. We use survey results made among thousands of spanish weblog readers/writers; so far, it is reading habits most extensive survey. Other results, and comments, can be found at http://tintachina.com/archivo/cat_i_encuesta_webloggers.php. By using weblog reading preferences, instead of hyperlinks, our algorithm extracts information from user themselves, who make associations by choosing a few weblogs out of the huge amount of them available. This also means that rules extracted should be expressed as “Readers who chose this (these) weblog(s) also chose this other”. It is often the case that weblogs that appear in the same rule, but that does not happen always, for several possible reason: not all weblogs use hyperlinks, and hyperlinks are unidirectional, so hyperlinked need not be aware of that; even more so, those who read a blog often do not know other blogs that link to that one, even as that fact implies that they are related.

This work is organized as follows: after a brief exposition of state of the art, a priori algorithm is briefly explained in section 3; further on, a formal problem description and data mining phases is given. Finally, results are presented along with conclusion details and future works.

2. STATE OF THE ART

Association rules are widely used, and can be considered a mainstream procedure for recommendations. Amazon.com, through extensive analysis of clickstreams (visits through their pages), buying habits, as well as other data available for them (wish lists, lists from listmania) has one of the most extensive databases of recommendations in the industry, so that readers recommendations are quite accurate. Many other e-commerce sites use same kind of algorithms, but, for the time being, website recommendation is much more elusive.

Main problem is that, even as Amazon’s items database is huge, websites number, and even of weblogs, is almost as big. Besides, Amazon features static item with known characteristics, while websites evolve, offer different facets, and change completely, even more so in the case of weblogs, which can be said to be created collaboratively by the author and its readers through comments.

Weblogs have several mechanisms that allow readers to discover others: one of them is simply hyperlinks; if weblogs author finds something interesting elsewhere, he refers to it by adding comments with hyperlink in its own weblog. Another mechanism is called trackback: a weblog can inform another that he is linking to it, or talking about a similar topic, by calling a function in a particular way; trackbacks appear alongside commentaries in the post they refer to.

These mechanisms, however, are often not enough. Every weblog works in its own way: some of them do not link at all (think about literary weblogs, for instance, or pure personal diaries), others link more often to news sites than to other weblogs (mainly collective weblogs), and others, simply, are not aware of the huge amount of sites available out there.

So far, we have proposed using community detection mechanisms (Merelo et al., 2004) that help authors and readers to know which community do they belong, and, by linking, what kind of communities emmerge; however, this only tells a part of the story. By using survey result, and applying rule extraction algorithm, we can find new associations that could not have been discovered by analysing links.

3. A PRIORI ALGORITHM

This algorithm was proposed by Rakesh Agrawal and Ramakrishnan Srikant, from the IBM Almaden center (Agrawal et al., 1993, 1994). The problem of discovering all association rules can be decomposed in two different subproblems:

1. Find all itemsets whose support is over a threshold. The support for an itemset is the set of transactions (or baskets) that contain that itemset. All itemsets with a support over a threshold are called large itemsets and the rest small itemset. Algorithms for discovering large itemsets make multiple passes over the data. First pass, we count the support of individual items and determine
which of them are large. In each subsequent pass, we start with a seed set of itemsets found to be large in the previous pass. We use this seed set for generating new potentially large itemsets, called candidate itemsets, and count the actual support for these candidate itemsets during the pass over the data. At the end of the pass, we determine which of the candidate itemsets are actually large, and they become the seed for the next pass. This process continues until no new large itemsets are found.

2. Use large itemsets to generate rules. The general idea is that, if ABCD and AB are large itemsets, then we can determine if the rule AB \( \Rightarrow \) CD keeps the ratio \( \text{conf} = \frac{\text{supp}(ABCD)}{\text{support}(AB)} \). If \( \text{conf} \geq \text{minconf} \), then the rule is valid; ABCD as a rule already has a minimum support since it is a large itemset. To generate rules, for every large itemset \( l \), we find all non-empty subsets of \( l \). For every such subset \( a \), we output a rule of the form \( a \Rightarrow (l-a) \) if the ratio of support \( l \) to support \( a \) is at least \( \text{minconf} \). We consider all subsets of \( l \) to generate rules with multiple consequents. Since the large itemsets are stored in hash tables, the support counts for the subset itemsets can be found efficiently.

4. RESULTS

The study has been done on a poll taken among weblog readers and authors, who answered, among others, the following question: ¿Which are the last 3 weblogs you have read?

Data was stored in XML file after extraction, it had to be cleansed. Some cases, weblog titles or names were used instead of URLs; and even if addresses were used, they sometimes missed the final slash (/) or the initial http://www. At the end of this preprocessing phase, we obtained baskets with 3 URLs, with each weblog represented by a single URL. Apriori algorithm described above was then applied to this set of items, and results analyzed.

![Figure 1. Min confidence vs Min support](image-url)

Rules were also analyzed to find which was the minimum confidence and support that guaranteed reasonable results. Since even the most popular site (MiniD) was voted only by a fraction of the pollsters, a very small support should be expected; confidence went up with the minimum support, and finally, a level of confidence of around 50%, for a support of around 0.2%, was found reasonable, as is shown in figure 1.
Obviously, the number of rules found changed with confidence level and support chosen, as is shown in figure 2; there were very few rules with a support over 20%, which is to be expected, due to the dispersion of the readership. The confidence of the rules which was finally used in this study was actually quite low, as is shown in figure 3, but due to the huge number of weblogs available, and the number of weblogs that were mentioned in this study (around a few thousands), the fact that two weblogs are associated even in a few polls is quite relevant.

After a detailed analysis of results using our knowledge about the blogosphere and of many of the weblogs used in this study, we have been able to find the relationship among weblogs appearing in the association rules. For example, the following rule:

\[
\text{bandaancha.st} \Rightarrow \text{barrapunto.com (0.692308, 9)}
\]

with a confidence factor of 0.69 and support of 9 rules represents two collective weblogs with a big audience (in fact, Barrapunto, at http://barrapunto.com, is possibly the most popular blog of the Spanish blogosphere, as was also found in survey results shown in http://tintachina.com/archivo/los_weblogs_mas_leidos.php) and with a strongly technical, and more weakly political, background. In this case, there are several links between both sites, and the result is not altogether unexpected. However, in the following example:

Users who read **barrapunto.com** also read:

1. aretzo.blog-city.com
2. yildelen.blogalia.com
3. laflecha.net
4. osnews.com
5. bulma.net

For this kind of recommendations expert advise would be needed, since they are not so obvious as the previous one. In fact, paper’s authors, who are heavy participants in Barrapunto, did not even know about the first one. Using this association rules we can recommend similar weblogs to readers of a given site, without human intervention.
Several groups of tests have been done, changing minimum support and minimum confidence. Minimum support has been reduced until 0.001 in order to obtain 96 rules with minimum confidence of 0.6. For a minimum support of 0.1 no rule is obtained. With a minimum support of 0.0006, 5800 rules were obtained.

From these results we would like to remark the values obtained for rules support. It is very low, but we think they are relevant enough. We think there are two main reasons. The first one is the wide variety of “products” in our “supermarket” which, following example proposed in (Kleinberg, 1999), is very big. Our articles are URLs pointing to weblogs. We have counted more than 2160 articles in this example and we are working with a database of 1473 baskets. We think this is the main reason for a so low min support: great diversity of articles and low number of baskets.

Following figures show number of rules variation with respect to the minimum support and minimum confidence.

![Figure 3. Number of rules changing minimum support and minimum confidence](image)

5. CONCLUSIONS AND FUTURE WORK

We can conclude that obtained results are good enough. Obtained rules offer interesting information for weblogs classification, using data obtained by mining readers replies to a poll. These results can be improved increasing the number of replies. This also makes us think that the “Apriori” algorithm not only works well with big databases, as originally proposed (Agrawal et al., 1993, 1994), but also that it works with smaller ones.

We think this algorithm can be applied also to provide interesting links related to a given post of a weblog. The plan is to use posts as baskets and permalinks, that is, permanent links to weblog postings, as articles.

Another idea is to relate weblogs using URLs in a given weblog as a basket and the weblogs referenced as the set of articles.

Another line of work will be the application of algorithms for obtaining more efficient rules, and also to study methods for obtaining the better min confidence and min support for obtaining optimal rules set.

We also believe that an interesting work on knowledge representation has to be done in order to make these results more useful to weblog users. For example, it would be useful to present this knowledge on-line, together with any given post, in order the reader can access to related content.
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INFORMATION DESIGN TO SUPPORT "AN EMERGENT TYPE OF LOCAL GOVERNANCE"

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ABSTRACT
The Emergent type of local governance is based on the Public management system. The public management system consist of citizens and subsystems which are council/administration subsystem, corporate subsystem and NPO subsystem. A BBS-forum for citizens serves as a platform in a local government and NPOs to support an emergent type of local governance, occupying an important place in this report. But the platforms in community are not confined to the BBS-forum for citizens. We are currently conducting verification experiments using the "e-community SHIMADA" which is a platform for local community. We discussed the information design of "e-community SHIMADA" as an important platform.

KEYWORDS
E-democracy, local government, governance, community, blog, BBS

1. INTRODUCTION

The purpose of this report is to discuss the conditions required for establishing “an emergent type of local governance and propose appropriate information design.”

“An emergent type of local governance” is defined as governance established by citizens and NPOs and businesses that are their agents as actors in “public” along with councils and administrations to propose, form, and execute policies for finding and solving regional challenges in a creative and spontaneous manner.

“Information design” in this report is defined as a method of conveying and exchanging information using information and communications technology [ICT] such as web sites.

An emergent type of local governance does not mean mere “citizen participation.” Citizen participation implies participation in frameworks designed by local governments or administrations. The emergent type of local governance is characterized by citizens seeking autonomy of the district in relation with varied public agents based on the various cooperation.

The emergent type of local governance is based on the review of the “public” concept. Conventionally, “councils/administrations” are apt to be considered public and activities by others are apt to be considered “private.”

First of all, a question is raised about this mentality. This question is associated with the inability of administrations to solve current local problems. There are many discussions about “public” concepts such as “public sphere” by J. Habermas [1].

As shown in Figure 1, a “Public management system” is a concept in which citizens participate in “new public” management directly or using subsystems such as councils/administrations, corporations, and NPOs as agents through mandates, requests, and evaluations for agents to mutually evaluate and involve one another.

Based on the premise noted above, the need for an emergent type of local governance where citizens, NPOs, and corporations as public actors comparable to councils and administrations cooperate on regional issues in varied manners and seek resolution of problems in a creative and spontaneous manner is understandable.
The potential of an emergent type of local governance as can be implemented in association with citizens, NPOs, corporations, and administrations can be clarified by introducing the concept of the platform. The platform will now be defined. Jiro Kokuryo stipulated that “the platform is an existence for activation of the interaction of participants, providing a mechanism to generate a common language, trusted relationships, and inducements for participation”[2] and defined “platform business” as an information-intensive operator [3], with action to integrate functions such as searching for trading partners, providing reliable mediation, evaluating economic value, offering standard bargaining procedures, and logistics.

2. BBS-FORUM FOR CITIZENS

An example of a platform constructed using ICT is illustrated by the BBS-forum for citizens. In recent years, the number of BBS-forum opened using message boards on websites has increased.

2.1 E-democracy.org

As an actual case, we shall now describe E-democracy.org of Minnesota in the U.S [4].

E-democracy.org is a website which was created for the 1994 U.S. Senate elections. Using the Internet, “Minnesota E-Democracy”—a non-profit, non-partisan group—publicized information about candidates, and provided a forum for debates between candidates, and discussion between candidates and the public.

On the top page of E-Democracy.org is the statement “Building online public space in the heart of real democracy and community.” There are two sites at E-Democracy.org: “DISCUSSION” and “INFORMATION.” The "DISCUSSION" section is a forum where citizens of Minnesota enthusiastically discuss issues in a forum for exchanging opinions which is divided into national, statewide, and city/region categories. The Wiki-based “INFORMATION” section enables users to obtain related information using the mass media and a variety of links. On the “E-Democracy Experience” page at E-Democracy.org, the following is written under the title “BE AN E-CITIZEN”: “We don't just vote every few years and wait for the next election to participate in public life. We care about the future of our communities. With the Internet we can now participate on our own time, from anywhere. While we still get out in-person, we know that listening to others and raising our diverse voices online will strengthen our communities.” Based on this mission, discussions are conducted in each forum, with the focus on close-to-home regional issues. There are specific rules to enable a diverse, lively exchange of opinions with mutual trust between participants, and moderators who are highly capable in managing discussions play a key role.
2.2 The city of Fujisawa’s BBS-forums

In Japan, the city of Fujisawa’s BBS-forums for citizens is yielding commensurate results [5]. The City of Fujisawa states transitioning “from passive information use to voluntary and active information use” as “a fundamental principle for community information use” in the “City of Fujisawa’s basic plan for regional IT.” The city of Fujisawa’s BBS-forum for citizens has been constructed as part of that plan.

The specific circumstances of the city of Fujisawa’s BBS-forum for citizens will now be examined. It is not managed by the administration but by a governing board consisting of citizens selected from among applicants. It consists of the city hall area where the administration sets themes and the citizens’ area where citizens set up the BBS-forum.

In the city hall area and citizens’ area, the members of the governing board and the person who opened the BBS-forum serve as the host.

The course of the BBS-forum started with establishment of an experimental project in 1996. There are already five proposals submitted by governing board members to the city based on the opinions in the BBS-forum in the city hall area. This result shows that the city of Fujisawa’s BBS-forum for citizens properly acts as “a place where a variety of information about public management meets.” The city of Fujisawa’s BBS-forum for citizens serves as a platform in an e-municipality to support an emergent type of local governance, occupying an important place in this report.

The reason why the city of Fujisawa’s BBS-forum for citizens is achieving commensurate success as a platform will now be analyzed.

First, outside support such as by Keio University during inauguration and continued efforts by the city of Fujisawa should be emphasized. Thus, the city government is recognized and evaluated both inside and outside the city of Fujisawa, which functions as feedback, and further expansion of the system is planned.

Next, the narrowly defined information design will now be discussed. With regard to the design of the BBS-forum, the city hall area and the citizens’ area are separate. Themes set by the administration are insufficient for citizens to detect problems. For example, the BBS-forum’s “Thinking about barrier-free [facilities]” starts with themes set by citizens and in which active discussion takes place. The discussion here develops into the WebGIS that the administration works on as a policy. Meanwhile, “places” such as “a trip in a gourmet hometown” that are not directly linked to local problems are also important for lowering the “threshold” of the BBS-forum and making participation enjoyable. There are keys to managing the BBS-forum. The BBS-forum is not managed by the administration but by governing board members selected from among applicants [city hall area] or citizens who opened the BBS-forum [citizens’ area]. This structure is likely to allow more flexible and prompt responses than the administration, which requires the backing of laws and regulations. What is important is the editing work by governing board members through knowledge based on their academic backgrounds and experience in the electronic BBS-forum of the city hall area in order to dynamically expedite the proceedings. Establishing the existence of the governing board members in the citizens’ area and promoting recognition of the “faces” of participants through activities including establishment of BBS-forums are also important. No less important than on-line activities are off-line ones as well. For example, these activities include workshops for citizens to participate in, write in, and establish the BBS-forum. Conventional IT workshops are likely to be confined to learning for so-called information consumers. The activities can be evaluated as they prompt citizens to participate in the emergent type of local governance as a principal or agent.

Other activities off-line should be noted. They include establishment of places where participants in the BBS-forum meet rather than just introductions and careful preparations by governing board members for easier establishment of communication and discussion. This is not just an off-line meeting where participants in the network meet each other. Editing work for communication is also performed off-line. This is nothing less than work to “re-embedding” trust in faceless communication on the Internet.

It is impossible to overlook the information designs of applications used in the city of Fujisawa’s BBS-forum for citizens. An application called “Community Editor” is used in the city of Fujisawa’s BBS-forum for citizens. The Community Editor has many characteristics including ① a bulletin board in conjunction with a mailing list, ② the simple consent function with an “applause button,” and ③ threads [a tree diagram showing the flow of topics] that can be exchanged by authorized persons. These serve to accelerate participation in exchanging opinions and have the advantage of maintaining precise discussions. Another
point to note is that introduced applications are updated while checking whether functions are easy to use or not. Even the application, the foundation, can be changed by exchanging opinions. These complex conditions allow the Fujisawa BBS-forum for citizens to achieve commensurate success. They will be significant operating standards for construction of platforms in e-local government in the future.

3. E-COMMUNITY SHIMADA

3.1 Originality

Taking into consideration these prior examples, what sort of research should we conduct? As a platform for Shimada City in Shizuoka Prefecture, we have built "e-community SHIMADA" for building and invigorating local community using ICT, and we are currently conducting verification experiments using the “e-community SHIMADA” platform.[6]

First, the unit of participation in the “e-community SHIMADA” system is not individuals, but rather a diverse range of other groups such as voluntary groups, community groups, Parent and Teacher Associations, and Town Management Offices. Second, the “e-community SHIMADA” system has “cell-portal sites” which are community websites operated by each group, and a “shared-portal site” for sharing the information from those individual websites in various ways.

Now we will describe the specifics of “e-community SHIMADA” focusing on its individual features.

3.2 Details of operation

Operation of “e-community SHIMADA” is centered on the “Shimada e-community platform study group.” In the Shimada e-community platform research group, the members work against a background of corporations, administrative organizations, universities, think tanks, non-profit organizations, media organizations and other groups, and they are cooperatively involved in the resolution of technical problems and the proper management of “e-community SHIMADA.”

When we solicited groups to participate in “e-community SHIMADA,” we adopted the name “Community-Cells” for groups using “e-community SHIMADA.” To the groups applying for Community-Cells, we requested that they describe “what they will discover in the region, and what they would like to discover,” and suggested that they adopt the goal of building and invigorating local community.

We decided to make the number of participating members in each Community-Cell roughly 3 to 10 persons. When soliciting Community-Cells, we actively encourage the participation of existing groups like non-profit organizations and schools, and we also recognized the participation of Community-Cells newly formed to respond to the solicitation for participants. When there were individuals who wished to participate in “e-community SHIMADA” but could not immediately form their own group, we either introduced them to an existing Community-Cell, or helped them create a new Community-Cell by introducing acquaintances with similar interests. Also, we decided that each Community-Cell would be comprised of 3 to 10 persons, so in some cases organizations like existing non-profits participate not as the entire organization, but rather by being broken up into a number of groups. We also recognize participation of individuals in multiple Community-Cells, and assume that Community-Cells may merge or split. Our efforts (like the above) are currently continuing.

As a result of these efforts, Community-Cells have a strong mission-orientation, and are likely to become network organizations oriented toward problem discovery and resolution. Community-Cells are not fixed in the pattern of one cell per region, and thus some overlap may arise in action regions. This means that the various Community-Cells may discover the region from diverse perspectives. In other words, it is expected that new ways to solve problems will be noticed through discovery from different perspectives.

The unit of participation in “e-community SHIMADA” is not the individual; it is the Community-Cell acting as a group. Therefore, a distinguishing feature of the approach is that the persons in a Community-Cell are already acquainted, and have a certain degree of trust amongst themselves.

The functions of “e-community SHIMADA” are explained as follows on the web page.

- “e-community SHIMADA” is a “mechanism” for aiding various regional activities using ICT.
“e-community SHIMADA” is a “place” where anyone can browse, and learn what kind of place the area around Shimada City is.

“e-community SHIMADA” is a “place” where the participating regional groups can each have their own web page.

“e-community SHIMADA” is a “mechanism” which regional groups can use to discuss their own current and future activities, amongst themselves, or with people in the region, or people who are interested in the region.

“e-community SHIMADA” supports new relationship-building by hosting face-to-face meetings such as networking events for local groups, and workshops for learning how to use the “mechanism.”

As indicated in the last item, we have planned events where people (primarily those belonging to Community-Cells) can meet in various ways, exchange opinions and work together. We envision meetings for networking by the members of the multiple Community-Cells, and workshops for more effective use of the “e-community SHIMADA” system. Furthermore, it was decided to provide a location in a shop with no tenant on a local shopping street as a networking base for face-to-face meetings. Through these efforts, we conceived of opportunities for networking between members of different Community-Cells, and for inviting new participation in Community-Cells. We believe these approaches will become a mechanism where participants of “e-community SHIMADA” can meet and talk face-to-face, and build experience working together.

3.3 Website design

Now we will talk about the information design of the “e-community SHIMADA” website, focusing primarily on the two-level structure of the “cell-portal sites” and the “shared-portal site.”

The cell-portal sites and shared-portal site both use XOOPS—a software package for building community sites using PHP.

At cell-portal sites, the system primarily uses Blog, BBS and WebGIS as XOOPS modules. In addition, each cell-portal site can use a variety of XOOPS modules. This makes it possible to create a design suited to each Community-Cell. Blog is a feature used in common by all Community-Cells, and blogs contain daily articles on subjects such as day-to-day activities, event announcements and opinions about the region. Maps and photos are posted in many articles, and the content is easy to understand. Blog’s features for commenting and trackback are significant not only within Community-Cells, but also because they enable exchange of opinions and information sharing between different Community Cells. Blog can also function as a database by effectively using categories and search. These features are suitable for accumulating discoveries about the region, and using them later. Blog has an RSS feeder function. This makes it possible to notify other Community-Cells and the shared-portal site of the article update situation. This is significant for collaboration between people. Also, it is simple with Blog to update pages using existing systems. For example, it is also possible to post information from mobile phones. This is likely to be useful in achieving wider participation in “e-community SHIMADA.”

Community-Cells use the Geographic Information System (WebGIS) used with web pages. This is very significant because it helps in accumulating “place-linked” knowledge about the region.

Another feature is the ability to limit (at multiple levels) the persons who can post articles at cell-portal sites. Each Community-Cell can adopt settings which allow article posting and comments by members only. Individual Community-Cells can also set the system to enable comments by anyone viewing the page. Community-Cells can take a variety of approaches regarding how they wish to build a community.

The main part of the shared-portal site is the gathering and posting of new information from each cell-portal. RSS reader is used for this purpose. This makes it possible to check new articles from each cell-portal site at the shared-portal site. WebGIS makes it possible to view the overlaid posted content of the maps of each cell-portal site from the shared-portal site. A person who has viewed the map of the shared portal-site can understand the same region from the perspective of the different Community-Cells. This allows viewers who do not belong to a Community-Cell to develop a comprehensive understanding of the region centered around Shimada.

The shared-portal site also has a blog called the “administrator blog.” In this blog, we post interesting articles from cell-portal sites, and describe opinions and thoughts about points of interest to the entire “e-community SHIMADA.” We expect that this will explain new information at each cell-portal site, posted as
headlines only, and promote networking between Community-Cells based on information. In other words, the intention is to edit information. In the BBS, users post content common for all Community-Cells, such as questions on how to use the system and event announcements. Responses and comments from participants can also be obtained using the BBS.

In addition, the shared-portal site also has lists of information and Community-Cells, a feature for searching “e-community SHIMADA,” and posts of photos from networking meetings, workshops and other events.

Through these efforts, we are working to connect the different Community-Cells using various methods, and showcase both the overall “e-community SHIMADA” and the region of Shimada City. Based on this foundation, we are also trying to build and invigorate local community from the standpoint of website design [Figure.2].

![Figure 2. e-community SHIMADA](image)

3.4 Research results

Here we will describe the course of our verification experiments up to October 2005.

When we opened “e-community SHIMADA” in December 2004, the number of Community-Cells was seven, and at present (December 2005) the number of participating Community-Cells is 22. Participation has increased by 3 times in 12 months. Community-Cells also have a variety of missions, and different organization. These various groups learn of each other and begin collaboration by using “e-community SHIMADA.”

Some typical Community-Cells include: the “Community Otsu Committee” which was an existing community group in the mountain region, the “Environment Forum —Water & Green——” and the “Environment Forum —Garbage——” which formed by the split of a non-profit organization, the “Workshop of Water” which studies flood damage, the “Child Treasure Community-Cell” created by the region’s Children’s Center, and the “I Love Kanaya” cell created by people living in the former Kanaya Town which merged with Shimada City.

Each Community-Cell has its own approach in using the various features of the system, such as Blog, WebGIS, BBS, linking to photos and movies, podcasting to introduce the region, event calendar and simple questionnaires.

Community-Cell members are currently writing a monthly average of about 150 articles for the blogs on cell-portal cites. About the same number of comments are being posted to the blogs on the various cell-portal sites. On the BBS at the shared-portal site, posters contribute to topics divided into 66 threads. We have written 110 articles under the title “Administrator’s Blog.” This results in linking of information within “e-community SHIMADA” and collaboration by the actual groups which are creating Community-Cells.

In October 2005, there were a total of 49,138 page views and 12,000 visitors.

Now we will discuss the qualitative situation of “e-community SHIMADA.” With regard to events announced in the blogs of cell-portal sites, we have seen examples where we posted an article in the “Administrator’s Blog” of the shared-portal site, and (as a result) there was an exchange of opinions between
Community-Cells, and actual action was taken. These cases suggest the possibility of collaboration through e-community SHIMADA in regional activities which tend to be done by individual groups.

Opportunities for actual face-to-face meetings of Community-Cell members include Kick-Off Events, workshops on using the system, and Community-Cell networking sessions. By talking face-to-face, Community-Cell members invite citizens who are not yet participating to participate in a Community-Cell, and stimulate the creation of new Community-Cells. There have also been cases where government employees and citizens participating in networking meetings have exchanged opinions, and new proposals have been made from the government side.

On September 3, 2005, we held a listening session, focusing on 8 key persons active in Community-Cells. In that session all 8 persons replied that: “their knowledge of the Shimada City region had increased,” “their knowledge of regional activities within Shimada City had increased,” and “their interest in regional activities within Shimada City had increased.” Six of these people responded that: “they had become more active in regional activities,” and that “participation in e-community SHIMADA is attractive because you can make friends.”

3.5 Discussion based on verification tests

Here we will describe our thoughts, from the start of verification experiments to the point where 10 months had passed. In this discussion we shall study 3 points, while also referring to the aforementioned proposal of the “Conference of Advisors to Support Region-Building.”

First is the fact that talent is being developed to do the work of building and invigorating local community. As an issue for local community building, the proposal points to the fact that the will to participate in local governance does not arise due to the waning of the sense of belonging to regions, and as result, there is a lack of methodologies for developing regional leaders.

In contrast with this, “e-community SHIMADA” provides WebGIS and a diverse range of other ICT-based applications for linking regional knowledge, taking small groups called Community-Cells as the unit of participation. In reality, too, we are creating opportunities for members of the various Community-Cells to meet up. This makes it possible for key persons among the Community-Cell members to have experience managing a small-scale group, and experience working by meeting face-to-face with other leaders and exchanging opinions. As a result, the “e-community SHIMADA” verification experiments relate to the development of talent to drive the building and invigoration of local community—as regional leaders, producers and editors.

Next, we shall describe the active use of information within the region. The proposal states: “In many cases information relating to region building has not been organized, and it takes time to obtain the needed information. Also, people have not developed the ability to sift through information relating to region building. Furthermore, we have also seen cases where no mechanism has been established for exchanging information between active people.”

We provided "e-community SHIMADA" with features as a blog database, and with WebGIS for map information. This makes it possible to accumulate information and search it as necessary. We have also made it possible to post still images and movies to “e-community SHIMADA,” and are working to archive regional information. In addition, information is being organized and sifted by holding face-to-face networking sessions.

Third is collaboration between people inside and outside of the region. The proposal states that efforts to build community are proceeding in isolation from each other, and collaboration between the various actors is insufficient. In response to this, “e-community SHIMADA” has comment and trackback features using Blog, monitoring of information updates using RSS feeder, and promotion of collaboration between actors at the “shared-portal site.” Diverse types of face-to-face networking based on “e-community SHIMADA” also promote collaboration of the different actors.

The common thread of the above three points is a mechanism whereby the activities of individual groups and actors lead naturally, before you know it, to building and invigoration of local community in the entire region, without the explicit intention to invigorate the overall region, and the result is creation of a safe, anxiety-free and vigorous region. We have noticed this point.
3.6 Problems

In the future, we will conduct verification experiments to achieve even broader use of “e-community SHIMADA.” For this reason, we feel it is necessary to further study the above considerations (including quantitative analysis) because they are limited to actual results and possibilities in a narrow scope.

We would also like to consider use outside of Shimada City, and conduct research establishing the effectiveness of the ICT-based equipment and face-to-face network environments of “e-community SHIMADA.”

With regard to the future development “e-community SHIMADA,” we would also like to create new human networks by also introducing social networking services.

4. CONCLUSION

The conclusion of the discussion in this report is that the platform constructed through use of ICT is considered to be “a place where a variety of information about public management meets.” Thus, the platform is expected to support the emergent type of local governance.

This definition will be specifically verified amidst confirmation of examples and its development heightened.

In the prior section, the BBS-forum for citizens will be confirmed as an already functioning platform and the “e-community SHIMADA” will be confirmed as an example of a platform for which future development is expected.

NOTES

“HEY COME VISIT MY SITE”: KID-E-COMMUNITIES ON THINK.COM

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ABSTRACT
This paper considers the extent to which the free, password-protected online community environment of the Oracle Education Foundation’s Think.com supports children’s learning. Using an interpretive approach, we analysed the uses of the environment within a broad frame of digital literacies, social interaction and facilitated collaboration, in order to identify potential for, and instances of, learning. We found that many children engaged readily with the site to display a range of digital literacies and to communicate with others, and that teachers and facilitators played a powerful role in mediating learning, managing the communities, setting guidelines for participation, and linking students with outside experts. There is, however, scope for richer learning which is yet to be developed.

KEYWORDS
Children, online communities, learning, Think.com

1. INTRODUCTION
This paper explores how school students have engaged in web-based communities facilitated in one software environment: Oracle Education Foundation’s Think.com. Little has been written about the specific learning outcomes of large-scale communities for children, or the role of teachers in connection with the management of, and learning from, participation in online communities for children. We focus on the Australian context, and consider the potential of such online communities for learning, specifically in relation to personalising learning and developing digital literacies that enable students to create identities in a social context. We look at the current uses of Think.com, and the potential for exploring personal and community values through local, national and international communication and collaboration. Finally we consider the role of teachers and other facilitators in children’s online communities. We base much of our paper on our experience as one of the Foundation’s Australian Training Partners, and look specifically at the uses of Think.com in Australia.

2. CONCEPTUAL BACKGROUND
In this paper we consider learning as the process by which people create knowledge, the product itself containing the meaning of objects and events (Dewey, 1910). Like Bereiter and Scardamalia (1998), we take a social view, suggesting that knowledge itself must be in the world, rather than in the mind, so that knowledge itself is in the form of objects (including principles and theories) to be considered, criticised and improved by the learners. Knowledge building is activity that leads to the creation of knowledge products, while learning is a personal consequence of this process.

The relationship between teaching and learning is also important to this paper. In contrast to conceptions of teaching as simply transmitting a body of knowledge from experts to novice learners, a view of teaching as knowledge building is based on creating new knowledge with learners, as one school leader commented:
[Teaching is] developing a partnership with the kids saying, ‘We are learning this together. We’ve got a framework in which we are going to learn this stuff and there has to be some kind of rules and fences around that. But within that we are learning together’ (Hartnell-Young, 2003, p.170).

This view has developed as communication technologies, and a context of uncertainties, challenge teachers’ sense of control of student learning. Many teachers are now happy to describe themselves as learners (Hartnell-Young, 2003). They are also designers of learning for, and with, others.

The leader’s comment above also raises notions of a community bounded by ‘rules and fences’ that provides security and, perhaps, a sense of identity. Lave and Wenger (1994) see the individual learner as part of a community of practice, where learning takes place through the sharing of purposeful, patterned activity, as a newcomer—or novice—moves from the periphery to the centre, becoming an expert within that community. They use the term legitimate peripheral participation to describe engagement in social practice that entails learning as an integral constituent. Peripherality, they suggest, is a positive and dynamic term, offering an opening and a movement toward expertise. In many school communities using computers, we find that at times the students have expertise and the teachers are on the periphery, while at other times the teachers are experts, particularly in teaching students how to learn.

Learning and literacy are inextricably linked in the view of many educators, so that new terms such as digital literacy and multiliteracies have been coined to acknowledge the need to learn a wide range of literacy skills in a digital age. Multiliteracies, according to Cope and Kalantzis (2000), is a term that acknowledges cultural and linguistic diversity and the communication opportunities of new media. Those who are multiliterate can express themselves and make sense of the world through multiple modes: linguistic, visual, audio, gestural and so on, in a continual process. Similarly Unsworth (2001) argues that there is a plurality of literacies, and becoming literate is a more apt term than being literate. We include with this a conception of emotional literacy (Sharp, 2001), which includes self-awareness, managing feelings, motivation, empathy and social skills. These characteristics are emphasised in the renewed interest in values education on the part of the Australian government, which has called for explicit teaching of Australian values in schools.

In our view there is a continuum of user activity on the Internet from consumption or downloading of digital material; through reproduction, such as compiling a digital presentation from other sources; to creation, such as making new digital products (Hartnell-Young, 2003). Like Heppell (2005), we prefer our servers to be filled with opportunity for student conversation, creation and publication rather than top-down selections of content. The increasing interest in blogs, wikis, social networking and communities of practice (Wenger, 1998) indicates the human need to communicate and publish. Learning, according to Kolb (1984), involves active experimentation in this way, as well as time for reflection. Hence Wenger suggests that a design for learning needs to be opportunistic rather than rigid, so that a minimalist design, creating apparently empty software that students can populate (Zucchermaglio, 1992), is preferred. This allows for students to develop and express their voice (Hargreaves, 2004). Further, Papert (1996), discussing learning through constructionism—students designing and making things—notes research evidence that indicates students are motivated by making, rather than merely using, software, and in doing so are able to concentrate their attention for surprisingly long periods. Having fun, or playing, is also a means by which students and teachers can explore, experiment and become familiar enough with technology to ask the important questions about its role in society (Selfe, 1999).

### 3. THINK.COM: BACKGROUND, DESIGN AND FUNCTIONALITY

The online presence of Think.com had its origins in 1998 when the British Prime Minister, Tony Blair, mandated that every student in the UK would have an email address by the year 2000. According to the Foundation’s website, the Government asked Ultralab (www.ultralab.net) where Stephen Heppell had worked on similar large-scale projects, to assist. The set of online learning community tools subsequently developed with Oracle became the Think.com project, and has since led to new projects including Notschool.net, a virtual school for those many children not formally at school, and Talking Heads, an online community of newly-appointed UK headteachers. Think.com is now available free of charge and exclusively to schools in around twenty countries. It began in the English language, and has been translated into Spanish, Thai, and Chinese.
On its website (www.think.com), the Oracle Education Foundation envisions that Think.com will be used to assist the adoption and integration of technology by schools. As a result of using Think.com, it states, students will be motivated to communicate effectively with members of a global community; to read, reason and write more powerfully; to conduct thoughtful research into important questions and issues; and to perform well on demanding standardized tests requiring inferential reasoning.

Access to Think.com is limited in that schools must enter into and abide by an agreement with the Oracle Education Foundation through the school principal. It is then available to students and their teachers who are all easily identified by their user name and the community or school they belong to. Students are known by first name and last initial, such as Jesse B, while teachers use real names such as Mr Smith or Ms Garcia. An Oracle representative verifies registrations and creates access for a school administrator who can create individual access for teachers and students. Each member school must dedicate a staff member as the Think.com administrator, a user who has special system privileges and the responsibility of monitoring student content within the school. There are easy-to-use tools to monitor the use of inappropriate language, such as an automatic screening device for text, and an image review tool for teachers. A flag tool allows any teacher in the world to comment on the appropriateness of content. Although no environment that allows free speech and private space is completely safe, the combination of known identity, teacher mediation and total access for school administrators is intended to provide an environment of responsibility and accountability.

Unlike the usual model of a web-community based upon a common interest, Think.com is a community of school students and teachers with many interests: both academic and personal. It is primarily intended for 7-14 year olds, so the design elements are intended to engage this age group. The portal is organised into four areas at the top of each page, as shown in Figure 1: My Website, Email, People and Groups.

![Figure 1. Think.com Sample Screen](image)

At any time, the People area shows who is online in the world. As well as sending emails and stickies (simulated sticky notes containing messages), students can invite others to participate in polls, message boards and debates. The Groups area contains communities within the classroom, the school and the world. Teachers can create Assigned Groups to facilitate project teams—allowing only group members to create content—thus exercising more control than, say, a wiki. The Create button on the left of the screen allows users to add material to their own website.

4. METHOD

This paper draws on the experience of the authors in the Centre for Applied Educational Research at The University of Melbourne. The Centre has been a training partner for Oracle’s Think.com in Australia since 2003, and has managed Australia’s National Quality Schooling Framework (NQSF: www.nqsf.edu.au) and the Boys Education Lighthouse Schools Project (BELS), both of which used some of the features of Think.com to build a national community of teachers. The authors were therefore involved in the Think.com community as both members and administrators. The Centre distributed a regular email newsletter (Oz Think.com News) to Australian schools to support their involvement in the community.
The main question this paper addresses is: To what extent does the current use of Think.com support children’s learning? A subsidiary question addresses the role and importance of teachers and facilitators in the community. To identify likely instances of learning we looked for evidence in three broad areas: a range of literacies, instances of social interaction and collaboration on tasks. Our approach to the task was interpretive, drawing on qualitative and quantitative data, although it was rather cursory. Due to the high number of users in Australia (over 28,000), we took opportunistic samples of student sites, looking for digital literacy, interaction and collaboration on tasks. Our role as a training partner gave us privileged access to information on student sites as well as a client relationship with other users of Think.com, and all quotes in this paper from members’ sites are anonymised. We also used internal reports on Australian-based activities we have facilitated, and anecdotal comments made by current participants in telephone calls, face-to-face workshops or in response to emails or newsletter items, particularly in terms of teacher roles. We searched the Web for other comments made in relation to Think.com, particularly by users.

As evidence of digital literacy, we considered individual students’ pages, and the range of digital products with which they filled them. We looked for a sense of identity and audience, as well as appropriateness to these audiences, and a developing sense of emotional literacy. For social learning, we looked for evidence of interaction with the audience, through message board entries, votes and stickies. In terms of collaboration we looked for joint tasks that groups were working on together, within a school or across schools and nations.

Quantitative data, consisting of user registrations and log-ins collected by the Oracle Education Foundation on a monthly basis, were used to set the Australian context. The qualitative evidence was sorted, but not quantified. In light of our experience in Australia, and our intention that this paper would not provide a definitive evaluation of Think.com using Preece’s (2001) sociability and usability criteria, we have drawn some preliminary conclusions that we intend will inform future work in this area.

5. USERS AND USES OF THINK.COM

In this section we focus mainly on Australian examples, in terms of the three aspects of learning identified earlier, and the roles teachers and facilitators play. Australia has long had distance education using print, radio, and more recently, online communication forms for students in remote areas and those who are excluded from schools for health reasons, poor behaviour or itinerant family life. The notion of learning at a distance is now spreading to mainstream schooling. Of the 10,000 schools in Australia there were 838 schools registered in Think.com as of September 2005. Of these, 493 schools had used Think.com in the previous six months. About 10% of the 838 registered schools actively used Think.com, evidenced by the number of students (more than twenty) and over 75% of these students logging in over the previous six months. This can be considered as a core group of users. However in some schools only the teachers had registered, and all students used the one username and password, thus distorting the figures. In contrast, in a few cases, all pupils were allocated an account when they joined the school, and it was not always used. In spite of Oracle Education Foundation’s intended target group of 7-14 year-olds, we have found that in many countries older students used Think.com, and in Australia clusters of teachers were developing communities of practice.

5.1 Individual literacy

Digital literacy includes the appropriate use of range of media: text, images, animations and codes, with a sense of the audience. Students typically constructed their website to include a small biography, images of a favourite band, actor or hobby, and polls, as shown on Figure 1. A number of students worked alone as members of Think, often from home, rather than as members of a class. Asked about how her school used Think.com, one student wrote:

*We use Think.com so that we can transport work from home to school and so we can show our teachers and class mates. We also use it during ICT. If we have just completed an exam or if we finish early, we have the chance to go on Think.com for 10 minutes, like an award scheme...We also get the chance to design our webpage and put homework, articles and things about us on it, as a way of expressing and creating new ideas.*
Some users display extremely high levels of digital literacy. We saw that students (and teachers) have developed and shared HTML codes that personalise their websites. The codes were used to enhance web pages with patterned backgrounds, pop-ups and music. In the view of the Oracle Education Foundation, these codes are not a standard or acceptable part of Think.com, as they slow it down. Windows for cutting the code in are usually blocked upon each new release. However this has not deterred the student hackers who have found new windows. A high level of programming is needed to discover the windows, but a low level is needed to copy and share. This can be viewed either as an example of anti-social behaviour or of students demanding that their voices be heard.

The role of the teacher in this type of learning has often been to guide students in using the tools, establish guidelines or etiquette for communication, and as an administrator, to remove inappropriate content. One teacher gave demonstrations on accessing information, producing photos and movies, how to insert data and different ways to communicate information over the Internet. As in most online communities, various administrators and users developed rules of use and guidelines for etiquette as a result of their experience, limiting personal information, and urging students to report intrusive questioning or abuse to a teacher. The reasons for this were stated by one school:

*When using Think.com you are representing the school and your name is published and attached to all documents…Think.com is not a private area for you to express your own language and feelings but a powerful resource to develop education and community skills to a wide audience. Think.com is your online electronic school exercise book.*

Teacher moderation was appreciated by at least one student from another school:

*I think that it is good that teachers check because some kids talk about either inappropriate stuff or disgusting stuff.*

A scan of Think.com showed both boys and girls were using the space, although we have no figures to show proportions. However several teachers have commented that the design is childish and girly, such as this one:

*My class of grade 3/4s tried using Think.com with moderate success. The big drawback was that it was a little too cutey with the stamps and not all that appealing to most of the group except some of the girls.*

On the other hand, a secondary teacher commented:

*My kids like it; some LOVE it, and all find it more engaging than exercise books. I really use the fact that the sky’s the limit for the motivated students.*

### 5.2 Social interaction

Having created their sites in Think.com, students often sought out other people, initially within their school, and then by seeing who was online (or by clicking on a country), and leaving a message inviting other students to visit their sites. Similarly, a student could receive an unsolicited visit by another Think.com student.

These are just two examples of invitations:

*Please come to my site*

and

*HEY COME VISIT MY SITES I LOVE URS*

A selection of stickies is shown in Figure 2, indicating communications from both students and teachers from various countries. (“Parth” refers to Perth, Western Australia).
The next stage of interacting is to find students with similar interests, by using the search facility in topics or groups. One Australian student explained:

_We can use it to communicate to our friends in the library or at home whenever we want, then we meet new friends from our school and from around the world. If people do not have an email account then they can use Think.com to email friends and family if needs be._

Students shared tips and tricks, as this offer of assistance, posted via a sticky, indicates:

_do u no how to get backgrounds if no ill tell u (sic)_

Teachers facilitated interaction in many ways: by organising a website competition, a student representative council page, or an interest-based group within a school, such as ‘The Mad Scientists: for lovers of science who enjoy discovery’. Some links were clearly at the school-to-school level, while others were between individuals. In one term-long trial, seven year olds used Think.com to view the classroom pets of children in other locations. One student commented:

_You get to find out about everyone’s classroom pets from other schools without having to go there_ (Foreshaw, 2005).

Other meaningful interactions occurred around current events. A Hurricane Katrina/Rita Group was set up in September 2005 by an Indian school to express their sympathy: ‘our hearts go out to the victims’. Within two weeks, 105 members had joined from Australia, India, USA, UK, Germany, contributing messages, pictures, a message board asking ‘have you ever been in a hurricane?’ and ‘has the government done enough to satisfy those affected?’ This site was also personalised with an animated border featuring ‘God Bless the victims of Hurricane Katrina’.

Teachers who encouraged social interaction on a wide scale generally played a role in designing activities and allocating time to Think.com interaction. The expectations of teachers regarding participation of their students in an online community, and their ability to provide opportunities for, and control much student computer use, clearly played a role in the type and level of activity students can enjoy. One commented to us:

_I think that the site gives students an opportunity to share ideas, gain insight into life outside of their suburb and a sense of belonging to a wider community._

On the other hand, another, writing on an external discussion list for teachers, wrote:

_The drawback was that often the challenge for participants was the collection of stickies or votes on polls for the favourite site. In our experience there was not a lot of real communication going on._

The term ‘real communication’ implies a negative attitude, but we believe the activity itself might not preclude learning. In contrast, a student writing on the site saw both fun and education as outcomes of her time on Think.com:

_I love think.com for two reasons. It’s so much fun going on this website! One of the reasons why I love think.com is because you can chat to friends. It is also educational. You can also download music and pictures and all kinds of fun things. The second reason about why I love think.com is because there is games and voting. Right now my background is positively full of hearts! I soon will get my e-mail._

### 5.3 Facilitated Collaboration

The Groups area of Think.com gives students space to work collaboratively on school projects or activities of interest, but unless it is a popular topic, or there is heavy promotion through announcements and stickies, or teacher direction, it seems that this area is not utilised as well as the other tools of Think.com. Only the three newest groups are listed, and unless a student does a search on a topic or clicks through to the entire list of over 800 groups they may not see the group that fits their interests. It seems that real collaboration requires teachers to design suitable curriculum activities, to manage time and access to resources for the students and to mediate learning through questioning, dialogue and monitoring progress. As an example, teachers in the Schools of Isolated and Distance Education (SIDE) in Perth involved students from small country schools in Western Australia in a virtual classroom trial. Students completed projects in a real time, online environment using various applications and then shared their work with other group members through Think.com. On a larger scale, two national activities are described below.

Early in 2005, the Centre facilitated an extensive set of activities on the Asian Tsunami of December 2004. Guests and experts included the Chief Executive Officer of the aid organisation World Vision; the Australian Ambassador to Indonesia; the Australian High Commissioner to Sri Lanka; a seismologist; several relief volunteers, and one tourist eyewitness. This event gave students access to people who were closely
involved, and enabled teachers to broaden their study of natural disasters and humanitarian responses. The activity was promoted through announcements on Think.com and email newsletters. Over 350 students, mainly from Australia, asked questions of the guests, by typing them in to the site. They were curious about the emotional toll on the survivors and the volunteers, the processes of delivering relief, scientific facts about the tsunami and earthquakes, and the effect on children in the region, asking:

*How did you feel when you saw the terrible sight?*

and

*Do you think Thailand will ever fully recover from the shock and damage of the tsunami?*

One student asked the eyewitness tourist who was in Sri Lanka visiting family:

*Were you really there? I reckon it would have been an experience I'll never forget but seeing all those people dying was it sad?*

(sic)

These expressions of emotional literacy (Sharp, 2001) transcend the limitations of the text-based system, revealing a high level of knowledge and maturity among students.

During the tsunami activity, a message board asking ‘what has your school community done to help’ attracted 76 contributions. Later we asked a school principal, who with his total complement of thirteen students organised local fundraising, for his impression of the worth of the activity:

*As a motivator to use the technology: fabulous. To communicate with others beyond the school walls: sensational. To make the children feel more socially aware and feel they too have a voice: priceless.*

A second large-scale activity, the August Author Festival, held in August 2005, involved around thirty authors from Australia, Canada, USA, UK and New Zealand. It was facilitated by the Centre and a teacher in an Australian primary school. Its purpose, in the words of one participating author, was to do with storytelling and identity:

*We all need stories…to tell us about ourselves, our society, about our world and our past. This innovative online festival is a great way to create that excitement, that joy of reading, as it gives students and authors a chance to chat about their favourite books and the process of writing.*

Several writing masterclasses were held, and another author commented approvingly on the asynchronous global participation in this format:

*The cool part about the masterclass is the people you get to hang out with and swap emails and comments with. Especially considering that the 5 people in the masterclass are from all over the world.*

While those involved generally commented positively on these activities as supports for teaching and learning, the amount of time required to contact authors and experts as participants in these activities, to provide or make links to additional online resources, and to promote the activity to students, was a concern for the facilitators. Compared with the potential, the facilitators reported disappointment with the participation levels in some activities.

6. CONCLUSIONS

In this paper we set out to find out how students used Think.com to learn through developing literacies that enable them to create identities in a social context, and to identify the role of teachers and other facilitators in children’s online communities. The ‘global learning environment’ description often given to Think.com may fit the potential of what can be achieved, but we found that clearly, giving students access to the software alone cannot create knowledge in the manner that Bereiter and Scardamalia intend. Depending on the level of supervision, facilitation and guidance students received from teachers, they used it most commonly at the simplest level as a fun communication tool, and, less frequently, for curriculum tasks. Although fun and play can result in learning, there are other important aspects that teachers can encourage, such as reflection, critical thought and emotional literacy. As Harasim (2002) found in adult communities, the climate and sustained engagement is positively affected by purposeful coordination.

While student voice (Hargreaves, 2004) is enabled through tools that Wenger (1998) and Zucchermaglio (1992) would approve of, it appears that little agency is formally allowed to students in terms of the design of Think.com. This might explain why they hack and share codes in order to personalise sites. In spite of our intention to capture student voice we found that the voices of teachers and administrators often intruded, whether through rules and guidelines, or through responses to our requests for children’s comments, which were often mediated by teachers. We do believe, however, that there is a clear role for teachers in these
communities. Teachers and facilitators need to encourage active engagement in developing the range of digital literacies, through, for example, designing activities, managing access to resources and mediating learning through the technology by asking relevant and thought-provoking questions, and challenging students’ conceptions of audience. As students share their pages, they provide exemplars for others, in a way that goes even further than Druin and Solomon (1996) suggest. Students in small schools can expand the range of feedback they receive, and teachers can gain ideas, as well as benchmarking standards, by seeing what students are doing in other schools and other countries. Teachers need to play an active role in ensuring that students can identify quality content.

As noted earlier in this paper, the Oracle Education Foundation expects that as a result of using Think.com students will be motivated to communicate globally; to read, reason and write more powerfully; to conduct thoughtful research into important questions and issues; and to perform well on demanding standardized tests requiring inferential reasoning. We have some evidence of the first three, but we are not in a position to comment on the fourth goal. That would require a tightly-structured research project rather than the opportunistic review we have carried out for this paper.

In keeping with our view of active involvement and enabling students to create and build knowledge and have their voices heard, we end with an excerpt from a poem written by two students in India, that we feel covers many of the points we wished to explore:

Waves of fantasy, and fun: Sweep by as you get to learn
A moment or two in someone's site: You get to know more, Right?
A treasure of knowledge is hidden here: Meet people from far and near.

REFERENCES


APPROPRIATION AND MEDIATION OF TECHNOLOGY USE IN STABLE SELF-ORGANISED ONLINE COMMUNITIES

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ABSTRACT
Appropriation of information technology by a group of users is a dynamic process, which should ideally be explicitly moderated in a process usually termed as technology-use mediation. So far, processes of appropriation and technology-use mediation have mainly been investigated in respect to the introduction of software systems in traditional organisations. In this paper we present two case studies that we characterise as stable self-organised web-based communities and identify characteristics of the processes of appropriation and mediation of technology use in this setting. Results show that all phases and activities of technology appropriation are dominated by mostly unsolicited efforts of individual community members. Mediators in self-organised communities succeed in promoting technology use if they succeed in making sense of the technology for their fellow community members.

KEYWORDS
Appropriation of technology, technology-use mediation, virtual communities, self-organisation

1. INTRODUCTION

Appropriation of information technology by a group of users is commonly seen as a dynamic process (Huysman et al. 2003), which should ideally be explicitly moderated in a process usually termed as technology-use mediation (Orlikowski et al. 1995). Literature describing processes of appropriation and technology-use mediation mainly focuses on the introduction of software systems in organisations (e.g. Orlikowski et al. 1995, Scheepers 1999, see section 2). Less is known about the processes leading to the adaptation and use of information technology by communities that are essentially self-organised and have little formal hierarchies. These communities rely heavily on the commitment and intrinsic motivation of their members to be successful, whereas software use in traditional organisations is probably at least partly involuntary.

For successful software support, the circumstances of its introduction into a community are crucial (cf. Orlikowski et al. 1995). In this article, we explore the processes of technology appropriation and technology-use mediation in self-organised web-based communities. Under what conditions is software support for communities successful, when is it doomed to fail? Under what circumstances do users – or a community of users – appropriate a software system, what conditions interfere with it?

To explore the implications of self-organisation concerning the processes of appropriation and technology-use mediation, we investigate two web-based communities that were purposefully established by a group of people to extend the possibilities of interaction within an existing social aggregation. Alpha is a community of students of Information Systems, Beta represents a network of freelance IT and management consulting professionals. Due to their group and organisational structures and conditions of membership, they can be characterised as stable self-organised communities. Characteristics of such communities are

1 Names and backgrounds were made anonymous.
described in detail in section 3, along with the two case studies and the methodology underlying our work. The results of our research are presented and discussed in sections 4 and 5.

The two case studies were conducted as part of our research on learning communities and virtual networks of freelancers (Finck & Janneck 2005, Janneck & Finck, in preparation). Working in the research fields of computer-supported collaborative learning (CSCL) on the one hand and virtual enterprises on the other hand we found notable parallels with respect to the processes of organising and maintaining such a community that may apply to virtual communities in general. In particular, in our former work we explored the role of social identity (Tajfel 1978) in respect to processes of community building and fostering participation in web-based communities. Looking more closely at the processes of appropriation and mediating of technology use in virtual communities was a logical next step in our research.

2. APPROPRIATION AND MEDIATION OF TECHNOLOGY USE

The appropriation of information technology by a group of users is commonly understood as a dynamic, evolving process with rather unpredictable outcomes (Huysman et al. 2003). This is especially true for communication technology that allows for various use purposes (Ciborra 1996). Therefore, appropriation of communication should ideally be explicitly moderated in a process termed technology-use mediation by Orlikowski et al. (1995). Drawn from a study in a large manufacturing company, Orlikowski et al. (1995) describe technology-use mediation as a "deliberate, ongoing, and organisationally sanctioned" intervention carried out by specific members of the organisation termed as mediators. Orlikowski et al. (1995) identify four activities of mediators:

- **Establishment** of the technology both technically (e.g. setting up hardware, installing software, registering user accounts) and socially (e.g. proposing usage goals and customs).
- **Reinforcement** of the system use once it is established (e.g. offering ongoing support and guidance, helping to integrate the new technology into existing routines and workflows).
- **Adjustment** or refinement of certain aspects of the system usage (e.g. technical alterations or a change in usage rules) in response to problems or challenges.
- **Episodic Change**: Major modifications of both the underlying technical system and/or usage customs and norms may be necessary to address organisational changes or different users’ needs. Episodic changes need to be prepared and legitimised carefully to ensure that the majority of users will support them.

These activities can be related to the three types of technological change in organisations identified by Orlikowski & Hofman (1997): Establishing technology is usually an *anticipated* change that was planned and prepared in advance, even though in some cases technology use might emerge from a smaller ‘inner circle’ and spread to wider parts of the organisation. Adjusting technology use is also a reaction to *emergent*, spontaneous changes. Episodic changes tend to be *opportunity-based* responses to developments or events that were not originally anticipated but are nevertheless introduced in a purposeful manner. Reinforcement does not represent change, but is directed at stabilising the existent patterns of use.

Technology mediators carry out tasks similar to e.g. support staff, administrators, or ‘organisational sponsors’ promoting technology use (Scheepers 1999), i.e. organisationally imbedded and sanctioned roles. Other actors that influence technology use in an organisation without official legitimisation are technological champions who make unsolicited efforts to introduce new technologies and ideas, often out of personal motivation (Scheepers 1999), expert users or translators that serve as models for other users or provide support for them (Gantt & Nardi 1992, Mackay 1990).

Bansler & Havn (2003) broaden the concept of technology-use mediation by emphasising that it is an active process of *sense-making*: Initially, mediators do not necessarily have a clear notion or even vision of what the respective technology may offer them and how they would like it to be used, but have to construct their understanding in a process of enactment of different practices and interpreting their experiences, that is, “to make sense of the technology” (Bansler & Havn 2003). Thus, technology-use mediation is highly dependant upon the personality, values, and responsibilities of the mediators. As a result, two mediators may develop different views and strategies of technology use even though they work in the same organisation using the same tools. However, Bansler & Havn (2003) do not explore exactly how these factors influence technology appropriation and which suggestions for community development can be derived from this.
3. STABLE SELF-ORGANISED ONLINE COMMUNITIES: TWO CASE STUDIES

3.1 Characteristics of stable self-organised communities

Our research in the field of web-based communities focuses on a type of community that we label *stable self-organised online communities*. They represent a blend of traditional organisations (e.g. company intranets, networks of organisations) with strong community boundaries and offline interactions (e.g. Bradner & Mark 2002, Takahashi et al. 2003) and large online communities with sometimes thousands of users, a high fluctuation and mostly anonymous interaction (e.g. special interest or self-help groups) that are often established by individuals or a group of individuals out of personal motivation and evolve in a self-organised manner (e.g. Blanchard & Markus 2004, Burnett & Buerkle 2004).

We identified the following characteristics of stable self-organised online communities:

- **Offline Relationships**: Communities of this type often exist physically. Thus, they can be characterised as hybrid communities since their members also interact in the physical world. However, the possibility to interact virtually is seen as an important characteristic of the community: Due to their distributed nature or size, respectively, these communities are only sustainable as such through the use of information technology.

- **Strong boundaries**: Stable self-organised online communities have strong boundaries and fixed conditions of membership. Non-members are not allowed to access the community.

- **Familiar interaction**: No anonymous communication takes place. Members need to register with their proper name, which is shown with all of their postings. As a consequence, interaction is more familiar than in e.g. public discussion forums.

- **Continuity**: Stable self-organised online communities are characterised by continuity concerning individual membership as well as the existence of the community as a whole. Fluctuation is low.

- **Self-organisation**: These communities are completely self-organised. Typically, they are established due to the commitment of a small group of founding members. There are no officially established formal hierarchies, instead individual members gain influence and take on roles on the basis of their own activities and commitment.

Thus, on the one hand, stable self-organised online communities are similar to traditional organisations. They have strong boundaries, they exist in the physical world as well as virtually, and they have a certain continuity – or stability – of membership. On the other hand, they are self-organised communities without officially established and implemented hierarchies or roles.

Regarding technology appropriation, stable self-organised communities need to address the challenge of establishing solid patterns of interaction without relying on officially recognised mediators or extrinsic factors such as organisational sanctions or benefits to promote technology use. Instead, the communities’ success or failure depends on the commitment and intrinsic motivation of its members.

3.2 Case Studies

To explore the processes of appropriation and mediation of technology use in stable self-organised communities, we conducted two case studies of web-based communities. To preserve anonymity, we call them ‘Alpha’ and ‘Beta’.

*Alpha* is the nickname of a web-based platform for students of Information Systems at the University of X that serves as a medium of communication, information-sharing and support. Up to now, appropriately 500 members belong to the community. Teachers or students from other faculties are not allowed on the platform. Alpha is completely organised and maintained by students without any financial or organisational backing (Rohde et al. 2004).

*Beta* is a network of freelance IT and management consulting professionals. It was founded in 1997 as a pool for consultants to exchange experiences, knowledge and work results. The network offers its members a variety of services such as vocational training and the opportunity to get involved in several occupational working groups or to meet potential clients via the network’s contacts. Today about 20 members belong to the community. Beta’s organisational and technical infrastructure is organised by network members with very little financial resources.
Both communities satisfy the characteristics of stable self-organised online communities:

- Both communities exist physically and virtually. However, they are only sustainable as such through the use of information technology: Beta members live too far apart to meet often, and Alpha students naturally only get to know a small part of the student body in the physical world.
- Both communities have strong boundaries and fixed conditions of membership. Only students of Information Systems are allowed to join Alpha. Persons who want to join Beta need to introduce themselves by giving a presentation on a workshop and sign a contract settling the conditions of membership (including membership fees).
- Both communities are characterised by continuity, having existed for more than seven years, and both are completely self-organised.

3.3 Methodology

In our research, we want to identify the characteristics of technology appropriation and technology-use mediations in stable self-organised online communities in contrast to traditional organisations.

Semi-structured interviews were chosen as an appropriate method to grasp the subjective views of the community members. Notwithstanding, this approach allows for addressing specific topics and comparability between interviews (Kvale, 1996). The interviews were moderated by means of an interview guide addressing the history of the community, experiences of use, usage customs and problems, measures of mediation, roles, and the meaning of the community.

Data on Alpha was derived from two interview series, interrogating a total of eight average and also especially active members of the community. To collect data on Beta we conducted three group interviews with a total of twelve community members. This was largely due to organisational reasons of bringing the highly distributed network members together.

The interviews were audio-taped with the interviewee’s permission and transcribed verbatim, resulting in over 200 pages of interview-transcripts. Data analysis was carried out following the three steps of paraphrasing, generalisation, and reduction suggested by Mayring (2003): In a first step, the respective units of analysis (usually singular phrases) are paraphrased to reach a uniform level of speech. In the next step, the paraphrased expressions are generalised on a higher level of abstraction to enhance comparability (generalisation). Thirdly, synonymic or correspondent expressions are omitted or combined (reduction).

In addition, we were able to observe Beta’s system usage while working with some core network members to analyze usage problems and elaborate requirements for software support for more than half a year. We also accompanied and observed the development of Alpha over several years (Pape & Strauss 2004).

4. RESULTS

In the following sections, we will present the results of our case studies. First, we describe the characteristics of technology-use mediators in stable self-organised communities. Then we address the activities that these mediators carry out to foster technology use.

4.1 Mediators

In both communities, people can be identified who carry out activities of mediators.

In Alpha, they describe themselves as playing a double or even triple role as administrators, moderators or contact persons. They emphasise the importance of moderation and support for the use of Alpha and were also partly engaged in providing or even designing the technical platform.

In Beta, a small group of members who use the platform often and actively also describe themselves as moderators. They offer user support, provide content and try to stimulate use, and also act as administrators. They were involved in the process of establishing the platforms for the network and are highly experienced in the use of ICT.

The mediators’ influential online position typically corresponds to their real-world activities and roles: Alpha mediators also engage e.g. as representatives in student boards or in student guidance and support.
Beta mediators are also core members in their network, often presiding over real-world meetings and also possessing more decision-making power than other network members. They also have a clear vision of how they would like their network to develop and how to use the groupware system, expressing numerous ideas for using and adapting the system or adding concrete functionality.

In both communities, the mediators are explicitly perceived as such by other participants. However, their activities are appraised rather differently: In Alpha, the mediators’ active usage stands out and partly annoys and discourages other users who feel hampered in their attempt to find a place in the community and develop their own interests and activities. Nevertheless, users agree that there is a need for someone to play an administrators’ role and also to regulate the system thematically and structurally. However, it remains unclear whom they would want to assume responsibility for these tasks.

In Beta, members mostly welcome the mediators’ efforts. Criticism was not voiced. However, we also observed that mediators tend to dominate the system usage and force use patterns on other members. Instead of protesting against this predominance, as Alpha members do, Beta members rather tend to feel guilty about their own ‘incorrect’ usage.

In both communities, mediators face a frustratingly low rate of participation. While the majority of Alpha members can be classified as lurkers (Preece 2000) who never posted any entries themselves, but use the system for their own information retrieval purposes, the majority of Beta members behave very passively. They make no significant contribution to the system or avoid using the platform altogether, not even as lurkers.

4.2 Mediating Activities

We cluster our results according to the four activities of mediators identified by Orlikowski et al. (1995):

Establishment: In both communities, technology use was initiated by a small group of core members:
In the case of Alpha, a group of freshmen established a web-based community system to foster communication and a sense of community among students. Each semester, the community platform is introduced to new students during a preparatory seminar, making sure that everyone gets access to the system and becomes familiar with its use. Freshmen are encouraged to participate and share important information with their fellow students.
For most Beta members, using a web-based platform for communication seemed quite natural or even constituted a part of their self-conception of being a member of a virtual network. Therefore, they welcomed the establishment of a groupware tool, which was done by a small team of members who were especially interested and skilled in the use of web technologies. They invited the other members to register for a user account or even set one up for them.

Reinforcement: In both communities, the members who had set up the technology also act as administrators and try to moderate and support use.
In Alpha, Moderators try to stimulate use by posting all kinds of interesting information. They make an effort to react as quickly as possible to questions posted by other users. From time to time, they initiate discussions about measures to be taken for the development of their community. Thus, Alpha gives students a unique opportunity to become and stay informed about relevant student matters not otherwise provided for.
In Beta, to foster communication and a sense of community, virtual as well as real-world activities were established. Members have the chance to attend a workshop to exchange experiences every two months. On the platform, moderators try to stimulate use by posting relevant information and structuring it according to the different topics that are of interest to the community. For example, the network members were encouraged to post their vocational profiles on the platform, and links to different job exchanges were provided. The moderators also tried to establish interaction and incentives for use. For example, certain announcements were no longer distributed by mail but only available on the platform.

Adjustment: In neither community, considerable adjustments were made:
In Alpha, from time to time, the structure of the platform was adapted to the growing number of members and entries. For example, discussion forums were closed or combined, or outdated entries were deleted.
In Beta, adjustments of the existing platform or refinements of certain aspects of usage barely took place. Instead, several changes of technology were initiated.

Episodic Change: Episodic changes can be characterised as a change of technology:
The community Alpha underwent several technological changes in the past years. In the beginning, a simple website was used to spread information. After about a year, the students decided to use a more sophisticated groupware tool to ease active participation. They chose the Open Source software CommSy, a groupware tool to support communication and coordination especially in learning groups. In 2003 the technological basis was changed again to phpBB, an Open Source discussion forum software. Those changes were initiated by the respective group of administrators and motivated by their personal interests and preferences rather than technological or group requirements.

In Beta, several groupware systems were tested, starting with Lotus Notes. Since commercial platforms came out to be too expensive, Beta turned to the use of Open Source groupware to support the network. In October 2003 dotProject, a PHP web-based project management framework, was installed and adapted to network use. Currently a systematic evaluation is carried out to investigate the network’s requirements for software support. The groupware system CommSy serves as a prototype that will be continually adapted. It was introduced to the network members on a workshop in October 2004.

5. DISCUSSION

In the following section, we will contrast the findings from our case studies of stable self-organised communities with the processes of appropriation and mediation of technology-use that can be observed in traditional organisations (e.g. by Orlikowski et al. 1995). In this respect, we identified a change of roles as well as a change of activities.

5.1 Changing Roles

In both communities, we identified people who carried out activities that are typical of mediators as identified by Orlikowski et al. (1995): They

- initiated the establishment of technology use by testing and selecting different groupware systems and registering user accounts,
- set up hardware and software and keep the system running,
- propose customs of use and try to promote usage, for example by posting interesting information, in some cases exclusively via the platform.

Thus, mediators in these communities play a double or even triple role as administrators, moderators or contact persons. However, unlike mediators in traditional organisations, they lack official legitimisation by the other community members to carry out these activities. Their role can rather be compared to that of “technological champions” in organisations, making unsolicited efforts to introduce new technologies out of personal motivation (Scheepers 1999): None of them was chosen or appointed in any way by the community. Instead, they became ‘mediators’ by taking on an active part in the appropriation process and simply using the virtual platform intensively, thus serving as an example of how and for what purposes the software can be used.

Mediators in stable self-organised online communities also tend to be central actors of the community in the physical world, implying that group structures and relationships established in offline interactions are implicitly transferred to the virtual platform. This correlation is problematic. On the one hand, it serves as a stabilising factor especially in the early phases of establishing technology use, allowing actors to set up a functioning system without much controversy. On the other hand, it carries the risk of coining certain types of usage and subduing the activities of other members before they even have the chance to get involved [2].

Furthermore, mediators in stable self-organised online communities do not have any kinds of sanctions at their disposal to promote use. In contrast, in traditional organisations it is often mandatory to use certain types of information technology or follow certain procedures or workflows. Instead, mediators in self-organised communities need to invest heavily (in terms of time, knowledge or information resources) into the community to create some tangible benefits of use for the other community members. This is a real challenge, as the low usage rates observed in either community suggest.

Thus, mediators in self-organised online communities exist and carry out activities of mediators in traditional organisations. However, they need to do without organisational legitimisation, backing, and recognition.
Whether mediators in self-organised communities succeed in promoting technology use seems to be closely related to the concept of *sense-making* introduced by Bansler & Havn (2003): Instead of relying on the authority and legitimisation of an officially recognised role, they have to rely on the power of their own ideas, visions, and personality. In other words: They need to *make sense* of the technology.

### 5.2 Changing Activities

As was already noted above, many of the activities of mediators in traditional organisations described by Orlikowski et al. (1995) are also carried out by mediators in self-organised communities. However, we also identified a number of differences:

*Reinforcement* of the actual use of the technology once it was established happens mostly through the model usage of a few active members – the mediators or rather *sense-makers*. Their activity serves as an example of how and for what purposes the software can be used. In some cases, these activities – not being coordinated and revised within the community – lead to misconceptions of the platform use. One example is the ambiguity we observed concerning the usage of a groupware system as pull-media vs. push-media: The self-organised nature of the communities with a lack of official regulations and a variety of users’ preferences, conditions, and restrictions rather suggests a ‘pull-media’ usage leaving it in the responsibility of each individual user when, why, and how he or she wants to contribute to the platform. However, we observed that the moderators react to the low intensity of use with a high level of insecurity as to what extent their contributions and efforts are even recognised by the other participants. One means to counter this insecurity is to use E-Mail to point out new postings on the platform. However, for passive members this practice rather implies a ‘push-media’ usage of the platform that urges members to use it if required. Thus, the moderators’ efforts to stimulate use hinder the establishment of responsible individual usage. Instead, members form a habit of reacting only to external stimulation to use the platform.

Interestingly, unlike observations in traditional organisations, *adjustment* of the existing platform rarely takes place. Instead, usage problems or crises within the community rather lead to *episodic changes* of the whole technological basis. These changes are, again, driven by the initiative of the mediators who have a personal preference for a certain technology, an interest for technology evaluation, or simply the motivation to set up ‘something new’. However, it is doubtful whether these changes address actual usage problems or whether they lead to a more satisfactory use since they were not collaboratively planned and implemented in the sense of participatory design (cf. Floyd et al. 1989).

All in all, technological changes in self-organised web-based communities can be mostly characterised as *emergent* changes (Orlikowski & Hofman 1997) that are not anticipated, carefully planned, or reviewed within the community.

### 6. CONCLUSION

To summarise results, all phases and activities of technology appropriation in stable self-organised online communities are dominated by mostly *unsolicited* efforts of individual community members, in contrast to traditional organisations with officially legitimised roles, relying on extrinsic factors such as organisational sanctions or benefits. Mediators in self-organised communities can be best described as *sense-makers* (cf. Bansler & Havn 2003) who succeed in promoting technology use if they succeed in making sense of the technology for their fellow community members.

Nevertheless, we believe that it might be helpful for mediators to get some kind of legitimisation for their activities and, generally, to increase transparency regarding roles. Furthermore, rules or conventions concerning use should be established within the community. This is consistent with the findings of our former analyses concerning the *hosting* of web-based communities. In these articles we elaborated recommendations for hosting web-based communities – addressing role allocation, community boundaries and inclusion of new members, incentives for participation, common visions and rules and the visibility of passive participation – that might also prove useful for mediating technology use (Finck & Janneck 2005, Janneck & Finck, in preparation). To implement these measures within the communities and evaluate their usefulness is one of the prospects for our future work.
Furthermore, we plan to examine other examples of web-based communities that fulfil the criteria of stable self-organised communities in respect to processes of community building and appropriation of technology, preferably in larger-scale and quantitative studies. In addition, it would be interesting to investigate whether the characteristics of the appropriation and mediation of technology use identified in our research apply to other types of online communities as well.

REFERENCES


ACTION-ORIENTED WEBLOG TO SUPPORT ACADEMIC CONFERENCE PARTICIPANTS

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ABSTRACT
In this paper, we propose a system called ActionLog which supports authoring and sharing Weblog contents for the purposes of reviewing support and communication support on Academic Conferences. ActionLog collects users’ actions from other information systems placed at a conference site, and automatically generates drafts of Weblog contents based on the action contexts. Users can edit and publish entries according to their will. We implemented and applied the system on an actual academic conference as a field test. The result shows that the system was used both for reviewing their activities and for communicating other participants.

KEYWORDS
Academic Conference Support, Weblog, Action Records, Reviewing Support, Communication Support

1. INTRODUCTION
Finding people with similar interests is an important activity in event spaces such as academic conferences. Presenting information related to participants is helpful for this purpose. However, because of limitation of time and effort, it is almost impossible to look through all information. It is also difficult to write and publish own information for sharing them with other participants. Through this research, we intend to assist participants to review their activities at conference site and to enhance communication among participants.

Our approach to enhance communication is to share experiences, i.e., users’ actions/interactions with their surroundings that include information systems and other people. Sharing experiences enhances greater understanding of people and objects. Before sharing others’ experiences, however, we must understand our own experiences. For that reason, communication support based on shared experiences should include support for reviewing of individuals’ experiences.

Personal experiences consist not only of the objective observed histories from sensors/systems but also their related thoughts and impressions. Therefore we include the subjective authoring process to procedures of sharing personal experiences.

This paper presents an action-oriented Weblog generation and aggregation method to activate communities. The next section describes our strategy to examine actions for community support specifically and proposes an action-oriented Weblog system, and we apply its application for an academic conference in section 3. Field-test results are shown in section 4 and features of our method are discussed in comparison with related works in section 5. Section 6 concludes our paper.
2. ACTIONLOG CONFERENCE

2.1 Basic Idea

Weblog has been widely spread all over the world. Many people use Weblog as a record of their daily life, much like a personal dairy. Our system supports such authoring by adding context.

We model users' behaviors as actions with real world contexts. Action means what they do and the real world context is a set of information for the environment in which they do so. The real world context includes some physical situations like time and place, subjective situations like intentional objects, and social situations like people nearby.

The system manages to capture actions and contexts by using sensors and cooperating with other systems. Some contexts, like time and place can be obtained directly from sensors, but others should be inferred from sensor information. For example, we can obtain nearby people by integrating locational information of multiple users.

Then the system generates an entry for each action with sentences indicating the context of the action as a draft. Furthermore, the system shows related information, e.g., entries by other people with the same or similar contexts. This is achieved by integrating and calculating contexts.

We call this system concept as ActionLog, and we implemented and applied it to support academic conferences. We call this version of the system as ActionLog Conference later on.

2.2 Sharing Users’ Opinions: Action-oriented Approach

The purpose of ActionLog Conference is not only to support participants in composing their record of experiences but also to share experiences among participants. Sharing opinions or impressions among participants for an event serves an important role in characterizing the event and in communicating about it with other participants. We propose a way to share participants' experiences using ActionLog Conference to achieve casual sharing of opinions among participants.

To involve user's subjective thoughts to the contents, personal experience should be described by the user. For example, we cannot tell what Mr. A is doing when we find the situation where he is in a restaurant, eating some food, and talking about something with Ms. B. Mr. A might say he was having dinner, having an important discussion, or just socializing with Ms. B. Therefore, we employ Weblogs as an infrastructure for contents sharing. People can easily express their thoughts or opinions with Weblog. In addition, Weblog offers an infrastructural aid to manage and share machine-readable contents (Karger 2004).

The generated and published contents are aggregated according to their context. For example, extracting and listing the contents about a certain presentation achieves a topic-centric view (Avesani 2005) on the presentation.

In this research, we assume an experience consists of an objectively observed action and her/his subjective thought at that time. To achieve experience sharing using information systems, we propose a method to capture user's actions, to generate contents from these actions, and sharing the contents among participants. Based on this method, the system helps the user to communicate with other participants.

2.3 Criteria to Design Communication

To design communication by sharing action-based contents, the following points should be considered.

What kinds of actions are shared? We especially address event participants' interactions with information systems because they seem to be active and spontaneous actions for the system user. These interactions are efficiently collectable by the system and are easily understandable for participants.

When actions are shared? Meeting the other participants is one of the most important activities in an event space. Action-based contents should be ready for sharing immediately after the actions occurred to support participants in finding participants with identical or similar interests. Previous works for sharing experiential contents do not process the experience in real time. PEPYS (Newman 1991) and ComicDiary (Sumi 2002) are also automatic content generation systems, but they generate diary-style contents day-by-day.
How actions are shared? It is important to reduce users’ costs of capturing actions, creating contents, and sharing contents. Wearable computers can record all things the user sees and hears (Gemmell 2002). Video and audio recordings help users to review their actions and share those experiences; nevertheless, using such large-scale equipment engenders high costs and is difficult to casually achieve. Sharing videos is also a difficult task for watchers of the contents. Text-based and/or other easily understandable expressions of experiences are needed.

With whom actions are shared? Sharing actions engenders privacy problems. There are some solutions for location-based systems, such as an anonymizing approach (Gruteser 2003) or an obfuscation approach (Duckham 2005). However, in event spaces where participants wish to meet people, disclosure of the location and/or actions does not matter. It is sufficient for the user to select to publish or hide each action using a one-click operation.

3. IMPLEMENTATIONS

3.1 Overall

We implement ActionLog system for an academic conference called JSAI2005. In the conference, we provide several support services and ActionLog is also provided as a conference service. ActionLog collects participants’ use of the other systems provided at the conference site and represents these use records integratively.

Figure 1 depicts the architecture of the ActionLog system. The left-hand side of the figure indicates the action collection part of ActionLog. The system captures the user's action from the other information systems placed at conference sites and on the Web. The center part indicates the content generation part. In this part, the system generates the Weblog content associated with the action based on the captured context information of the action. The user's action records are generated automatically through interactions with other systems and other people in the event space and on the Web. In the right-hand side of the figure, the user interacts with the system as Weblog system. The user authorizes the generated contents. They are published on the Weblog and are shared among participants. Exchanging contents among users can enhance communication. Aggregating the contents based on their context facilitates context-based access to the contents; responding to others’ contents engenders topic-based discussion.
3.2 Designing Users’ Actions

ActionLog collects the users’ activities and the users’ information from the following services/systems, which were provided as conference services at JSAI2005:

- Web-based systems (*Polyphonet Conference*)
  - Researchers’ social network system (Matsuo 2003)
  - Scheduling support system (Hamasaki 2004)
- Onsite systems
  - Name cards with RFID tags
  - Session participation management terminals
  - Presentation management terminals
  - Kiosk terminals using RFID card for user authentication

Figure 2 shows the installation of a session participation management terminal and an RFID card.

![Figure 2. Participation management terminal and RFID card](image)

The types of action captured by the ActionLog system and the users’ information sent from the other systems are as follows. Session participation management terminals detect users’ entrance to conference rooms (1). Conference participants touch the card reader connected to the terminal placed at the entrance of each room with their RFID cards. This signal tells information on the participation action, i.e., “when”, “who”, “which session”, and “where” to the ActionLog system. Presentation management terminals capture two types of action, i.e., making presentation (2) and attending presentation (3). When making a presentation, the presenter places her RFID card on the card reader connected to the terminal. This signal directly tells information on the presentation, i.e., “when”, “who”, and “where”. Referring the conference timetable stored in the database of Polyphonet Conference, the ActionLog system infers which presentation is made at this time. At the same time, attending actions to the presentation are inserted to all participants who are in the same room. Uses of kiosk terminals (4) are also captured and sent to the ActionLog system. By touching with her RFID card, a user can log in to Polyphonet Conference and manage her schedule or view the social network around her. When two users placed their cards on the reader, the kiosk terminal shows the network between two. This action, viewing social network (5), is also detected. Table 1 shows these five types of action and the captured/inferred contexts.

<table>
<thead>
<tr>
<th>Action</th>
<th>Terminal</th>
<th>Captured context information</th>
<th>Inferred context information</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Participating session</td>
<td>Session participation terminal</td>
<td>User ID, Time, Place</td>
<td>Session ID, List of acknowledgements who participate the same session</td>
</tr>
<tr>
<td>(2) Making presentation</td>
<td>Presentation management terminal</td>
<td>User ID, Time, Place</td>
<td>Presentation ID, List of acknowledgements who attend the presentation</td>
</tr>
<tr>
<td>(3) Attending presentation</td>
<td>Presentation management terminal</td>
<td>User ID, Time, Place</td>
<td>Presentation ID, List of acknowledgements who attend the same presentation</td>
</tr>
<tr>
<td>(4) Using kiosk</td>
<td>Kiosk terminal</td>
<td>User ID, Time</td>
<td></td>
</tr>
<tr>
<td>(5) Viewing social network</td>
<td>Kiosk terminal</td>
<td>User ID, Time, User who views the network with</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Captured action types and contexts
3.3 Collecting Users' Actions, Generating and Publishing Weblog Contents

Users' actions are sent by the terminals for the ActionLog system via HTTP POST requests. A terminal sends a request that includes queries, such as UserID, Place, ActionType, ContextInformation. ContextInformation depends on its ActionType, which is pre-registered to the ActionLog system. ActionLog interprets the ContextInformation based on its ActionType, and then it generates the contents.

The ActionLog system generates a Weblog entry for each action sent from a terminal, interpreting the context information of the actions. Interpretation of the context information differs according to the types of actions. Take a session participation action for example. A participation action is sent from the session participation management terminal and its directly captured context information is UserID, Time, and Place. The ActionLog generates a Weblog entry using the following steps:

1. Fetch the ID of the session (SessionID), which is held at the Time in the Place.
2. Fetch the session title associated to the SessionID.
3. Get a list of users who participated the session.
4. Get a list of user's acquaintances from the social network system of Polyphonet Conference.
5. Make an intersection of these two lists.
6. Apply the template and generate the content.

An example of the output is shown in figure 3. These procedures, the content templates, and the type definition of the context information are also pre-registered to the ActionLog system.

![Figure 3. Example of generated content](image-url)

Generated contents are inserted to the user's Weblog. The context information, e.g., the presentation that was attended, the place this action occurred, and so on, is attached to the contents. A user can edit the contents on the editor page (Figure 4). She can remove or modify the generated sentences, or add new sentences.

Figure 5 shows a snapshot of the ActionLog system menu page. On the menu page, the captured actions, i.e., the generated contents, are listed in the box. The user can edit and publish the generated contents. Figure 6 shows the Weblog-style view, which lists the user's published contents in chronological order.

3.4 Aggregating and Sharing Context

Efficient sharing of published contents is achieved through content aggregation. We provide a context-based aggregation view of contents.

Kaenampornpan et al. (2004) proposed the context model for context-aware systems based on an Activity Theory (Engestrom 1999). According to the model, contexts are classified to seven elements: User, Tools and their availability, Rules, Community, Division of Labour, Object, and Time.

In explanation of our proposed system, User is the user herself and the place she is. Tools represent each terminal. Rules are the norms and the social rules of the conference, and Community includes the people around the user. Division of Labour is the role in the action, such as presenter or attendee. Object is the target of the action, such as the presentation that the user attended. Time is the time at which the action occurred.

The Weblog-style view is a person-based view of the contents in chronological order. It includes User, Community, and Time items. Tools, Division of Labour and Object items are closely related to the type of action. We provide aggregation views on the types and targets of actions. We do not target Rules in this system.

The basic idea of aggregation is filtering according to context. The system extracts and lists contents related to the same presentation or the same type of action. The user can look through all contents related to the context that the user specifies. Figure 7 shows a snapshot of the aggregated view of a certain presentation. This type of aggregation treats Object contexts. The system also aggregates by type of action. In this case,
Tools and Division of Labour are considered. As we previously mentioned, the personal Weblog-style view includes User and Community based aggregation. The user can look through all the contents related to the context that the user specifies.

4. USAGE ANALYSES AND EVALUATIONS

4.1 Basic Data and Usage Status Data

We tested our system at the 19th annual conference of the Japan Society for Artificial Intelligence (JSAI2005), which held on 15th-17th, June 2005 in Kitakyushu. In this conference, there were 290 presentations in six parallel sessions and 609 authors (including co-authors). About 400 or 500 participants joined the conference.

The number of participants who use any terminal at the conference site, i.e., the number of users whose actions were captured at the site, is 332. Finally 10848 draft entries were generated and 381 entries were edited and published by 35 users.

4.2 Analyses of Published Entries

To reveal the forms of system usages, we analyzed the published entries in two ways.

4.2.1 Relation between Action Type and Content

Firstly, we checked what was described in the edited and published entries. We read through all published entries and marked them with five characteristics, i.e., (1) memorandum, (2) diary, (3) opinion, (4) message, and (5) note about the system. One entry can be marked with multiple characteristics. Table 2 shows the relation between content characteristics and action type. Points where more than half entries are
marked with the same characteristic are underlined. For example, most of content authors took memorandum and described their opinions in attending presentation actions. This result shows that capturing variety of users’ actions promotes properly use for the purpose, such as reviewing or communicating.

Table 2. Rate of characterized entries for each action

<table>
<thead>
<tr>
<th>Action</th>
<th>Memorandum</th>
<th>Diary</th>
<th>Opinion</th>
<th>Message</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participating session</td>
<td>28.6%</td>
<td>64.3%</td>
<td>37.5%</td>
<td>10.7%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Making presentation</td>
<td>18.2%</td>
<td>63.6%</td>
<td>81.8%</td>
<td>36.4%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Attending presentation</td>
<td>55.5%</td>
<td>19.5%</td>
<td>78.9%</td>
<td>32.0%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Using kiosk</td>
<td>8.7%</td>
<td>69.6%</td>
<td>30.4%</td>
<td>8.7%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Viewing social network</td>
<td>4.2%</td>
<td>52.1%</td>
<td>56.3%</td>
<td>12.5%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

4.2.2 Human Relation between Entry Authors and Target Presentation Authors

Next, we analyzed the relation between entry authors and presentation authors, to investigate whom entries are published for. We compared the rates of related authors in generated drafts and published entries for presentation attending action. In this analysis, we use the relations managed in Polyphonet Conference. In draft entries, 23.9% of entries are generated by related authors’ actions. On the other hand, 57.1% are published by related authors. This means that the ActionLog system could support communications among acknowledgements.

4.3 User Evaluations

We requested the system users to evaluate the system on Web-based questionnaire after JSAI2005. Answers from 45.7% of users who edited and published entries were obtained. The selected questions, which are especially related to the subject of this paper, are following:

Q1. Were draft entries generated from your action records helpful?
Q2. Was information about presentation/session attached to actions helpful?
Q3. Was ActionLog helpful for reviewing?
Q4. Was ActionLog helpful for knowing about other participants?

All questions were answered by selecting one option from “5: very helpful”, “4: helpful”, “3: OK”, “2: not very helpful”, and “1: useless”. The average points for each question are: Q1 – 4.00, Q2 – 4.38, Q3 – 4.13, and Q4 – 3.88. From these results, we believe that expected effects are accomplished.

5. RELATED WORKS

Several conference support systems have been proposed. IntelliBadge (Cox 2003) is an RFID-based academic conference support system that traces users’ positions and provides location search services for users. It enhances communication at conference sites, but does not support post-conference communication.

Another system, C-MAP (Sumi 1998), is a personal mobile assistance system for exhibition tours. It is intended as a location-aware support by sharing experiences and knowledge using mobile terminals like PDAs. It provides total support in an event space, but does not target integrative support of independent subsystems in the real world or on the Web.

LifeLog research, like MyLifeBits (Gemmell 2002), is a salient approach to sharing experiences by recording everything users see and hear. However, our approach is to share users’ subjective experiences rather than objective records.

SPECTER (Kröner 2004) is a personal journal generation system that generates content based on the users’ action records. This approach closely resembles our approach, but it is specifically intended to model users’ behaviors and does not target supporting communications or sharing experiences.
6. CONCLUSION

This paper proposes the ActionLog system, which supports authoring and sharing Weblog contents for the purposes of reviewing support and communication support on Academic Conferences. ActionLog collects users’ actions from other information systems placed at a conference site, and automatically generates drafts of the Weblog contents based on the action contexts.

We implemented and applied the system on an actual academic conference as a field test. The result shows that the system was used both for reviewing their activities and for communicating other participants.

The action-oriented integration is easily extensible. New subsystems are pluggable through “action.” This means that our approach can be applied in various situations. Future work includes designing a system with more proactive supports. The tested implementation is a limited service in terms of time and place. When we utilize the system in an open environment, the information that will become available will be enormous so that a user cannot manage them.

REFERENCES


ABSTRACT

As the web is changing, e-communities are gaining more and more importance. The formation and maintenance of e-communities is supported by various technologies like wikis, discussion forums and Internet games which we briefly describe in this paper. Some of these technologies are not completely new and have been well known for a long time. We believe that in combination with new technologies and methodologies it makes sense to take a look on how e-communities are used now and will be in the near future. This paper describes an overview which software pieces, methodologies and techno-social behaviours are responsible for the growing importance of the further development of e-communities.

KEYWORDS

wiki, blog, Internet games, file sharing, discussion forums, answer brokering, Web 2.0.

1. INTRODUCTION

The Web is more and more a technological basis for the information and knowledge society. It is not only driven by new services, technologies, methodologies and content-rich digital media, but by an increasing amount of interactivity. The early Web user who consumed information, placed some orders, and participated in a chat or discussion here and there is more and more replaced by an active participant creating new and intertwined content on the Web, or is working in close collaboration with others for productive tasks or for just the pleasure of doing so. Vehicles for such activities are e.g. wikis, blogs, file sharing systems, discussion forums, answer brokering and Internet games. Nowadays the easy usage of a variety of new software tools is sometimes referred to as Web 2.0 (O’Reilly 2005), a term we consider a bit unfortunate, since there have been earlier uses of the term Web 2, e.g. a VRML based Web called 2nd Web (2nd Web Symposium 1998) or a second generation Web systems (Maurer 1996). A feature of O’Reilly Web 2.0 is that organisations offer simple technical services like blogs, wikis etc. and users – the community – easily fill them with content without knowing anything about HTML, Java etc. In Web 2.0 users are more than information consumers, they are also authors: publishing information is as easy as retrieving information. This opens the Web for a whole new group of users and applications.

The necessary technologies have spread rapidly in the last years and can now be found almost everywhere on the Web. The impact they have on the way our society works is tremendous. E-communities have existed since the beginning of the internet, but their real role and potential has just been discovered and is bound to further increase in the course of time.

In the second chapter of this paper we will describe features, advantages and possible problems of these interesting emerging services, technologies and media. Since many of these technologies are not really new but parts of them have also been around or proposed in the past, our third chapter will offer a brief overview on earlier ideas and systems and what happened to them.

In the last chapter we also describe how these services, technologies and media could be combined in order to achieve even better results and therefore offer more collaborative possibilities for e-communities. We

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propose a system which combines the advantages of wikis, blogs, discussion forums, file sharing, answer brokering and possibly even Internet games in order to create a system which supports the formation and maintenance of e-communities.

2. COMBINATION OF WEB 2.0 SERVICES LIKE WIKIS, BLOGS, FILESHARING, DISCUSSION FORUMS, INTERNET GAMES AND ANSWER BROKERING

In this chapter we will give a brief overview of each of the technologies mentioned above.

2.1 Wiki

Wiki or “Wiki Wiki” meaning “quick” in Hawaiian is about 10 years old. It was created by a software designer from Portland, Ward Cunningham, who wanted to have a simple database system which would enable him to easily exchange design patterns (Portland Pattern Repository) with his international colleagues. (Möller 2005) He describes wiki as ‘the simplest online database that could possibly work’ (Wiki 2005). Indeed a wiki is software which enables every user to easily change the content of a page by clicking on an “Edit Page” Button. The content can be changed directly in the browser using a special wiki-Syntax which is even easier than HTML. A speciality of the wiki-Syntax is a schema called “CamelCase” which describes links to other wiki pages. Such links consist of one or more words containing at least two capital letters. As soon as users write such a construct a wiki page can be created by clicking on this construct (link). The fact that creating a page demands that the name of a new page is mentioned as a link on another wiki page makes sure that there are cross links between pages in wiki. (Möller 2005) Besides open editing, the other important feature of wikis is sophisticated version control which enables users to see recent changes and the history of the changes of a Web page. This is often an important instrument for assuring the quality of content in a wiki as in the case of (malignant) manipulation of the content the old version of wiki page can easily be reconstructed by the use of version control.

2.1.1 Wikipedia

The most famous practical example of wikis is Wikipedia ‘the free encyclopedia that anyone can edit’ (Wikipedia 2005). However Wikipedia does not implement all Wiki features: for example the ‘CamelCase’ is not used in Wikipedia. Wikipedia was founded by Jimmy Wales in 2001 as a work platform for his encyclopaedia project “Nupedia”, which turned into the prototype of Wikipedia. It can be found in various languages, with the biggest Wikipedia edition in English.

The main requirements of an encyclopaedia are that information is presented in an objective, well-balanced and up-to-date systematic way. To give a specific example, contributions on artists of similar standing have to be similar in structure and volume. At this point the problem of content quality of Wikipedia is equal to the more general problem of the validity of information on the Web. Is the Web an immense collection of information garbage, disinformation, conspiracy-theories and individual information exhibitionism without any differentiation needs between reality and fiction/fantasy? The Wikipedia turns out to be a valuable knowledge tool, better than what ordinary search results on special topics would deliver. The Web community trusts Wikipedia more than other Web resources. The question is if this high trust is justified from the point of information validity. There are indications that completely uncontrolled contributions are not acceptable, a fact already discovered in the late 80’s in the open discussion forum E.R.D.E (Lechner and Maurer 2003) on Austrian videotext! This became evident to users of the Wikipedia when in November 2005 John Seigenthaler published his story in his column in USA Today (Seigenthaler 2005) (see also Kleinz 2005). In his article Seigenthaler explained how he found false data and accusations in his biography in Wikipedia. His case started an extensive discussion about the reliability of Wikipedia content. The problem is that many other Web sites, like (Answers.com 2005), publish data from Wikipedia which makes it even harder to correct false information. It is not hard to imagine the impact false data about a person on the Web could have on one’s life, in fact it can lead to as (Seigenthaler 2005) puts it: ‘Internet character assassination’. It can also be very hard for a person to find proofs to rectify such false information once it has been published.
The case of Seigenthaler has shown that there is a need for some kind of authentication in Wikipedia. Wikipedia creators and volunteers realized this and they are currently working on a solution for this problem.

2.2 Blog

Blogs is the shortened term for Weblog which describes a Web page on which an individual or a group frequently generate text, upload photographs, video or audio files and links. An important advantage over a normal Web page is that a blog is even easier to create and maintain using common free software like (Blogger 2005) or Austrian (Twoday 2005) enabling users to create their own blogs within seconds and without any technical knowledge. Most blogs use RSS-feeds (really simple syndication feeds) for user subscribing.

Blogs are very popular. There are approximately 50 million blogs worldwide (Siebert and Fischer 2005) and in some world countries like Croatia (Blog HR 2005) blogs have more readers than daily newspapers. Since 2003 there are even annual Weblog awards (Weblog Awards 2005) with many interesting categories for blogs.

There are different types of blogs: Some of them with most impact on the e-community scene are personal blogs, collaborative blogs, blogs about news and politics and topical blogs. However the most interesting type of blog for this paper is the collaborative blog. In a collaborative blog the blog posts are written by more than one person. These blogs can be open to everyone or limited to a group. (Blog 2005) As you can see a collaborative blog is very similar to a wiki. However there is one big difference: a blog is “additive”. I.e. there is no content edited or deleted from a blog. A user can just add text (or pictures, files etc.) to a blog post but it is not possible to edit or delete content once a blog has been published. A famous collaborative blog is (Slashdotcom 2005).

Personal blogs often act as an online diary containing very personal opinions and facts. These blogs have become amazingly popular over the last five years. However they have to be treated with caution, especially concerning privacy that bloggers can expect. Of course it is obvious that almost all bloggers desire attention and want people to read their blog posts. But although we all subscribe to the principle of free thoughts and speech, bloggers should be cautious when writing about politically controversial topics, or information that might be interpreted as innuendos. A year ago a young Croatian called Vibor Kalodjera, who worked at the U.S. embassy, was suspended from his job because he was suspected of writing a blog in which he ridiculed his job, the U.S. president and foreign officials. He did his blog posts anonymously but signed it with “Vibbi”. (CBS News 2005) Another similar recent case happened to a school student who was reprimanded because he criticized his teachers in his blog. (Blog HR 2005) Such stories should serve as a reminder that we must not misinterpret the Web as a private diary unless the information is secured in some fashion.

However, there are also various advantages of blogs. The first one concerns private blogs: in some cases like for a person having cancer or suffering from anorexia or just having a bad period in life, it can be comforting and empowering to read about others having the same experience. Also there is the possibility to exchange experiences in form of recipes, advice, music, videos etc.

An important advantage of a (collaborative) blog is the speed of such a medium. If there are some interesting news they can be written within minutes. Such blogs can be also updated very fast and in case of a collaborative blog from very many persons in order to offer the most recent news. Of course one should consider that in this case the correctness of the news could be reciprocally proportional to the speed of the news.

One interesting example is a Korean citizen reporter portal with over 30.000 users and almost 2 millions readers daily. (Oh my news 2005) In this portal every user can write about regional happenings or specialized articles. In order to publish, users must first register and then they can publish articles for the portal. International editors read through stories, decide which articles are going to get online and polish them for readers.

The blog scene is developing fast and the newest trends among blogs are video blogs or vlogs. (Siebert and Fischer 2005)

2.3 Discussion forums on the Web

A discussion forum is a popular tool for theme-based communication on the Web which is methodologically similar to the first client-based newsgroups which have been used in the beginning of the Internet age. Nowadays discussion forums are more and more implemented as browser-based and clientless newsgroups.
Discussion forums come in many flavours and can be un-moderated or moderated. The second alternative is usually more successful. (Maurer et al. 1999) In a way it is surprising that discussion forums that often offer good structure are not preferred over blogs!

2.4 File sharing

In the last years file sharing has become very popular. The exchange of music, photos, movies or even applications is the new hobby of many. File sharing as such has a long tradition. At first there was the Internet Relay Chat (IRC) which was mainly used for text based communication, e.g. exchanging news from Gulf War 1991. (IRC 05) Nowadays IRC acts as an important file sharing system were large amounts of music, movies and applications are exchanged all over the world. However the problem with IRC is its usability. IRC is a text based application without good search facilities. In order to find something users have to first become member of an e-community and make friends willing to share their files. This can be very time consuming and exhausting and requires users to have good skills in computers. Napster, the well known music sharing program had better usability than IRC. It was the first with a nice graphical interface, making music sharing simple and hence very popular. But both, Napster and IRC were using centralized file servers. So stopping the trade could be easily done by shutting down the fileserver. After Napster was shut down due to IPR problems, peer to peer technology emerged. It allows everyone on the net to be both - server and client at the same time. The more data a user gives to others the more he gets from users. Today a new OpenSource peer to peer network has taken the leadership: BitTorrent. BitTorrent is software which was originally written to enable users to transfer big files (greater 100 MB) without using http or ftp. If one downloads a file from another user this file is split up into segments and everyone wanting this file shares their downloaded part with others. So the traffic can be better distributed and the file is faster on the downloaoder’s hard drive. (Hot- tes 2004) Sharing of photos is also very common. Yahoo recently started flickr, an online photo management and sharing application. Photos can be easily shared with friends and stored on the internet. (Flickr 05) also offers the possibility for users to blog their photos. Following flickr many other similar services that are incredibly easy to use and are free have come available, e.g. (Magix 2006).

2.5 Answer Brokering

Answer brokering systems help users to find a solution to a given problem. Users first choose a domain of their problem and then ask a specific question. Depending on the system users can ask the community or declared domain experts.

Google Answers is a service from Google offering answer brokering. In Google Answers, users choose a problem domain, ask their question and determine how much they are willing to pay for an answer to their question. Domain experts who read the question can post an appropriate answer along with references and other resources. These experts are paid for each satisfactory answer. Registered users have the possibility to submit answers but they will not get paid. (Google Answers 2005)

Active documents use this idea: users can ask arbitrary questions to documents and answers are provided immediately and apparently from the document itself. According to (Kolbitsch and Maurer 2005b) and (Heinrich and Maurer 2000) there is an “online” and an “offline” component for such documents. The “online”-component provides the answer without human intervention. It provides a similar answer which has been asked (and answered) before. Otherwise the “offline”-component is invoked: the system answers something like “This is a really good question. Let me check with our expert and you will have the answer in a few days.” Then the question is sent to an expert who answers it and stores the answer in the database. An advantage is that after some time, typically after some 500 to 1000 users per document, answers are available for most significant and most frequently asked questions.

2.6 Internet Games

Internet Games have been existing since the very beginning of the Internet and include all sorts of computer games which involve playing online with other users. To succeed in playing the games e-communities are created to share knowledge among users. Although all current popular gaming consoles like Microsoft XBOX 360, Sony PSP, Sony Playstatiion 2 and Nintendo DS support an Internet interface, the market for
collaborative Internet games is currently low. However it is expected that the market will grow in the next years. (Heise News 2006). A few examples will have to suffice:

Bongfish Interactive Entertainment was founded by two students from Graz University of Technology in 1996 (Bongfish 2005). They have implemented a snowboard action PC game which is now in beta phase. One interesting feature of the game is: the players can choose on which route (in Alaska) they want to ride. They can practice riding this route under various weather and light conditions and then compete with other members in the e-community! (Stoked Rider 2006) Another similar ski game where users can compete in the community is (Ski Challenge 2005).

A game called OGame has gained large popularity in 2005. OGame is a strategic space simulation PC game with players competing with each other simultaneously. An important advantage is that a standard Web browser is sufficient for playing the game. A player can choose one universe and make a planet with resources. The goal of the game is to build an empire with lots of resources, make alliances with other players, attack other alliances and players and destroy their planets. The e-community is very important for this game, for example OGame offers a management for alliances which enables forming an own alliance or search for already existent ones. There is a ranking of players which makes the game even more appealing. OGame requires its players to be virtually always online in order not to miss an opportunity in the game and can therefore provoke some problems in every day’s life. It is also interesting that this game is offered as a free game and it is completely financed by in-game advertising. (OGame 2005)

Since its launch in 2000 the Internet PC game (Habbo Hotel 2006) has opened the world of e-communities to children. “Habbo Hotel has already attracted users to create 37 million Habbo characters to the game and the number of unique monthly users is already over 4.3 million.” (Sulake 2006) Habbo Hotel is a computer 3d graphics animated chat room platform as a virtual hotel where users move around chatting, build their own characters and rooms, make friends, exchange furniture and buy Habbo coins in an e-shop to be able to decorate their rooms, buy gifts for friends or play additional games. The game was designed for teens between 8 and 18.

### 2.7 Other interesting services/tools/technologies for e-communities

There are new promising services, tools and technologies emerging almost every day. One of these are geographical information systems, e.g. (Google Earth 2005) which is a piece of software that enables users to search for places all over the planet, search for services in these places (e.g. pizza delivery) and add tags to these places. (NASA World Wind 2006) is an open software geographical system which offers similar features like Google Earth but in a more scientific manner. One interesting feature of NASA World Wind is the possibility to see the moon as well as the earth. Recently also Microsoft has released a beta version of a geographical system called Windows Live Local (see Live Local 2006). It offers similar services like the two already mentioned geographical systems but it can be used from an ordinary browser and it has other interesting features like e.g. possibility for creating driving directions and printing them out. Furthermore it offers the possibility to locate users on the map by using Location Finder from Microsoft or IP-address.

Podcasting is another emerging service. The word (Podcasting 2005) comes from iPod and casting and stands for producing and publishing audio files in form of a Weblog (blog) with a special RSS-feed. As there are more and more videos there are also podcasts with videos called videocasts or vcasts. The audio or video files are called episodes and can be heard or seen on the computer or an iPod. Podcasting can be used for various purposes e.g. e-learning, diary, radio etc. (see also Odeo 2005)

There are other interesting services for e-communities like online bookmark management (del.icio.us 2005). Everything posted to del.icio.us can be seen by other users which enables building of a great team-work bookmark collection. (Yahoo 2005) offers a similar service in a beta version.

As we have shown in this chapter the development of Web is going towards more and more actively involving the users, by content production, diverse activities, communication, building and maintaining of strong e-communities. However we may ask ourselves whether the tools and technologies described in this chapter are really new. This is discussed in the next chapter.
3. REVIEW OF SOME EARLY SYSTEMS

In the second chapter we have discussed many interesting technologies. However research shows that most of these are not really new. In fact many of the ideas behind the technologies have been present for quite a long time but were not accepted by large user communities. In this chapter we want to discuss some of the past developments and ideas in this direction.

3.1 Xanadu

Although never implemented in its entirety, Xanadu (Nelson 1965) (Gillies and Cailliau 2002) as proposed by the visionary Ted Nelson was not just a forerunner of all Web-like efforts, but was already expected to deeply involve the user, not as reader, but as someone who would assemble material from existing sources via the ingenious and still rarely implemented transclusion idea (see Kolbitsch and Maurer 2005a) and combining it with own content. Actively incorporating links was another feature of Xanadu. Since information could never be deleted it can be said to have had already the most perfect version control conceivable. We all have to bow to the genius of Ted Nelson who was some 30 years ahead of his time.

3.2 Early Hypermedia Systems

It has been noted that many of the earlier Hypermedia Systems did contain features that go well beyond what is even now available on the Web, including much user involvement. The famous Hyperties system of Ben Shneiderman is one such system, but maybe the grandest of all was the Intermedia system developed by Andy van Dam and others at Brown University: its functionality even from today’s vantage point is stupefying. However, after years in good use (locally) it shut down simply because it was based on an obsolete hardware/software platform and nobody had enough courage to try to port it! Those are just two of the many hypermedia systems, many with features that go much beyond what we have today on the Web, but did not make it big. Early surveys such as (Conklin 1987) show how much has actually been lost by the wave of victory of the rather simple minded Web, that is only slowly catching up.

Before 1980 (!) Viewadata, later called Videotex (VTX, and BTX in German) was already started in Europe as first large scale public distributed systems. They were the predecessor of the Austrian BTX system starting in 1985 (Gillies and Cailliau 2002). By using proprietary hardware called MUPID which has been sold some 40,000 times (Bruck and Mulrenin 1995), MUPID-BTX had already “teleprograms” (akin to Java applets) and a number of e-Community features.

3.3 Early collaborative gaming and discussion systems

The craze of the (in)famous “Dungeon and Dragons” games that where played on the now almost forgotten PDP 11 in just about any research establishment world-wide gave early indication of the popularity of networked games. Collaborative games like “Discovering the Planet AC” in Austrian BTX showed already the power of large-scale networks for gaming, yet somehow things did not take off in a big way, except for some local success. From 1988 until 1995 a public discussion forum existed on the Austrian videotext system BTX called E.R.D.E (Elektronische Rede und Diskussions Ecke) (Lechner and Maurer 2003) where users could discuss any topic in e-communities.

3.4 Hyperwave

Hyperwave is an internet information system originally called Hyper-G. Hyper-G was conceived and implemented in the early nineties by Frank Kappe and Hermann Maurer at the Institute for Information Systems and Computer Media at the Graz University of Technology and was officially released in July 1994. Its concepts reach far beyond the usual WWW. Among other advantages, Hyper-G offers more structure than WWW (for example by having persistent help for orientation and navigation) and a more powerful linkage model. There is an object oriented database where all documents and links (link is an individual object) are stored. Furthermore links are bidirectional, meaning that they can be followed back and forward, and in Hy-
per-G links can show from and to any type of documents. The later feature allowed links in all kind of docu-
ments – even pictures, video and 3D-objects. This technology also enabled making annotations or blogs in
these documents: for example users could annotate a video. (Dalitz and Heyer 1995) (Maurer 1996) (Dalitz
and Heyer 1996). Hyperwave (Company 2006) is still in major use in Intranets: with its many collaborative
features, its version control, its built-in annotation and discussion features, its provisions for consistent file
sharing, etc. it can do all that systems mentioned earlier can do, with one significant handicap: the interfaces
due to high functionality) are not as clean and easy to use as in today’s dedicated systems. We can notice
here an aspect that is typical: the simple often beats the more complicated one: programming in schools
would have never taken off without a stupid programming language such as BASIC, laughed at by the devel-
opers of Pascal, Algol 68, etc.

3.5 Computer Supported Cooperative Work (CSCW)

Many of the present ideas for enabling e-communities have already been designed in the past (Uni Hannover
2006) as the part of Computer Supported Cooperative Work. The idea of CSCW was to build a work plat-
form for groups which could overcome geographic and time barriers. The term groupware is often used in
this context: groupware is a notion for practical implementation of CSCW-theory as software or hardware.

A CSCW system consists of four base models: multi user editor, news systems, conference systems and
coordination systems. Let us take the multi user editor as an example. This is an editor which enables many
users to jointly edit documents in a collective environment. This kind of editors can be compared to today’s
wiki systems. It is interesting, however, how attitudes are changing over time. In the past it was not at all
imaginable that somebody would change the text another user had written in such a collaborative document.
This would rather be taken as an insult. But today this is even desirable: it is one of the most important char-
acteristic of wikis. The importance of CSCW can be best judged by the plethora of conferences that have
been held on this particular subject.

4. WHAT SHOULD A MODERN E-COMMUNITY OFFER?

Physical and virtual communities (e-communities) depend on communication. Classical communication
among humans without any technology is mainly (a) face-to-face or one-to-one (e.g. in a dialogue), some-
times (b) one-to-many (e.g. speakers to their audience, a priest to his community, advertisement) and rarely
(c) many-to-many (e.g. sellers and buyers at a marketplace). The speech flow from many-to-one (e.g. many
buyers at an auction to one seller) is less dominant in classical communication than in the digital age. With
the technological inventions of the Morse telegraph, telephone, radio, television, fax, mobile telephone, and
a variety of text based and multimedia internet communication systems the disparities between (a), (b), (c)
and (d) have changed. Communication has been enriched by digital tools, which enable users to communi-
cate with these communication models in a more balanced way. In the digital age phones (e.g. mobile
phones, internet phones), emails and instant messengers are the main tools for (a) one-to-one communication
(e-communication). Portal web servers, file sharing, Web radio, Web-TV, blog and e-shops are typical tools
for (b) one-to-many. Mailing lists, newsgroups, discussion forums, IRC, e-marketplaces, Internet game sites
and wikis are used for (c) many-to-many communication. If many people communicate to one person in or-
der to get information, knowledge, services, products or entertainment, they use the (d) many-to-one form of
communication, e.g. in Ebay and dating/matching sites. The many-to-one communication flow has also a
severe data protection impact. With hidden wiretapping systems, spyware and employee observation soft-
ware, conversations, emails and Web transactions can be easily transmitted from numerous unsuspecting
users to one single point of analysis, e.g. for criminal action. E-communities can use multiple combinations
of communication flow models, but they should be aware of the fact, that it is relatively easy for communi-
cation tool providers, network administrators and hackers to read, copy or manipulate unscrambled contents.
Especially the instant messengers are a new target for hackers (Leavitt 2005) to integrate viruses, worms and
malicious codes. Therefore e-communities – even within a closed virtual private network (VPN) - should
encrypt their content before sending, such as Skype encrypts ‘voice over IP’, file transfer, and instant mes-
senger with AES 256-bit end-to-end encryption.
Assuming that all social software tools for e-communities are secure, the question is how we should use them without taking the risk of a Babylonian confusion of tongues, where the explosive development of digital tools – with the consequence that everybody uses a different tool and methodology – leads to the destruction of all communication. Two key concepts are a well-known solution to this question: standardization and market leadership. Thus we should learn how to communicate with proper tools.

Most of all e-community home sites are centered around portal servers. Since the late 1990s these portal servers have been simple content aggregating engines with features like member mailing lists, schedulers, project management tools, document management, archives, file sharing, organization charts, discussion forums and link lists. Portal servers and enterprise information technology core systems have been completely different. But in the last few years the portal servers have adopted application integration and then – most recently – the automation of business core processes. One major business core process of an e-community is communication itself. Communication is mobile and user-centric, therefore the best tool for communication is the personal digital assistant (PDA) – also known as a Pocket PC Phone Edition or Smartphone, which is a mobile phone on a sub-sub-notebook with all sorts of fast internet tools. The new home of the e-community is the fully customized PDA, which works as a client or mirror of a powerful e-community server system. The features of such a next generation PDA are: mobile phone, full feature browser, fast Internet through WLAN and UMTS, VPN, huge memory cards/sticks, high resolution camera with flash-light (for scanner functions), media player, social software tools like instant messenger, I/O for external devices, GPS integration, touch screen display and slide-out keyboard. At the moment the Blackberry client/server 4.0 technology and the Microsoft Mobile 5/Exchange 2003 SP2 are close to this PDA specification. One of the most important new features is push technology, which means that the user of a PDA does not have to retrieval his/her emails, calendar, tasks, contacts or other data by starting a synchronization program - the data replication finds its client automatically and updates the client over-the-air close to real time. Therefore the user is always online and standby such as working in an office desktop environment. Another basic requirement for this PDA technology is to protect data against usage by unauthorized people, e.g. in the case of losing the PDA.

Assuming that such a PDA in combination with a server infrastructure is available: what are valuable applications and features for e-communities? Most people are members in communities. Exceptions are people who deny communication like anchorets or are not able to communicate like patients with complete paralysis or locked-in syndrome. But the majority of people are members of several communities and e-communities. Today the contact manager feature in the organizers like Outlook, Groupwise and Lotus do not manage e-community features. The contact manager does not propose to automatically store new contacts from instant messaging sessions, discussion groups and chats. But this would be an advantage, if persons could go back to a contact they had e.g. during a messenger session without searching in several social software tools. E-community management is an item which should be integrated into organizers. The main tasks are: organization of e-communities (“my e-communities”, where someone is a member and “other e-communities”, which is a link list), listing of the members contacted before by specific communication channels (phone, email, messenger, newsgroup, etc.), storage of the contacts in the contact folder/database. Another important application feature is how to work with documents within an e-community. Hyperwave IS 6.3 and Microsoft SharePoint Portal Server 2003 are good examples of providing access to information and documents for e-communities. The Microsoft SharePoint Portal Server 2003 uses the concept of Web Parts. These are predefined components which can be easily configured by non programmers by simply dragging and dropping to assemble a view of complementary information from multiple sources. For example, one Web Part might display a user’s appointment calendar from Outlook; another might show a list of e-community members, each of which functions as a link to an instant messenger service. The SharePoint Portal Server 2003 is designed to be a self-service portal and therefore new features can be easily added. As a server for an e-community it has features for alerts and audience targeting. Alerts notify someone when any relevant file, Web site, person, or application has been added or changed. Audience targeting enables individuals or groups to push relevant information and applications to an e-community. Search and indexing can easily implemented over the whole portal. PDAs as the new e-community engines have transactional access to portals, on the one hand to retrieve information and on the other hand to upload content and change the architecture of the portal according to the user’s roles and rights. For a glimpse of what future PDA’s might look like and what they can do see (Maurer et al 2003).

A self-service portal in combination with instant messaging services is an interesting combination for accelerating the e-community development process. Messaging services like ICQ, Psi (Jabber), MSN Messenger, Yahoo Messenger, Google Talk, AIM (AOL Instant Messenger), Skype and QQ have been used mostly...
without collaboration on portals. These tools are used in situations, where problems have to be solved by teams using time sharing by communicating in parallel with some members of an expert team e-community. The reason to use the instant messenger in a special situation instead of a phone and email is that the communication with the team is faster and electronically documented. With an instant messenger, team members on the “buddy-list” are “online-marked” and therefore seen as being available/standby. Now someone who is working on a problem can easily communicate with more than one member, ask questions and “pick up” the solutions from the different instant messenger windows and copy & paste it into the own document. The phone has the disadvantage that the caller knows only after the call, if the callee would have been ready for collaboration before the call. A caller has also the communication control which is sometimes too invasive into team collaboration, e.g. some people do not stop talking while phoning. The email-collaboration is sometimes too slow and complicated with using attachments. Also the communication flow of “replying to all” results in some cases in too much information where the overview can easily be lost as to who has inserted which piece of information into an email or into an attachment. The disadvantage of the instant messenger is that the information archive is not automatically integrated into the email/organizer/desktop-search systems. The search: “Which messages did I get from Hermann Maurer the last 2 days?” should list a result like this: “5 emails, 3 SMS, 2 phone calls, 1 fax, 3 instant messages and 1 video conference”. With the paradigm of a unified messaging system (UMS) one step has been already done: the integration of email, fax, SMS and voice mail, e.g. to send a SMS by email or receive a voice mail by email. Instant messaging and video conferencing (e.g. by using UMTS video phones) are the next integration tasks.

5. CONCLUSION

In this paper we have written about the growing importance of e-communities on the Web. We discussed various new technologies like wikis, blogs, file sharing etc. The development and the offer of various services, tools and new medias/technologies are enormous. This is the reason why our paper cannot provide more than a first glance at some of the more important developments. All technologies described in this paper enable building and maintaining different kinds of e-communities, like work communities, entrepreneur communities, friends, neighbourhood communities, research communities, developer communities etc. We want to emphasize that the boundaries between these technologies are vague. To re-emphasise this point let us look once more at wikis. A wiki where editing of already existent pages is permitted by for some reason deleting this content is prohibited can also be referred to as a (collaborative) blog. The same principle can be applied to blogs. A blog to which a person can directly respond and start a new topic, can also be seen as a sort of a discussion forum. Discussion forums exchanging various types of files can bee seen as a file sharing area and so on!

Up to now wikis, blogs, file sharing, discussion forms and answer brokering have been using independent technologies. However, our research has shown that a system combining all of these technologies would be a very powerful system for development of e-communities regardless of their purpose. We intend to come back to this in further papers.

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ABSTRACT
In this paper we consider a process which complements the learning process for building personal knowledge through the exchange of knowledge chains in learning communities. The process differential is the addition of “how to use” the available knowledge to its “authors” (who), “localization” (where), and “content” (what), which are commonly used. This paper presents the Evaluation Module, created to give feedback to the learner about what he/she is studying in the knowledge chains. This feedback will be carried through with personalized dynamic tests, to be created by intelligent agents. With this information, the learner can self-evaluate his/her learning process. This point became extremely important, when we consider that learners weren’t motivated to study the chains because they didn’t have any feedback saying that he/she learned what the chain proposed. The hypothesis is that one learner will guide his/her own study easily when he/she has a system to provide assistance.

KEYWORDS

1. INTRODUCTION
According to Schroeder (2002), there is a general agreement that our society is changing into a knowledge and information society, so, life-long learning became a necessity rather than a possibility or a luxury to be considered. Life-long learning has emerged as one of the major challenges for the global knowledge society. It has become an integral part of work activities in the form of continuous engagement in acquiring and applying knowledge and skills, in the context of a current task at hand.

According to Bade (2004), students and professionals asking for additional knowledge are usually pleased with the wide scope of knowledge sources available electronically and wish to “learn on demand”. This implies a high level of student’s independence from locations and time schedules, which have been described previously by other terms like “open learning” or “distance learning”. Then – besides finding skilled multimedia instructors - the integrated administration of the learning program and implementation of a feedback channel between students and tutors as well as the training organization is critical for the success and of such blended learning concepts.

To complement the learning process, there are communities of practice focused on learning, i.e., learning communities. These communities act as both a method to complement teaching in the traditional classroom and to acquire knowledge in evolution. Pawlowski (2000) defined a learning community as being an informal group of individuals engaged in a common interest, which is, in this case, the improvement of the learner’s performance using computer networks. One of the principles of Wenger (2002) for cultivating communities of practice is the sharing of knowledge to improve personal knowledge. Another issue towards making a successful community should be intense communication between the members. Finally, a community should assist the members in building up their personal knowledge. (Souza, 2005)
1.1 Motivation

In the attempt to complement the learning process, a system has been developed to promote knowledge building, dissemination and exchange in learning communities. This system is called the Knowledge Chains Editor (KCE) [Rezende, 2005a] and is based on a process for building personal knowledge through the exchange of knowledge chains (KCs) [Rezende, 2005a]. It is implemented on top of COPPEER1.

The KC [Figure 1] is a structure created to organize knowledge structure and organization. A KC consists of a header (which contains basic information related to the chain) and a knowledge unit (KU) list.

Conceptually, knowledge can be broken into smaller units of knowledge (recursive decomposition). For the sake of simplification, it was considered that there is a basic unit which can be represented as a KU (a structure formed using a set of attributes).

To build his KC, the learner can use the KCE. In the case of questioning, he must create a KU whose state is “question”. At this moment, the system starts the search. It sends messages to other peers and waits for an answer. Each peer performs an internal search. This search consists of verifying if there are any KUs similar to the one in the search. All KUs found are returned to the requesting party. [Figure 2]

The creation of a KU of type “question” is obviously motivated by the learner’s need to obtain that knowledge. So far, we have considered the existence of two motivating factors for the creation of available KCs. The first would be a matter of recognition by the communities, since each KU created has a registered author. The second would be the case where the tutor makes them available “as a job”, with the intention of guiding his learners’ studies.

After the KCE prototype’s development, experiments had been carried out with a group of graduate students at PESC/COPPE-UFRJ. [Rezende, 2005b] Amongst the results, we found the difficulty of the learner in knowing if he/she learned what KC proposes. In the attempt to solve this problem, in this work we present a proposal of evolution for the KCE. The main goal of the Evaluation Module (EM) is to give feedback to the learner about what he/she is studying in the KCs. This feedback will be carried through with personalized dynamic tests, which will be created by intelligent software agents. With this information, the learner can self-evaluate his/her learning process. [Katerina, 2004]

The remainder of this paper is organized as follows. The next section presents the intelligent software agent’s main concepts and the description of the agents in the evaluation module. In section 3, we present the proposed idea and the prototype developed. Conclusions are given in section 4.

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1 COPPEER [Xexeo, 2004] is a framework for creating very flexible collaborative peer-to-peer (P2P) applications. It provides non-specific collaboration tools as plug-ins.
2 PESC is the System Engineering and Computer Science Department of COPPE/UFRJ (Federal University of Rio de Janeiro)
2. EVALUATION MODULE AGENTS

According to Bradshaw (1997), a software agent can be defined as a complex object with attitude. It is governed by its state and behavior. The agent’s state is described by its knowledge and expressed through mental components as beliefs, objectives and plans. Its behavior is composed and governed by a set of behavioral characteristics, which are called agency properties. [Shoham, 1993]

An agent can possess some of the following properties: autonomy, reactivity, adaptation, interaction, “knowledge-level” communication ability, inferential capability, collaborative behavior, temporal continuity, personality and mobility. These properties and its descriptions can be found in [Bradshaw, 1997]. Amongst these there are 3 which are required for an entity to be considered a software agent: autonomy (goal-directedness, proactive and self-starting behavior), adaptation (ability to learn and improve with experience) and interaction (ability to work in agreement with other agents).

Software agents can also be classified on their degree of intelligence. The ones with a high cognitive capacity are classified as cognitive agents while less cognitive ones are classified as reactive agents. [Ferber, 1999]

Ideally, a software agent that works continuously in an environment over a long period of time would be able to learn from its experience. In addition we expect an agent that inhabits an environment with other agents and processes to be able to communicate and cooperate with them, and perhaps move from place to place in doing so. [Bradshaw, 1997]

The tests which will be used by the evaluation module will be created by intelligent software agents. Four agents had been defined to carry out this task. The complete vision of the collaboration between these agents will be presented in section 3.

2.1 Questions Builder Agent (QBA)

The QBA agent will try to stimulate the KUs’ author in creating new questions which can be used in future tests. So, how the QBA can stimulate the creation of new questions? For this, the QBA will make use of templates, which can suggest and assist the author in the creation of the new questions. The partial automatization of the process of creating questions is carried through the use of the technology from agents, ontologies3 and data mining4. Here, agents will monitor all KUs and questions created and visited by the author and the members’ communities, and classify its content using an ontology. From there, we want to create and recommend questions to the author. The new questions must be classified and stored on the questions database (QDB).

2.2 Questions Collector Agent (QCA)

This agent has the job of finding questions which can be used in a specific test. It initiates the searching for new questions sending messages to the IQCAs (section 2.3), which are agents located in other peers, located in “near” communities and waiting for answers. The messages sent informs to the IQCA what it must look for. Each IQCA is responsible for the internal searching in its peer.

The QCA decides what to search, where to search and how to manage search results. It makes use of the ontology technology and data mining techniques to conclude if a question is (or not) relevant for a specific topic, and to specify its degree of relevance. It can search many similar topics at the same time. The new collected questions must be presented to the author and he or she accepts or rejects them. The accepted questions must be classified and stored on the QDB.

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3 Ontology [Gruber, 1993] is a formal specification of concepts and their relationships. By defining a common vocabulary, ontologies reduce concept definition mistakes, allowing for shared understanding, improved communications, and a more detailed description of resources.

4 Data mining generally refers to the process of (automatically) extracting models from large data storage areas. [Fayyad, 1996].
2.3 Internal Questions Collector Agent (IQCA)

The IQCA is the agent that properly makes the questions search. It is responsible for carrying through the internal search (inside the proper peer) to find questions which matchs with the format specified by the requesting party. The requesting party is the QCA.

The internal search consists of verifying if there are any questions whose characteristics, like ontology nodes and associated KUs, matches the format considered in the search. All questions found are returned to the QCA. For each question found, it is necessary to return the ontology nodes, which can be added to the ontology from the QCA. In cases where the IQCA can’t find any question, it does nothing.

2.4 Tests Builder Agent (TBA)

The TBA is responsible for creating the user’s personalized dynamic test using the questions stored on the QDB. The TBA holds the questions related to the KU to which the test is related, and needs to decide which of them and in which sequence they will be presented to the learner. This decision process will be based on recommendation systems.

Recommendation systems [Sarwal, 2001] are used in their essence, to suggest items to its users. These items can be recommended based on items that have greater acceptance by other users; in the user's profile; or in an analysis of the last user behavior as a base for predicting the future. Such techniques provide a way to personalize the system because they allow the system to adapt itself to each user. In this work, the questions will be the recommended items.

3. EVALUATION MODULE (EM)

This paper presents an evaluation module that is part of the KCE, which is an intelligent e-learning environment [Cristea, 2004]. This module can adapt to the learner’s profile (AP) and encourages active learning using personalized dynamic tests.

As stated before, the main goal of the EM is to give feedback to the learner about what he/she is studying in the KCs. This feedback will be carried through with personalized dynamic tests, which will be created by intelligent agents. With this information the learner can self-evaluate his/her own learning process.

A web oriented intelligent e-learning environment typically has a multi-agent architecture such as that shown on Figure 3. Human and artificial agents collaborate to achieve tasks. Each learner is endowed with a learner’s personal assistant to assist the learner, to monitor his/her actions, and to assure coordination and communication with other agents in the system.

Figure 3. Evaluation Module Architecture

The EM was divided in 3 sub-modules: the question builder module (QBM), the question collector module (QCM) and the test builder module (TBM). The QBM deals with the functionalities related to the creation
and persistence of the new questions. The QBA agent is part of this module. QCM module deals with the functionalities related to search, collect and persistence of questions located in other peers. QCA and IQCA agents are part of this module. The TBM deals with the functionalities related to the tests. The TBA agent is part of this module. However, all the sub-modules possess high coupling, such as that shown in Figure 3. These sub-modules will be following detailed.

### 3.1 Question Builder Module (QBM)

As well as in the creation of a new KU, in the creation of new questions we had considered that there are two motivating factors for the creation of available new questions. The first would be a matter of recognition by the communities, since each question created has a registered author. The second would be the case where the tutor makes them available “as a job”, aiming at guiding his learners’ studies.

When the author is creating a new KU, he/she must associate ontology nodes to this. (These ontologies nodes are used to give semantic to the KU, to verify if two KUs are similar and to facilitate the questions’ search and persistence. [Rezende, 2005a]) At this point, the QBA will try to stimulate the author to create new questions to be used in future tests. These tests will be created to evaluate the learner learning about the KU created or about similar KUs.

All the questions created by the author of the KUs are classified, organized and stored on a QDB, becoming part of the KC’s structure. This way, when a KC is returned by a search the questions associated with it must be sent too. The question classification process is based on many parameters but the main are: the “ontologies concepts” related to the question, which can be defined by the question’s author or using data mining in the question statement and correct answer; the question “difficulty degree”, which can be defined by the question’s author or by the community members evaluation; the question “quality”, which can be defined by the question’s author or by the community members evaluation; the question “relevance”, which can be defined by the question’s author or by the community members evaluation; and the “degree of author’s knowledge on the subject”, which can be defined by the author’s profile.

The partially automatic nature of the process of creating questions becomes extremely important when we observed that the authors weren’t motivated to create new questions, which, normally, takes a lot of effort. The hypothesis is that one author will create a greater number of questions when he/she has a system to provide assistance.

### 3.2 Question Collector Module (QCM)

As stated before, the QCM module deals with the functionalities related to search, collect and persistence of questions. It is necessary to have as much questions as possible stored on the QDB, so the TBM module can be able to create an adequate test to each learner.

The QCA periodically monitor the “near” communities’ peers trying to find questions that can be added to the list of questions of the KUs created by the authors. This monitoring is made through a request to the IQCA. The IQCA makes the peer’s inside search and supplies to the QCA the questions found according to the informed specification. This specification must be based on the question parameters, for example, question ontologies concepts, quality, relevance, etc. These questions are presented to the author and he/she accepts or rejects them. Also, the peer in which the KU is created must be part of the group of peers searched; thus a question used in another stored KU can be used to evaluate the newly created KU.

All the accepted questions are classified, organized and stored on the QDB, becoming part of the KC’s structure. This way, when a KC is returned by a search the questions associated with it must be sent too.

Even after the creation of the KU, the QCA agent continues to execute periodically. In the case of new questions with relevance are found in others peers or are created in the same peer for another KU, these will be presented to the author to be accepted or rejected.

It is worth pointing that the peer in which the KU had been created must be part of the group of peers searched; therefore a question used in another stored KU can help evaluate the newly created.

The author can also receive questions suggested by community members, commentaries on the questions created by him/her and reports (automatically generated) on supposed problems found in questions created by him/her, such as, a question which has a very low rightness percentage can have been badly formulated or its difficulty degree can be greater than the author thought.
3.3 Test Builder Module (TBM)

The tests will be created in a dynamic but personalized way. For each KU a mini-test must be created. The questions used in the tests will be those stored on the QDB. These tests will be created by the TBA. The TBA holds the questions about the KU that will be evaluated on the test and needs to decide which of them, and in which sequence they will be presented to the learner. This decision process will be based on recommendation systems. First of all, the TBA will take all questions related to the KU by matching the KU’s ontology concepts with the question’s ontology concepts. Then TBA will use the learner’s profile to choose the questions and its order. There are too many cases, so, let’s see an example: if the learner already has some knowledge about Relational Algebra [Figure 1] TBA doesn’t need to begins the test with simple questions, i.e., it can begins the test with more difficulty questions and only if the learner makes a mistake the agent will use the simple questions to verify his/her knowledge. Questions correctly answered by the learner and questions used in a short period of time must be avoided.

The TBA will go on to create an optimal course for the case where the learner makes right all the questions. The questions choice will be based on user’s profile, tests already carried out by him/her, communities to which he/she belongs, pre-requisite between the questions, chosen level of difficulty and according to the suggestions of the KU’s author. The KU’s author can define fixed questions, i.e., questions that will be part of all the generated tests. This functionality would be useful in the case when the tutor wants that all learners go through specific questions. It’s important to point out that new parameters can be added to the process of question selection.

When the learner answers the question incorrectly, the TBA must modify its optimal course selecting a new question, which approaches the same problem. After some attempts the learner must be influenced to review the topics related to the questions wrongly answered. The user has the option to move ahead or to step back to the studies. In the case of he/she chooses to step back to the studies, when returning to the test, the learner still can decide if he/she desires to continue with the same test or to start a new one.

When the learner finishes the test going through all the questions and following the instructions to review topics returning to studies, the KU state (in the learner’s profile) will be modified to "learned". In the end of each test a report will be presented with the learner’s correct and incorrect answers. Regions’ maps can be created to help the learner to perceive where he/she was better explored and where he/she needs to evolve. This report can be requested at any time by the learner and in this case it is called partial report.

The correct answers of the questions that were answered incorrectly by the learner will not be presented, so that the question can be used in a future test. In the case of the learner formally requests the answer, this will be presented and such question can not be used in future tests. All tests carried out will be stored.

3.4 EM Prototype

EM is a multi-agent system which main feature is to give feedback to the learners with personalized dynamic tests. To create these tests it is necessary to promote the exchange of questions between the nodes of the network. The exchange is possible thanks to the peer-to-peer (P2P) infrastructure which supports the application. The EM had been developed to work inside COPPEER and because of it the application has many facilitating features, such as concurrence control, search mechanism and awareness system (which enable to know when a peer fails). The P2P architecture enables the EM to be more dynamic, resilient and fault-tolerant. The absence of a server permits the EM to work simply connected to other peers and make queries about the desired questions. Even if some questions are not available when the query runs, it is possible to get other useful questions, which would be impossible by using a server.

Figure 4 shows the question authoring screen. At the top of the window is the identification of the KU to which the question that is being created belongs. On the left panel are the question’s information, such as identification, statement and related figure. The answer’s information is on the right panel. The answer’s options can be edited such as the question.

Figure 5 presents the learner’s test screen. It shows the test accomplishment created to a specific KU. The window is divided in 3 panels. At the top of the window is the identification of the KU to which the carried out test belongs. At the same panel are the questions created to the test optimal course. The question statement is on the intermediate panel. Finally, on the last panel, are the options to answer the question. The
learner will choose one of them and, automatically, the tool will update the window showing the next question. When the test finishes, a new window will be opened showing the test result to the learner. The learner can finish the test at any time.

Figure 4. Question Authoring Screen  Figure 5. Learner’s Test Screen

4. CONCLUSIONS AND FUTURE WORK

This paper presents an evaluation module that is part of the KCE. This module is able to adapt to the learner’s profile and encourages active learning using personalized dynamic tests. This point became extremely important when we observed that the learners weren’t motivated to study the knowledge chains because they didn’t have any feedback saying whether he/she learned what the chain proposed. The experimental use of the extended KCE showed evidence that when it is used by a learner to guide his/her own study, the hypothesis that he/she has a better performance and consequently became more motivated was confirmed. In order to evaluate the reach of the KCE goals, experiments aimed in obtaining qualitative and quantitative data, which would make possible the verification of the hypothesis under consideration, must be carried out.

Beyond EM, there are other tools that deal with student evaluation, such as the presented in [Cristea, 2004] and [Bade, 2004]. The main difference between these tools and the EM is that they are focused on the evaluation of the student’s capability to supply information to the tutors and the EM goal is not to create tests for tutors to evaluate learners but to create tests where learners can assess themselves. In [Barak, 2003] we can see a similar goal, but the solutions are different.

The result of these tests can be used by the learner for self-evaluation and also to verify if he/she is apt to undertake a "real" test on a specific subject. In the last case, the tutor can creates knowledge chains and questions and then the learners must study following tutor supervision and doing the tests created in the EM. When the learner took off a satisfactory grade (in the tutor’s opinion) he/she would be able to carry out a “real” task or take the final tests on the subject. The tutor can use these results for what he/she wants. It must be clear that here we are not worried about the fact that the learner can deceive the system or ask to another person to take the test for him/her (since the test is distance made). This is an EAD problem we do not intend to solve here. Meanwhile, we don’t advise the use of these tests as final tests, advising their use mainly as a way to shows to the learner that he/she is apt to be “truly” evaluated.

It is important to point out that the fact of modify the KU’s state to “learned” doesn’t ensure that the learner has assimilated everything in his knowledge chains. Our goal is to offer support for the learner’s learning process according to his/her priorities, which may be access to the chain with the best cost/benefic relationship between time, quality and others.

Special attention had been given to support the tests authoring, which is especially important on an intelligent e-learning environment context to assess learner progress towards the learning goals. (Junior, 2002) Adequate authoring tools can make the tutor task easier, can contribute to a greater acceptance of e-learning systems despite the extra work they require and can stimulate the participation of the students.

As a future work we have the use of the evaluations’ results as a competence certification to the user’s knowledge unit, so, from the moment the user makes the KU’s evaluation and gets a good result the tool updates the user profile making the evaluation available to the environment. After this, for example, the
evaluation can be used by a project management tool to search for students or professionals with specific abilities or competences (or specific profile).

Due to the fact that this work is still in progress, many future projects are expected to ensue. We presented a few here: enriching the profile with other editors such as a project editor; adding new types of searches, such as a search for successors, which would solve problems like: “What KCs can the KCE suggest to the learner to study based on what he/she already knows?”; adding a recommendation system module based on the successors search; applying this idea to a mobile environment with the aim of taking advantage of its characteristics (ubiquity).

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REFERENCES


THE THIRD GENERATION OF E-LEARNING: A DESIGN FOR EXPANSIVE E-LEARNING WITH RHETORIC, VIDEO CLIP, AND WEBLOG

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ABSTRACT
This study abandons the security system of an ID and password that creates an exclusive and encapsulated community. Rather, it aims to develop expansive e-learning in which vertical and horizontal developments are integrated into a single curriculum. As vertical development, students work on message construction based on the knowledge and skills of rhetoric and then apply it to video clip making. As horizontal development, they present their video clips to the public through a weblog and ask the anonymous audience to analyze them critically. This creates an open and flexible learning environment, which includes the vertical accumulation of knowledge and skills and the horizontal movement of different communities across borders. The author suggests calling this type of expansive e-learning as “the third generation of e-learning,” referring to the concept of expansive learning from the third generation of the cultural-historical activity theory (Engeström 1987). Further, the author designed an activity system for expansive e-learning and implemented it to a university seminar course for a pilot study in 2005. Based on the analysis of the records of this implementation, the outcome and future issue with regard to expansive e-learning will be discussed in terms of the vertical and horizontal developments.

KEYWORDS
Activity Theory, Expansive E-Learning, Third Generation E-learning, Rhetoric, Video Clip, Weblog

1. INTRODUCTION
Although previous studies conducted by the author on curriculum designs and implementations between 1997 and 2003 suggested that learning outcomes are consistent regardless of whether the learning environment is online or offline, the implementation of e-learning involves a critical issue (Makino 2004a, 2004b). An e-learning platform manages participants with an ID and password. This type of security system is useful for defensive protection as well as effective processing of learners’ records. However, it creates an encapsulated learning environment in which intervention across borders is not possible. Moreover, even though the process of curriculum development itself is creative and exciting, once a course and its materials are determined, the learning process becomes fixed and is categorized as routine work. It is the uncertainty of unpredictable and accidental processes that makes learning dynamic. However, in an e-learning environment, classwork proceeds as planned and the outcome is produced as predicted. Consistent outcomes are certainly a merit of e-learning; however, being unable to go beyond expectations is a demerit. This study seeks to establish a transparent classroom, which is open and flexible, and develop an expansive e-learning in which vertical and horizontal developments are integrated. The author designed an activity system for expansive e-learning on the basis of theoretical understanding of the cultural-historical activity theory and rhetorical theory.

In this paper, first, the theoretical backgrounds of the cultural-historical activity and rhetorical theories will be summarized; second, the curriculum design and its implementation at a university seminar course will be presented; third, based on the analysis of the learning records collected during the implementation, the outcome and future issue of the activity system for expansive e-learning will be discussed.
2. THEORETICAL BACKGROUND

2.1 Activity Theory and E-learning

The key concept of this paper—the third generation of e-learning—is based on the framework of the cultural-historical activity theory, which can be distinguished into three theoretical generations (Engeström 1999). The first generation of activity theory represented by Vygotsky (1978), created the concept of mediation in a learning process. The second generation represented by Leont'ev (1981), broadened the focus from individual action to collective action. The third generation represented by Engeström (1999), faced the challenges of diversity in a society. “The third generation of activity theory needs to develop conceptual tools to understand dialogue, multiple perspectives and voices, and networks of interacting activity systems” (Engeström 1999, p4). It pursues “expansive learning” (Engeström 1987) and emphasizes “boundary crossing” and “knotworking.” The concept of boundary crossing refers to the act of transcending a settled community and working together with other actors outside the community. Boundary crossing is risky because it requires dialogical problem-solving instead of top-down decision-making (Tuomi-Gröhn & Engeström, 2003). The concept of knotworking refers to unstable collaboration based on little guarantee. The participants become connected only when they share the objective and attempt to solve a problem together. In knotworking, there is no single authority that controls partnership or relationship (Engeström, Engeström & Vähäaho, 1999).

The historical understanding of the cultural-historical activity theory can be applied to the historical understanding of e-learning practices (see Table 1). The first generation of e-learning developed the idea of learning with a computer as mediation; this is known as CAI (Computer Assisted Instruction). The second generation of e-learning developed the concept of community by networking; this is known as CSCL (Computer Supported Collaborative Learning). The development of an activity system for expansive learning is a challenge for the third generation of e-learning; this can be called ELICT (Expansive Learning with Information and Communication Technology).

Table 1. Generations in Activity Theory and E-learning

<table>
<thead>
<tr>
<th>Activity Theory</th>
<th>E-learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Generation</td>
<td>Learning through Mediation</td>
</tr>
<tr>
<td>Second Generation</td>
<td>Learning within Community</td>
</tr>
<tr>
<td>Third Generation</td>
<td>Learning by Expanding</td>
</tr>
</tbody>
</table>

2.2 Rhetorical Theory and Message Construction

In the historical development of rhetoric, studies regarding message analysis have broadened the standpoints from monologue to dialogue, from rhetoric to argumentation, and from formal logic to informal logic in the paradigm shift from the decontextualization of modern rationalism to the contemporary recontextualization (Makino 2005). For example, the approach of pragmatic dialectic in the argumentation theory (Eemeren and Grootendorst 2004) is a reflection of these transitions. However, such theoretical tools are not sufficient to explain the dynamism of message construction that continues to expand beyond boundaries. In order to understand the dynamic and expansive process of message construction, Makino (2005) presents the model that is described in Figure 1, 2, 3, 4, 5, 6, and 7 as a minimal unit of accumulation of meaning and value. This model was originally developed in the attempt of integrating Aristotle’s syllogism and Toulmin’s model (Makino 1999). Aristotle is traditionally considered to be the origin of formal logic. Toulmin’s Uses of Argument (Toulmin 1958) is historically considered to be the turning point of informal logic. In order to integrate the perspectives of geometric decontextualization and pragmatic recontextualization, she applied the natural and flexible law of chemical reactions to the process of message construction. A chemical formula presents the process and the results; a structural formula presents the relationships between atoms in multi-angles. Further, the accumulative process of meaning construction is associated with a pile of tetrapod along the seashore. One can use this model for the analysis or the construction of monologue, dialogue, and multi-voiced formation.
Figure 1. Message Construction Cross

Figure 2. Logic Molecule

Figure 3. Compound of Logic and Application

Figure 4. Application Molecule

Figure 5. Compound of Logic and Dialogue

Figure 6. Dialogue Molecule

Figure 7. Compound of Application and Dialogue
3. **CURRICULUM DESIGN AND IMPLEMENTATION**

In this study, the basic curriculum was designed for acquiring knowledge and skills of rhetoric in a transcultural approach where both formal and informal logic are integrated. In this curriculum, both proof and story are equally managed. Narratives are not considered irrational; a story becomes as persuasive as a proof when it is constructed with logic, akin to rational arguments (Makino 1999). Based on this hypothesis, the curriculum was designed to develop the following capacities (See Table 2):

1. Persuasion with a proof
2. Persuasion with a story
3. Contextualization of a proof or/and a story according to the direct audience and situation

The curriculum was first implemented between 1997 and 1999 in a face-to-face environment to approximately 60 first-year university students at one of the national universities in Japan. The analyses of the records indicated that the course design was effective in improving each of the abovementioned three capacities and brought them to a standard level (Makino & Nagano 2003). In 2003, the course was implemented in a computer room to approximately 10 second-year international students. The analyses on students’ outputs revealed that the task of inter-learner evaluation was effective for each student in argument construction regardless of the following factors: (a) language used—first or second language, (b) language ability—verbal accuracy, and (c) environment—classroom or online (Makino 2004a).

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**Table 2. Design of Basic Curriculum (Makino 2004b)**

<table>
<thead>
<tr>
<th>Task</th>
<th>Knowledge and Skills of Rhetoric</th>
<th>Form of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analysis &amp; Construction of Linear Logic</td>
<td>Self</td>
</tr>
<tr>
<td>2</td>
<td>Presentation of Informative Speaking</td>
<td>Inter-learner</td>
</tr>
<tr>
<td>3</td>
<td>Methods &amp; Procedure of Critical Evaluation</td>
<td>Self</td>
</tr>
<tr>
<td>4</td>
<td>Peer Critique and Evaluation</td>
<td>Inter-learner</td>
</tr>
<tr>
<td>5</td>
<td>Self-evaluation and Reconstruction</td>
<td>Self</td>
</tr>
<tr>
<td>6</td>
<td>Analysis &amp; Construction of Configural Logic</td>
<td>Self</td>
</tr>
<tr>
<td>7</td>
<td>Delivery of Narrative Speaking</td>
<td>Inter-learner</td>
</tr>
<tr>
<td>8</td>
<td>Methods &amp; Procedure of Critical Evaluation</td>
<td>Self</td>
</tr>
<tr>
<td>9</td>
<td>Peer Critique and Evaluation</td>
<td>Inter-learner</td>
</tr>
<tr>
<td>10</td>
<td>Self-evaluation and Reconstruction</td>
<td>Self</td>
</tr>
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**Table 3. Vertical and Horizontal Developments in Curriculum Design**

<table>
<thead>
<tr>
<th>Rhetoric</th>
<th>Planning</th>
<th>Video Clip</th>
<th>Weblog Display</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proof</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Logic</td>
<td>Video Shooting</td>
<td>Film Editing</td>
<td>1st display</td>
<td>11</td>
</tr>
<tr>
<td>Informative</td>
<td>Peer Critique and Evaluation</td>
<td></td>
<td>2nd display</td>
<td>2</td>
</tr>
<tr>
<td>Criteria</td>
<td>Reconstruction</td>
<td></td>
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<tr>
<td>Peer Critique</td>
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<tr>
<td>Self-reflection</td>
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<td><strong>Story</strong></td>
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</tr>
<tr>
<td>Configural Logic</td>
<td>Planning</td>
<td>Video Shooting</td>
<td>3rd display</td>
<td>0</td>
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<tr>
<td>Narrative</td>
<td>Film Editing</td>
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<td>Criteria</td>
<td>Peer Critique and Evaluation</td>
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<td>Peer Critique</td>
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<tr>
<td>Self-reflection</td>
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</tbody>
</table>

Table 3 shows the framework of the activity system for expansive e-learning in which the vertical and horizontal developments are integrated in a single curriculum. In terms of the vertical development, the process of video clip making proceeds in parallel with the basic curriculum of rhetoric. This implies that students first construct a message verbally and then express it nonverbally in the form of a film. In film
editing, students are instructed to minimize the risk of self-disclosure and maximize the “return” of message delivery. The teacher, who is also the designer of the curriculum, sets up a personal weblog for horizontal development. One of the differences between a BBS (Bulletin Board System) and a weblog is that while a BBS is a platform that becomes the core of an online community, a weblog is a node of networking. By nature, weblogs expand their network by connecting with each other according to the article subjects using a function called TrackBack. For example, prior to the implementation of the curriculum, the teacher maintained an informal journal in her weblog; following implementation, she introduced the idea of expansive e-learning, explained the objective and procedure of the pilot study, and invited the audience to participate in the activity system in her weblog. As a result, those who were interested in the idea of expansive e-learning came together naturally, without large-scale advertisement.

In the spring semester of 2005, the curriculum was implemented to 11 students in a seminar course at Kansai University. The portion of the curriculum dealing with vertical development was performed as classwork (see Figure 8). All the students were beginners with the exception of one student who had some previous experience in film editing. However, the teacher encouraged the students to present their video clips regardless of quality in order to encourage learning. During the implementation, the access record of the teacher’s weblog increased to an average of 30 per day and various dialogues continued. There were two kinds of active critics. One was a team of university students who were also managing their group weblog (Critic 1); the other was a graduate student who was considerably familiar with film grammar and also owned his personal weblog (Critic 2). The multiple dialogues through these weblogs included various connections among the students, the critics, and the teacher (see Figure 8).

The students whose video clips were presented to the public found that the criticism was much more harsh than they had expected. Critic 2 analyzed each student’s video clip in detail and made severe comments regarding each one. As a result, some of the students decided not to present their works. Fortunately, however, Critic 2 was so committed that he did not behave irresponsibly and continued to participate. Although the students were given the freedom to choose whether or not to present their works, some of the students who had decided against the presentation changed their minds later and attempted to present their works again. The decrease and increase in the number of students (see Table 3) indicates the challenges that the students faced and dealt with. All the students presented their video clips in the first display; however, in the second display the number decreased from 11 to 2, and became 0 in the third display. However, all of them completed their assignments for the fourth display. At the end of the semester, 6 students decided to present their final works to the public and an additional student presented his final work after the semester was over since the dialogues continued in the weblogs.

4. ANALYSIS AND DISCUSSION

In terms of vertical development, the basic curriculum of rhetoric was effective for the construction of an argument with proof. In the first half of the curriculum (see Table 2), the students prepared their speeches on
“the new judicial system,” which is a kind of jury system and will be introduced in the Japanese court system in the near future. In Tasks 1 and 2 (see Table 2), the Logic Molecules (see Figure 2) made by the students were mostly valid because the students had conducted sufficient research on this topic. On the other hand, the Application Molecules (see Figure 4) and the Dialogue Molecules (see Figure 6) were poor by themselves. Some students simply claimed, “I don’t wanna go to a trial,” without a critical consideration of the social context. However, after they finished Tasks 3, 4, and 5 (see Table 2), they overcame these weaknesses. For example, some of the students refuted the new system by pointing out its contradiction with other existing laws; this strengthened the Dialogue Molecule. Other students suggested the need for preparation not only in the judicial system but also in the educational system; this reinforced the Application Molecule. These results were consistent with the previous implementations that were discussed earlier in this paper.

In fact, the previous implementations suggested that the basic curriculum of rhetoric was more effective for the part of proof than for the part of story (see Table 2). The experiences implied that only a few talented students were good at creating a persuasive story. This is not surprising when one considers the fact that everyone is not capable of becoming a novelist or a scenario writer. Interestingly, however, as they worked on the construction of a story on “value of life” in the second half of the curriculum, those who were not necessarily talented and would have otherwise faced difficulties in storytelling, learned to create persuasive stories when they were given a movie camera and an editing tool. They were able to skip one of the most difficult processes involved in story making. They did not need to convert the images in their minds into verbal expressions; they simply expressed their images nonverbally.

Although the teacher gave the students suggestions in the area of message construction, the only instruction that she gave in terms of film editing was that the students were to minimize the risk of self-disclosure and maximize the “return” of message delivery. The vertical development of video clip making in the curriculum (see Table 3) was somewhat effective, at least with regard to the minimal skills of film editing, because even those students who were beginners learned how to use the equipments. In the end, all 11 students were able to complete both a video clip with proof and a video clip with story. However, the video clip making process appeared to be more effective for the horizontal development than for the vertical development.

In order to study in greater detail the processes of how each individual changed and how the change influenced the other members, the students were categorized into five groups based on attendance and performance (see Table 4). Group 1 comprised students with perfect attendance; Student A had a considerable experience in film editing prior to the implementation. Group 2 comprised diligent students who were always present in the class meetings; Students B, C, and D were a part of this group. Group 3 comprised average students who did not attend some of the class meetings; Students E, F, and G were a part of this group. Group 4 comprised impishly behaved boys who were often late for class meetings; Students H, I, and J were a part of this group. Group 5 comprised quiet students who were absent for more than half of the class meetings due to unavoidable family circumstances; Student K was a part of this group. In Table 3, the symbol “+” represents a breakdown of the number of students. For example, it was Student A and E who decided to present their works to the public in the second display.

<table>
<thead>
<tr>
<th>Group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>1st</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>2nd</td>
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<tr>
<td>3rd</td>
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<td>+</td>
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<tr>
<td>4th</td>
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<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

The student who stepped forward first and significantly influenced the other students was Student E. After the first presentation, Student E received critical comments from Critic 2 such as, “too many uses of film effects” and “cannot tell what the intentions are.” In response to this comment, she answered, “I was
unsure whether it was for privacy protection in order to minimize the risk or it was for maximizing the ‘return.’ I used many kinds of film effects, but everything was incomplete.” However, when she presented her second video clip, she mentioned that she had attempted to overcome the previous issue by connecting various cuts and making a conversation using a telop. Her work improved so much that both Student A—the experienced student—and Critic 2—the strict graduate student—praised the high quality of her work. The teacher was also amazed and felt an impulse to analyze her video clip with the model (see Figure 1).

In the first display, the students presented their speeches just as they were written in the template of the model. However, in the second display, Student E ascertained ways to strengthen the Molecules by filming. For the Dialogue Molecule (see Figure 6), she inserted an imaginary voice between frames in the telop; this reinforced the Compound of Logic and Dialogue (see Figure 5). For the Application Molecule (see Figure 4), she added contextual scenes between the Atoms; this created a vivid description of the Compound of Logic and Application (see Figure 3). Although Student E was doing this without making a conscious effort, the teacher was excited at the prospect of having a theoretical understanding and shared the finding with other students; this influenced them to a great extent. Although none of the students presented their works in the third display (see Figure 8), they were thinking and working hard behind the scenes so that they would be able to complete their final works.

There was another production that was created through the dialogical connections (see Figure 8). In this, the process of multi-voiced formation was analyzed with the model. After the first display, Critic 1 visited Critic 2’s weblog. Critic 1 left a comment saying, “As we read the comments of Critic 2, who knows a lot about filming, we realized that this is what we were trying to say!” This is a context. The teacher asked Critic 1, “Do you mean that Critic 1 and Critic 2 had a common perspective?” This is a thesis. Critic 2 suggested, “Perhaps they were just trying to support me.” This is a rebuttal. Student B said, “I read Critic 1’s comment repeatedly, but I don’t think they were simply supporting Critic 2.” This is a refutation. Then, Critic 1 finally responded, “We were referring to the words, “the students are mixing film editing and effect use such as mosaic and shading.”’ This is a specific. “In short, we meant that the students are confused and are mixing the aim and the means.” This is a general. The students who were watching these dialogues were encouraged to ascertain the difference between film editing (the aim) and effect use (the means). This will be a claim.

The learning processes varied among individual students. Student A was exceptional; he was already semi-professional. As far as the students in Groups 2, 3, and 4 were concerned, it appeared as if the more diligently the students worked, the less openly they disclosed their work. Although Group 4 (Students H, I, and J) had not been as serious as Group 2 (Students B, C, and D) in terms of attendance and performance, it is difficult to judge the difference in the quality of their outcomes. It was the impishly behaved boys who took the initiative to display their final works to the public. Then, Student A agreed with them, followed by Students G and K, and Student B changed his mind after the semester was over. In the teacher’s opinion, all these students appeared to have ascertained the difference between film editing (the aim) and effect use (the means). Critic 2 approved the teacher’s judgment. The works of Students C and F were also strong; however, they decided not to present them to the public because the issues they had dealt with on the theme of “value of life” were too personal to disclose to strangers. Student E was not satisfied with her final work and refused to present it. Student D did construct a good story; however, his filming skills were not good enough for nonverbal expression in filming. Student K did not have many opportunities to interact with his classmates or the critics. He was able to finish all the assignments by himself; however, his manner of constructing messages did not change over the period.

Overall, it can be said that the video clip display was not necessarily effective for everyone. However, the horizontal development certainly influenced and activated the interactions among classmates. Expansive e-learning developed the community internally as well as externally. Further, the critics and the teacher were also involved in the process of multi-voiced formation. Critic 2—the strict but faithful mentor—confessed that had he been in a student’s position, he would have used all the knowledge and techniques, but would have been unable to present his works to the public just like some of the shy students. For the teacher, the idea of a transparent classroom was risky, and sometimes she almost lost control over the students and the learning process. However, the more insecure and vulnerable the learning environment became, the greater were the chances of receiving incentives and supports across borders. This suggests the potential of a different type of security system such as a human safety net instead of an ID and password.

However, despite these outcomes, only a few consistent members were active critics and visible participants. Although the online community consisted of multiple weblogs (see Figure 8), it was rather
homogeneous because the critics were all university students with an interest in filming. In this sense, the diversity of the expansion was not as dynamic as the real world.

5. CONCLUSION

This paper presented the idea of third generation e-learning and developed the concept of expansive e-learning in which the vertical and horizontal developments are integrated into a single curriculum. The author designed an activity system for expansive e-learning with rhetoric, video clip, and weblog. In 2005, it was implemented to 11 university students for a pilot study. In terms of vertical development, the students improved their knowledge and skills with regard to verbal and nonverbal message construction. In terms of horizontal development, each party—the students, the teacher, and the anonymous critics—experienced and shared the outcomes of boundary crossing and knotworking through self-disclosure and self-reflection. The human network expanded not only externally but also internally within the community; this vitalized the entire activity system. However, in order to further enrich the diversity of the expansion, the question of how the horizontal development can be organized more dynamically remains a future issue.

REFERENCES


FINDING EVIDENCE OF COMMUNITY FROM BLOGGING CO-CITATIONS: A SOCIAL NETWORK ANALYTIC APPROACH

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ABSTRACT
In this paper, we examine the problem of evaluating communities in blogs. We describe the construction and instrumentation of a research blog (on Canadian independent music) designed as a tool for measuring community effects in blogging. We then identify a number of measures concerning strength and type of communities. Using research results from sociology and psychology concerning how communities grow and function, as well as clustering algorithms from the physical and applied sciences, we demonstrate how these measures can be used in a case study based on the research blog that we developed. In addition to providing these results, the paper also introduces a computational framework based on social network analysis, which can be used to measure and evaluate community in blogs.

KEYWORDS
Blogs, community, social networks, virtual community, sense of community, computer-supported cooperative work

1. INTRODUCTION

Weblogs (blogs) adapt Web technology to allow for instant, updated and frequent communication of information such as events, personal interests, thoughts, and news. Blogs create an online conversation that is recordable on the web, and that is indexed and searchable by blogging search engines. With millions being published, blogs offer a new way for communicating and discovering social metadata, which provide advantages over other forms of content such as e-mail, forums, and wikis.

The conversational nature of blogs can be used to uniquely identify topics and similar areas of interest (Herring et al., 2005). These similarities can then be used to build community, and specifically identify virtual community, in blogs. A common theme that has emerged from past research is that the concepts of sense of community and virtual settlement are prerequisites to finding virtual community (McMillan and Chavis, 1986; Jones, 1997). These prerequisites can then be supplemented with links from blogs, used as indicators of community membership, and by using clustering algorithms to indicate the shape or structures of potentially overlapping communities.

The purpose of this paper is to conceptualize and develop a framework for measuring virtual communities in blogs, and to identify practical measures of community strength and inter-relation from the framework that could be applied to collections of co-citing blogs. Our contributions are the following: first, we propose a framework for measuring and evaluating communities and second, we create a prototype for applying that framework. In this paper, we focus on the first two steps of our framework: motivating the community and identifying the community. Using a specially created indie music blog as a case study for measuring and evaluating community in blogs, we illustrate how the research framework can work in practice.
2. BACKGROUND: BLOGGING AND VIRTUAL COMMUNITIES

According to the Wikipedia, “A community is an amalgamation of living things that share an environment… In human communities, intent, belief, resources, preferences, needs…may be present and common…, but the definitive driver of community is that all individual subjects in the mix have something in common.” (Wikipedia, 2005). Howard Rheingold describes virtual communities as “social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace” (Rheingold, 1993). Thus we may infer that a virtual community is a collection of online mediated personal relationships that are motivated or facilitated by a common interest that is shared across the members of that virtual community.

The importance of virtual communities can be explained in at least two ways. First, virtual communities are considered important for social reasons (Wellman and Guilia, 1999). Participation in virtual communities that increase participation in face-to-face communities is a common finding in some researchers’ empirical studies (Blanchard, 2003; Wellman et al., 2001). People tend to reap the benefits of social relationships with like-minded others as they become more connected with others through virtual communities.

Second, the existence of a virtual community relates to the sustainability of a virtual group. The term “community” implies an emotionally positive effect, participants are more likely to increase or maintain their participation in virtual communities when they experience feelings of community (Harris, 1999). Conversely, the lack of a community feeling among participants may be key to explaining the frequent demise of many virtual groups.

Based on these two aspects of virtual communities, researchers are examining how blogs facilitate members’ social interactions and create a virtual community, a set of blogs linking back and forth to one another’s postings, while discussing common topics. Social interactions around blogging have been studied previously by Nardi et al. (2004, pp 222-231), by Blanchard (2004), and by Herring et al. (2005), where they conclude that blogging is used as a means for communicating social activity.

A few studies have looked into identifying virtual communities in blogs. One method is to use content analysis by examining the content of the actual blog posts and comments. Wei et al. (2004) recorded the statistics of a knitting blog to find norms that indicate membership rules as an indicator of community. Nardi et al. (2004, pp 222-231) performed text analysis on bloggers’ posts and comments in order to elicit feelings of community. A second method involves observing participants of a blog through interviews and surveys. Nardi et al. also audiotaped interviews with bloggers and asked them questions in the form of surveys, then analyzed the responses from bloggers for existence of community interactions.

However, one difficulty with previous methods for identifying community is that they involve opinions from bloggers themselves, which are highly subjective, time consuming, and prone to wrongful interpretation by humans. Fortunately, the valuable qualitative information that is obtained by interviewing bloggers on topics relating to community can be supplemented with more formal methods to generate quantitative measurements of virtual community. One source of measures of virtual community in blogs is the wealth of literature on established methods from psychology and sociology for finding community in face-to-face and online virtual communities, such as e-mail and newsgroups. One common theme that emanates from this literature is the concept of sense of community in which an individual becomes part of this sense of community if she has feelings of membership, feelings of influence, support by others, and shared emotional connection (McMillan and Chavis, 1986).

Blanchard (2003) studied sense of community in the Julie/Julia project blog and discovered that for the most part, a blog is not a virtual community. Blanchard found that in order for a blog to be a virtual community, it has to exhibit the characteristics of a “virtual settlement”, that is, a virtual place in which people interact by examining artifacts. Finding evidence for virtual settlements is analogous to digging for artifacts in archaeology (Jones, 1997). For instance, Efimova and Hendrick (2005) applied this technique and used blog reading patterns, linking patterns, blog conversations and blogger directories as artifacts for indicators of blog community.

Recently, researchers have employed clustering algorithms to identify communities in blogs. Kumar et al. (2003) used Kleinberg’s bursty algorithm to identify temporary bursts of activity where there is intense linking of blogs to each other based on certain topics like world events. Merelo-Guervos et al. (2004) use a pattern recognition and data mining algorithm called Kohonen’s self-organizing map to identify communities,
highlight the topic defined by each community, and permit the assignment of new blogs to a community based on its links.

Social network analysis is another technique that is increasingly being used for analyzing blogs. In this approach, interlinking between blogs is used as a way to indicate relationships and determine conversations that can potentially identify communities (Herring et al., 2005; Efimova and Hendrick, 2005). In the following section, we will discuss how techniques such as social network analysis may be combined into a framework for identifying and measuring community in blogs. We will then illustrate the use of that framework in a case study.

3. FRAMEWORK FOR IDENTIFYING AND MEASURING COMMUNITY IN BLOGS

In order to identify community in existing blogs, tools are needed to detect the interactions, structures, and artifacts that are generated by activity within communities. In this paper, we outline a research framework for measuring the community building effects of different ways of constructing and motivating the use of blogs.

Determining community in blogs requires crawling and analyzing the blogs, along with a methodology to discover community patterns from existing blogs. Looking for patterns of community activity in blogs is somewhat akin to the software design patterns that arise in software engineering. Once the amount and type of community activity patterns can be detected, it should be possible to measure quantities such as the strength of community. These measures can then be used as diagnostic tools for comparing blogs and building better communities in blogs.

Based on this methodological motivation, we propose a framework for measuring and evaluating communities in blogs. This framework includes four main steps: 1) motivating community, 2) identifying community, 3) measuring community, and 4) evaluating community.

3.1 Motivating community

The first step in building and measuring community is to motivate people to blog based on shared topics of interest, coupled with easy to use blogging tools that encourage, rather than hamper, interactions through the blog. Web statistics counters can then be used to track various forms of traffic to the blog site such as length of the visit, pages accessed during the visit, and the path taken to reach the page. These statistical results can then be used to form measures of motivation that are associated with the success of the blog. This process of motivating and measuring motivation is illustrated in Figure 1.

![Figure 1. Block diagram for motivating community](image)

3.2 Identifying community

The second main step in the proposed research framework is to determine if the motivation used does indeed create and build community. We follow the methods used by other researchers such as Nardi et al. (2004, pp 41-46), Wei (2004), and Efimova and Hendrick (2005) to identify sense of community. We distribute questionnaires and surveys to users of the blogs, asking them about general blogging habits, behaviour, and
feelings of sense of community. Statistical analyses can then be carried out on the results from the questionnaires and surveys. The resulting interpretations, along with content analysis of posts and comments, are then used to create a sense of community model for blogs as illustrated in Figure 2 (a). Note here that the interpretation of the survey and content analysis results is influenced by the way in which the community construct is defined as indicated by the inclusion of “community concepts” in Figure 2 (a).

It is useful to supplement ratings of community with statistical analyses that are performed on analyses of links and associated graphs constructed using blog crawlers. We have developed a blog crawler that mines the links between blogs and we create a social network that illustrates the relationships between blogs. From this social network, we identify possible communities by performing clustering and social network analysis. The complete process is shown in Figure 2 (b).

![Figure 2. Block diagram for identifying community. The left panel (a) shows the sense of community model which is then used with community analysis in (b) to identify communities](image)

### 3.3 Measuring community

After the communities are identified, the next step is to measure community. This involves translating the sense of community model that we create in section 3.2 into a computational model where features of the sense of community model can be mapped into specific quantitative measures. Social network analysis can be adapted for use in measuring community. For example, we can use network centrality (de Nooy et al., 2005) to measure how important or central an individual blog or node is to the network. Degree centrality (de Nooy et al., 2005) measures the network activity of a node and gives an indication as to which people are influential and may be useful nodes to focus on in community building. It may also be possible (and useful from a calibration perspective) to develop mappings between questionnaire-based sense of community measures and somewhat analogous quantitative measures such as degree centrality. Closeness centrality (de Nooy et al., 2005) measures how many steps on average it takes to reach every other node in the network. A node C with high closeness centrality can most efficiently make contact with other nodes in the network. This suggests that if blog A connects to blog C then blog A can reach other blogs through blog C, thus extending blog A’s community to include blog C’s community. Betweenness centrality (de Nooy et al., 2005) measures the extent to which this node can act as an intermediary or broker to other nodes in the network. We can use betweenness centrality to determine if two disparate blog clusters (at least in principle) can be joined to become one community.

### 3.4 Evaluating community

After creating the metric for measuring community, a blog may be evaluated in terms of its sense of community. Ideally, it should be possible to come up with a score or rank of blog effectiveness relative to different communities. Thus not only will strength of community for a blog be mentioned but also strength
for different types of community. For example, interest in professional wrestling might be one community, but there could be other communities of interest that a blog could potentially relate to. Therefore, strengths of community for a particular blog could be evaluated for a range of different communities of interest. With respect to particular communities of interest, blogs could then be ranked in terms of their strength and representativeness. The resulting rankings could then be used for a variety of applications such as ranking search results with respect to blogs, prioritizing advertising expenditures on blogs, etc.

4. CASE STUDY: INDIE MUSIC BLOG

We apply our framework from the previous section to independent (indie) music as our shared interest, and created a blog for this on MSN Spaces, a popular blog website hosted by Microsoft. This blog showcases upcoming indie bands from an indie music website and is designed to promote and add value to the indie music virtual community. In this section, we apply the steps of motivating community and identifying community from our framework to the indie music blog, with demonstrations of other steps in our research framework reserved for future work.

4.1 Motivating community

To stimulate the interest of readers and foster the formation of online community, we incorporate numerous features into the blog (blog tools) in addition to regular posts and comments on particular topics. A media player automatically loads the featured song of the day and allows users to stop and re-play the song as desired. A photo album displays new and exciting pictures of artists, tours, and concerts. Custom lists categorize and index reviewed music by genre (ie. rock, pop, folk, etc.) with links to download the reviewed songs. A rating scheme rates reviewed songs on a five-point scale and encourages readers to post their impressions of the music in the comments. One particular song is selected as the ‘song of the week’ and allows new visitors to sample the different types of indie music. A screenshot of the indie music blog is illustrated in Figure 3.

In addition, we regularly visit and comment on other blogs, which encourage readers to visit our blog in return. Active participation also includes responding to comments and participating in activities featured in the community. A statistics counter was used to measure the statistics that record the number of visits, the visitors, length of visit and the path taken.

4.2 Identifying community

As an initial starting point for representing a model for sense of community in blogs (Figure 2 (a)), we use the definition for sense of community by McMillan and Chavis (1986) as a community concept and ignore surveys and content analysis. Then, we perform community analysis as shown in Figure 2 (b) by analyzing the links that connect the blogs in the indie music blog from the posts and comments.

We first find nodes and links in the blog network by creating a blog crawler that crawled the indie music blog up to a link depth of 2 or two degrees of separation for inlinks (blogs that link to the target blog) and outlinks (blogs that link from the target blog), and recorded the frequency of links. In addition, we restrict crawling to MSN Spaces and use the RSS feed for crawling the blogs. To obtain the inlinks, we used the Google search engine along with the results from Technorati, a popular blogging search engine. Merging the inlinks and outlinks together and then anonymizing the blogs, resulted in the complete blog trace needed for blog data analysis. After crawling the blog, we use the UCINET social network analysis software by Borgatti et al. (2002) to create the nodes and links in the network.

The network surrounding the indie music blog, for up to 2 degrees of separation including inlinks and outlinks from the blog crawl on November 8, 2005, is visualized using Pajek (a social network visualization software by de Nooy et al. (2005)) in Figure 4. The blog network consists of 604 blogs, it is relatively sparse, and thus it is difficult to identify clusters that could possibly represent communities. To find possible communities in this network, we need to filter out those blogs which are clearly not part of any community in order to simplify the network. We use clustering and social network analysis from Pajek to then identify possible communities and explain the results in Section 5.
Entries are meant to stimulate Indie music fans.

The commenting feature allows members of the Indie music community to interact and express their opinions.

Linking is a way to integrate and incorporate other communities.

New and exciting pictures of albums, artists, tours, and concerts keep fans coming back for more.

Music Player

Songs are rated on a 5 star scale

Custom lists organize the music that has been reviewed

Figure 3. Screenshot of the indie music blog from http://spaces.msn.com/members/howaboutthatmelody
5. DATA ANALYSIS AND PRELIMINARY RESULTS

In this section, we analyze the blog trace from the indie music blog and discuss the properties of the network around the music blog, in order to identify patterns of interaction that could possibly be communities. We use the Pajek social network visualization software by de Nooy et al. (2005) to visualize the network, then perform clustering and social network analysis as explained below.

5.1 Simplifying the network using reciprocal links

We use McMillan and Chavis’ definition of sense of community, just like other researchers (Blanchard, 2003; Efimova and Hendrick, 2005), as the community concept for simplifying the network in Figure 4. Recall that sense of community involves having feelings of membership, feelings of influence, shared emotional connection and support by others (McMillan and Chavis, 1986). Feelings of membership arise from having people voice their own opinions and receiving some positive response back in return. In blogs, feelings of membership or membership ties can be represented by reciprocal links in which a post by, for example, blogger A is commented by blogger B (which is denoted by the link A→B), and blogger B writes a post on blog B which is commented by blogger A (which is denoted by the link B→A). Then the combination of inlink (A→B) and outlink (B→A) forms a reciprocal link. Efimova and Hendrick (2005) use reciprocal links in their blog analysis to identify communities, and we follow their method here as well.

In our approach, we remove all unidirectional arcs (which are links in one direction which is an inlink or an outlink) from the network and convert input and output links in each direction (also known as bidirectional arcs) into undirected edges, which results in leaving only blogs in the network that have reciprocal links. We apply recursive degree reduction to eliminate all nodes that have degree less than 2 because these nodes only have one tie, which hardly is any indication of a community.

Employing this method of reciprocal links on the network from Figure 4 reduces the number of nodes from 604 to 54, and simplifies the network as shown in Figure 5. We can see from Figure 5 that there are 8 clusters as marked in Figure 6 (a). These clusters could form possible communities, but we need to conduct further analysis in order to confirm their role as either separate communities or as parts of a larger community.
5.2 Using social network analysis to identify possible communities

We use social network analysis to validate our initial intuition of identified clusters, as indicated in Figure 6 (a), and further refine them to create groups. In social network analysis, researchers use measures of cohesion to identify components that indicate the intense clusters of interaction. These intense clusters in blogs represent conversations and if we compare these conversations to face-to-face conversations, then there is the possibility of finding shared emotional connection and inferring support by others. We can use these components for reducing the initial clusters and create dense clusters of blogs known as cohesive subgroups.

One measure of cohesion that we use is k-cores (de Nooy et al., 2005). A k-core is a cluster where the minimum degree of each node in the cluster is at least k. The degree of a node is the number of neighbours in an undirected network (which we consider for the analysis of communities). In blogs, this means that each blog in a k-core has at least k conversations. From the Pajek visualization software, we find three 2-cores (minimum degree of each node is at least 2) where each 2-core connects 3 blogs together, otherwise known as a triad. The triangles, highlighted in Figure 6 (a) from the network and extracted in Figure 6 (b), illustrate the 2-cores. Every node in the 2-core or triad is completely connected with a connection to each of the other nodes.
Since we have identified a 2-core as a cluster, then we calculate the fraction of blogs in the network that belong to those clusters to determine how well blogs in the indie music blog network belong to possible communities. Taking the three 2-cores and finding those from the entire network in Figure 4, we find that 0.66%, 0.17%, and 0.17% of the 604 nodes were found in each of the three clusters respectively. The majority (99% of the nodes) were not identified as comprising communities in this analysis. This shows that this initial methodology that we are using does not find strong evidence of community overall on the indie music blog, since less than 1% of the blogs belong to one of the 2-cores. However on closer analysis, we do find that there are only a few bloggers (2, 3, 4, 5, 6) that form some type of community, which would hardly be evident at first glance.

5.3 Discussion

Our initial analysis of the indie music blog network does show existence of possible communities. Further interpretation of these results can then be carried out using social network analysis on the links. To determine if the clusters that we found are indeed communities and verify their existence, we need to take into account the bloggers’ behaviour to determine if they feel like they are a part of community. By having bloggers complete surveys, which we have started to do, we can identify behavioural patterns and features and combine that with sense of community.

We have not done any detailed content analysis of the posts and comments to determine whether the threads can indicate that there may be a sense of community. However, by briefly looking at the list of relevant bloggers (1,2,3,4,5,6) and examining their blog conversations, there is evidence to show that they are the prominent bloggers that engage in frequent dialogue with the author of the indie music blog (1), and that they should be included in the community. Combining content analysis along with statistical analysis from the surveys will allow us to create a complete and comprehensive model for sense of community in blogs.

Our preliminary analysis neglects the frequency of the undirected or bidirectional links (or edge counts). We can infer that the higher the edge count, then there is more conversation, which indicates higher membership ties (from sense of community), and can lead to a higher probability of community. It would be interesting to distinguish different types of community based on the strength and intensity of interactions.

Furthermore, we need to develop a computational model that maps the features of sense of community in blogs into quantitative social network analytic measures such as degree centrality. From there, we can create an algorithm for the computational model that takes into account the social network analytic measures and the bloggers’ behaviour, to create a community rating that differentiates a well-developed community from an under-developed one.

6. CONCLUSIONS

The research reported in this paper sought to address the gap that exists between what users perceive as community compared to what can be measured quantitatively based on online interactions. Consequently, a framework was developed for identifying practical measures of community strength and inter-relation that can be applied to collections of co-citing blogs.

We began by reviewing prior research on virtual communities and blogs. We then proposed a sense of community model for blogs based on interpretation of content analysis and survey data. Next, a blog crawler was developed to mine the blogs for links and infer a social network structure for the blogs based on those links. We applied this analytic approach to the network of blogs surrounding an indie music blog that we developed. After creating the network (using Google and Technorati to identifying incoming links), we then used clustering and social network analysis techniques to identify clusters in the network that could be possible communities.

Our preliminary research results show that communities can be found from a target blog such as the indie music blog that we developed. We still need to further refine the tools and methods by creating a sense of community model for blogs. The tools and methods developed in our research should now be applied to a range of blogs and blog communities for purposes such as developing typologies of blog communities, and for identifying the importance of various blogs and their positions in respective communities.
ACKNOWLEDGEMENT

We acknowledge Bell Canada University Labs and Interactive Media Lab for their support of this research, Annie Xu for assistance with the creation of the surveys, Melody Gilanpour for her creation and maintenance of the indie music blog, and the conference reviewers for their suggestions in improving this paper.

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SUCCESS FACTORS OF (DUTCH) ONLINE DANCE COMMUNITIES: A VALIDATION OF WEBSITE FEATURES FOR SOCIAL INTERACTION

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ABSTRACT
In the Netherlands dance music and dance parties are rather popular and offer (young) people with different cultural and national backgrounds ample opportunity to meet and relate to each other (KPMG, 2000). From the beginning dance parties were involved in the internet. Visitors of these dance websites increasingly feel the need to communicate with each other online, and websites are being developed to fulfill this need. Community developers and operators can build their own software or choose from several (free) community software packages. Both options require quite a few design choices about implementation of specific features to support social interaction. Although we find guidelines and design principles for successfully developing and maintaining online communities in the literature, these guidelines and design principles are based on experience and research on offline communities more than on empirical verification (Leimeister, 2004). We sorted guidelines and design principles into categories of website features, and asked 10 online dance communities via an online questionnaire to rate the individual features and the dance community sites they were familiar with from the selected sample. With a few exceptions our categories were confirmed. Correlation analysis showed that there are significant relationships between appreciation of features and websites.

KEYWORDS
online communities, website features, design principles, computer-mediated communication

1. INTRODUCTION
“Dance” developed into quite a popular musical and cultural phenomenon, that conquered clubs, discotheques, hit lists, radio, TV., record and CD-players in a relative short period of time. It also conquered the heart of millions of mostly young people of different cultural and national backgrounds, and its popularity is still growing (KPMG, 2000). From the beginning dance was connected to the Internet. First, enthusiastic partygoers published photographs on websites. Party organizers followed this initiative, and hired professional photographers to enhance their websites. Then website visitors became more demanding and expected more than just photographs: the latest news, an elaborate agenda, interviews, columns, information about artists etc. etc. Now dance fans also want to communicate online, contact people they met on parties,
arrange to meet on another party, share experiences and discuss developments. In short, these websites developed into real community platforms. Our working definition of online communities for this paper is derived from Porter (2004): an aggregation of individuals, organizations or business partners who interact around a shared interest, where the interaction is at least partially supported and/or mediated by technology and guided by some protocols or norms.

Some online communities though, are more successful than others. Just offering the opportunity to communicate online may not be enough to create a thriving online community. Although some literature on success factors, guidelines and design principles is available to website developers and community operators to change their websites into a community platform or to improve an existing platform, many of these have not been empirically validated, and/or do not directly translate into website features (Leimeister et al., 2004; Kollock, 1996; Preece, Maloney-Krichmar 2003; Kim, 2000). Therefore, the goal of this research is to:
- translate existing success factors, guidelines and design principles into categories of website features;
- empirically validate which factors underlie these features for online dance communities, and
- investigate to what degree those factors are related to site ratings.

In the next section we will report on how we clustered success factors, guidelines and design principles from different sources into categories, and how we translated them into website features, belonging to the same categories. Then we will discuss how we designed an empirical validation of these features in the context of online dance communities. Section 4 describes the results in terms of ranking of the items, factor analysis and correlation analysis. The last section provides a number of concluding remarks.

2. GUIDELINES AND FEATURES OF ONLINE COMMUNITIES

We based our comparison of guidelines and design principles on the much cited works of Preece, Kim, and Kollock (see also Leimeister et al., 2004). According to Preece and Maloney-Krichmar (2003) support for social interaction should include means to support grounding and social presence, should discourage misunderstanding, aggression and social dilemma, prevent flames, should allow for relationship formation, and should encourage empathy, trust and critical mass. Usability solutions should allow members to easily find answers to questions concerning joining, trusting, participating and leaving the online community. The authors occasionally, but not structurally provide concrete website features to exemplify these principles, which are based on research from a variety of disciplines (e.g. social sciences, CSCW). Though a framework for measuring success of online communities is provided, these principles have not yet been empirically validated.

Kim (2000) states nine design strategies that characterize successful, enduring communities. These strategies concern community attraction, infrastructure, identity, group formation, governance, norms and rules. These strategies are mainly based on Kim’s experience as a community website designer, and are not explicitly based on a theoretical framework. Many clear examples of community website design accompany the strategies she states.

Kollock (1996) considers solving social dilemma’s as an important characteristic of online communities. His design principles are based on Axelrod’s (1984) conditions on cooperation, and Ostrom’s (1990) features of communities that are successful in managing common resources and social dilemma’s. He intended these principles to inform technology designers which social issues to consider when designing support for social interaction online.

Leimeister et al. (2004) constructed a questionnaire on the basis of (partly the same) literature on success factors, guidelines and design principles with the intent that online communities evaluate them. They identified 32 success factors, of which 26 were member-oriented, and 6 operator-oriented. With their online survey they gathered data from 644 respondents from 160 online communities of different sizes and types. Respondents were asked to express their agreement with statements concerning the importance of the factors. Thus a ranking of these success factors could be calculated. Their research offers an evaluation of the aforementioned guidelines and design principles. However, they did not evaluate concrete connected website features, and they did not relate these 32 success factors mutually. Of these 32 success factors we only considered non-commercial member-oriented success factors and guidelines that are transparent to members of online communities. An overview of the various success factors, guidelines and design principles can be found in Table 1.
<table>
<thead>
<tr>
<th><strong>Clusters</strong></th>
<th><strong>Website features</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>P1: Encourage critical mass; P2: Provide changing content, stimulate social interaction; P3: Acknowledge responses to questions, offers of help &amp; support</td>
<td>Resources, supplied; exclusive news items; exclusive news articles; exclusive interviews; exclusive reviews; mailing list; reaction on news; reaction on parties in agenda; reaction on photos; reaction on articles; add news; add parties suggestion box;</td>
</tr>
<tr>
<td>K1: Define and express a clear purpose; K/O1: Rules governing the use of collective goods are well matched to local needs and conditions; K/O2: Most individuals affected by these rules can participate in modifying the rules;</td>
<td>Resources, created-by-reacting;</td>
</tr>
<tr>
<td>L1: High numbers of members within a short term; L2: Offering up-to-date content; L3: Offering high-quality content; L4: Appreciation of contributions by the operators; L5: Evolution of the community according to the ideas of its members; L6: Integration of the members into the administration of the community; L7: Encouraging interaction between members; L8: Personalised page design of the community-site according to the preferences of its members; L9: Building trust among the members;</td>
<td>Conversatio n &amp; Grounding, variety of communication tools; Conversatio n &amp; Grounding, social presence; Conversatio n &amp; Grounding, tele-presence;</td>
</tr>
<tr>
<td>P4: Support different communication tasks; P5: Support grounding, social presence; P6: Encourage empathy; P7: Discourage misunderstanding and aggression; P8: Prevent flames; P9: Provide emoticons, content icons, consider whether avatars, personal pages, seamless links to private email, etc. are needed; P10: Support private discussion;</td>
<td>Conversatio n &amp; Grounding, social presence; Conversatio n &amp; Grounding, tele-presence;</td>
</tr>
<tr>
<td>K3: Design useful dynamic user profiles; K/A2: Individuals must be able to identify each other; K/A3: Individuals must have information about how the other person has behaved in the past;</td>
<td>Identity (representation (profile, buddy system), record of past behavior (member search));</td>
</tr>
<tr>
<td>K2: Built flexible, scalable meeting places; K/A1: It must be likely that two individuals will meet again in the future;</td>
<td>message board (non-threaded bbs); forum (threaded bbs); private messaging; quote function; emoticons in posts; ubb-code in posts; personal signature; personal avatar; personalized (color) representation; personalized info-design;</td>
</tr>
</tbody>
</table>

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**Table 1. Overview of clusters of success factors, guidelines, design principles and website features**

<table>
<thead>
<tr>
<th><strong>Preece, Maloney-Kirchmar, 2003</strong></th>
<th><strong>Kim, 2000</strong></th>
<th><strong>Kollock, 1996</strong></th>
<th><strong>Leimeister et al., 2004</strong></th>
<th><strong>Clusters</strong></th>
<th><strong>Website features</strong></th>
</tr>
</thead>
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<td>K1: Define and express a clear purpose; K/O1: Rules governing the use of collective goods are well matched to local needs and conditions; K/O2: Most individuals affected by these rules can participate in modifying the rules;</td>
<td>L1: High numbers of members within a short term; L2: Offering up-to-date content; L3: Offering high-quality content; L4: Appreciation of contributions by the operators; L5: Evolution of the community according to the ideas of its members; L6: Integration of the members into the administration of the community; L7: Encouraging interaction between members; L8: Personalised page design of the community-site according to the preferences of its members;</td>
<td>Resources, supplied; exclusive news items; exclusive news articles; exclusive interviews; exclusive reviews; mailing list; reaction on news; reaction on parties in agenda; reaction on photos; reaction on articles; add news; add parties suggestion box;</td>
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<td>P4: Support different communication tasks; P5: Support grounding, social presence; P6: Encourage empathy; P7: Discourage misunderstanding and aggression; P8: Prevent flames; P9: Provide emoticons, content icons, consider whether avatars, personal pages, seamless links to private email, etc. are needed; P10: Support private discussion;</td>
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<td>Resources, created-by-reacting;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K3: Design useful dynamic user profiles;</td>
<td>K/A2: Individuals must be able to identify each other; K/A3: Individuals must have information about how the other person has behaved in the past;</td>
<td>L9: Building trust among the members;</td>
<td>Identity (representation (profile, buddy system), record of past behavior (member search));</td>
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</tbody>
</table>
Table 1. Overview of clusters of success factors, guidelines, design principles and website features (Continued)

<table>
<thead>
<tr>
<th>Clusters</th>
<th>Website features</th>
</tr>
</thead>
<tbody>
<tr>
<td>P13: Support relationship formation;</td>
<td>support of members organizing meetings; support of organizing parties; sub groups area’s; user ranking; prize contest; polls; indication who’s online;</td>
</tr>
<tr>
<td>P14: Discourage social dilemma;</td>
<td></td>
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<tr>
<td>P15: Determine what kind of usability support is needed for different groups in the community;</td>
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<tr>
<td>P16: Consider requiring registration;</td>
<td></td>
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<tr>
<td>P17: Provide clearly,concisely worded policies,and appropriately position them;</td>
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<tr>
<td>P18: Provide tools and policies to support the moderators;</td>
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<tr>
<td>K4: Design for supporting different roles;</td>
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<tr>
<td>K5: Encourage re-occurring events;</td>
<td></td>
</tr>
<tr>
<td>K6: Integrate rituals into community life;</td>
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<td>K7: Support sub groups;</td>
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<tr>
<td>K8: Develop a strong leadership program;</td>
<td></td>
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<td>K9: Encourage a suitable etiquette;</td>
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<td>K10: Arranging regular events;</td>
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<tr>
<td>L10: Supporting the community by regular irl-meetings;</td>
<td></td>
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<tr>
<td>L11: Offering privileges or bonus programs to members;</td>
<td></td>
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<tr>
<td>L12: Establishing and supporting sub groups within the community;</td>
<td></td>
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<tr>
<td>L13: Special treatment of loyal members;</td>
<td></td>
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<tr>
<td>L14: Establishing codes of behavior to contain conflict potential;</td>
<td></td>
</tr>
<tr>
<td>L15: Intuitive user guidance (usability/FAQ)</td>
<td></td>
</tr>
<tr>
<td>L16: Governance (policies, moderation, site-explanation)</td>
<td></td>
</tr>
<tr>
<td>L17: Clear netiquette;</td>
<td></td>
</tr>
<tr>
<td>L18: Moderation support;</td>
<td></td>
</tr>
<tr>
<td>L19: Report-to-moderator function;</td>
<td></td>
</tr>
<tr>
<td>L20: User guidance/FAQ;</td>
<td></td>
</tr>
</tbody>
</table>

To help community platform designers choose which features to implement to support social interaction we had to translate these guidelines and design principles into concrete website features. Our first step was to identify overlapping and relating principles. Five categories of various guidelines and design principles resulted of which two have three sub-categories. These categories helped us to identify connected features:

- **Resources:** An important motive to participate in an online community is acquiring information (see also Ridings and Gefen, 2004). Offering relevant content that expresses the purpose of the community could help to reach a critical mass, and should also be an important feature of a community platform (P1, P2; K1; L1-L3). However, various guidelines and design principles state that it is important to engage members into the community, and Kollock (1996) states that online communities work best if they are (partly) self-organizing. Therefore it is likely members want to respond to content offered, and want to
add content themselves (K/O1-2). In that way they can influence the development of the resources of the community (L5,L6). It is also a way to acknowledge and appreciate contributions (P3;L4).

- **Conversation & Grounding:** to have a community at all, an online meeting place where members can converse is a prerogative (P4;K2;K/A1;L7). Asynchronous communities can choose between threaded and non-threaded bulletin board systems (see Preece and Maloney-Kirchmar, 2003). Features that allow for personalized design could help members to feel at home (L8), by increasing the tele-presence of the online meeting place, in as far as they offer a possibility to manipulate objects in the environment (Wood & Smith, 2002). Lack of non-verbal cues and social presence can raise grounding costs, and cause misunderstandings and flaming. Features like a quote function, emoticons, private messaging, and personal icons may compensate for this lack of non-verbal cues and social presence (P5-P10).

- **Identity:** online identity is fluid, which makes online interaction risky. Members may therefore appreciate features that enable them to express their personal and social identity (P11;K3;K/A2;L9). Trust may also be furthered by allowing members to find other members, and thus records of their past behavior (P12;K/A3).

- **Group formation:** according to Kollock (1996) group boundaries are hard to define in online settings. Strong social relationships may help group identification and may further solving social dilemma’s as well. Arranging regular (online) events can strengthen relationships (P13,P14; K5;K/O3;L10, L11), especially when they carry a ritual-like character (K6). Polls and prize contests may express these guidelines. Prize contests also provide a bonus (L12). Members may also value features that support differentiation of members and (online) meetings, such as subgroup areas and user ranking (P15;K4;K7;L12, L13, L14).

- **Governance:** user guidance and netiquette inform members how to participate in the online community (P15;P16;K9;L15,L16). A community platform can support moderation by allowing levels of privileges to enable monitoring of members’ behavior (P18;K8;K/O5-7). A report-to-moderator function allows members to assist moderators and to give suggestions (K/O4, K/O6).

### 3. RESEARCH METHOD

We gathered data from ten online dance communities, dedicated to a variety of dance genres, both member-initiated and organization-sponsored (Porter, 2005), and different in size (between 1000 and 300.000 registered members) and founding date (between ten and three years ago). With the help of an online survey we asked visitors and members of the online dance communities to rate the features and give an appreciation of the dance community sites from the sample they were familiar with.

In September 2005 messages were sent to these sites with a link to an online survey, that stayed online for ten days (19-9 to 29-9). The survey contained 11 general questions concerning age, gender, favorite dance genres, from where the online survey was reached, familiarity with the ten online dance communities, and an appreciation of the familiar dance community sites on a 10-point scale, ranging from 1 - 10. In addition respondents were asked to rate the importance of 39 website features on a 7-point Likert scale (not important – very important). The online survey was built in line with general usability requirements (Nielsen, 2000), and questions were formulated in a simple, neutral way. Explanation was available on mouse-over. The online survey was pre-tested on a small sample of six people.

After eliminating double and incomplete answers, 284 respondents were available for analysis. It is hard to tell whether this is a representative sample, since we do not know how many members the online communities really have (see also Leimeister et al., 2004). Based on Ten Thij (in progress), which contains an analysis of sixty online communities, we see that there can be a great gap between registered and active members. Respondents on average know of 6 dance community sites, and have subscribed on average on one or two. 21% of the respondents were women, and 79% men. The average age of the respondents was between 24 and 25 years. The average age of women was somewhat higher (born around 1978) than the average age of men (born around 1981). These percentages are consistent with an online survey (Ten Thij (in progress), held among sixty online communities of interest (following the definition of Hummel and Lechner, 2002). Techno, house, and minimal are the most popular dance genres. More than half of the respondents (65.5%) visit dance parties between once and three times a month, 15.8% more and 18.7% less often.
The data analysis consisted of three steps. First we looked at the ranking of the features. As the goal of this research is to find categories of website features, we used factor analysis as a second step. Principal components method was used to extract the factors. It turned out that an eight factor solution was easiest to interpret. All eight factors have an Eigen Value >1 and were used for further analysis. Varimax rotation was used to facilitate interpretation of the factors. The third step in the data analysis was to correlate the factor scores to the evaluations of the sites by the respondents. Using Pearson’s R we looked at the correlation between factors scores and site rating.

4. RESULTS AND ANALYSIS

In Table 2 we provide an overview of the ranking of the 39 website features according to the ratings of the respondents.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Mean</th>
<th>SD</th>
<th>Feature</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forum</td>
<td>6.30</td>
<td>1.14</td>
<td>Report-to-moderator function</td>
<td>4.88</td>
<td>1.70</td>
</tr>
<tr>
<td>Private messaging</td>
<td>5.76</td>
<td>1.40</td>
<td>Reaction on photos</td>
<td>4.81</td>
<td>1.77</td>
</tr>
<tr>
<td>Clear netiquette</td>
<td>5.75</td>
<td>1.54</td>
<td>Profile, personal photo</td>
<td>4.76</td>
<td>1.66</td>
</tr>
<tr>
<td>Moderation</td>
<td>5.74</td>
<td>1.47</td>
<td>Profile, personal agenda</td>
<td>4.75</td>
<td>1.75</td>
</tr>
<tr>
<td>Quote function</td>
<td>5.53</td>
<td>1.60</td>
<td>Emoticons in posts</td>
<td>4.70</td>
<td>1.86</td>
</tr>
<tr>
<td>Member search</td>
<td>5.37</td>
<td>1.52</td>
<td>Add news items</td>
<td>4.66</td>
<td>1.64</td>
</tr>
<tr>
<td>User guidance/FAQ</td>
<td>5.35</td>
<td>1.40</td>
<td>Indication who's online</td>
<td>4.62</td>
<td>1.59</td>
</tr>
<tr>
<td>Add parties</td>
<td>5.28</td>
<td>1.48</td>
<td>Ubb-code in posts</td>
<td>4.56</td>
<td>1.79</td>
</tr>
<tr>
<td>Reaction on articles</td>
<td>5.25</td>
<td>1.46</td>
<td>Personal signature</td>
<td>4.43</td>
<td>1.68</td>
</tr>
<tr>
<td>Reaction on news items</td>
<td>5.22</td>
<td>1.58</td>
<td>Profile, favorite artists</td>
<td>4.39</td>
<td>1.69</td>
</tr>
<tr>
<td>Reaction on parties in agenda</td>
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<td>1.68</td>
<td>Personalized (color) represent</td>
<td>4.38</td>
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<td>1.44</td>
<td>Profile, favorite parties</td>
<td>4.22</td>
<td>1.82</td>
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<td>1.64</td>
<td>Personalized info-design</td>
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</table>

When we look at the ranking of individual website features, features that allow for (inter)personal interaction and its regulation are appreciated most, more than high quality content. Notably, a forum and a quote function, providing context to a conversation, are rated much higher than a message board or features that express social presence like emoticons and ubb-code. With the exception of adding parties, reacting to website content seems more important to members of online dance communities than adding content themselves. They do, however, rate a suggestion box rather high, indicating they do appreciate being involved in the development of the community (platform). Support of online events like ‘prize contest’ and ‘polls’ is rated higher than support of live meetings. Respondents are most divided about ‘emoticons in posts’, ‘buddy system’ and ‘user ranking’. Though emoticons express mood which can help grounding, at some sites the use of emoticons is exceeding substance (what, as we know from personal experience, happened at Start2Dance before it was taken over by Phono. In the long run, mood without content may become less interesting). The low and more divided ratings of ‘buddy system’ and ‘user ranking’ may indicate dance community participants’ attitude towards differentiation of (groups of) members.

Now we know how the features have been rated, we will try to find out what structure underlies these rankings. As said, for that purpose, we used factor analysis. The results from the factor analysis are presented in Table 3. Together, the eight factors explain 63.1% of the variance.
On the whole the identified factors corresponded well with the proposed categories of website features.

- **Factor 1 with Identity**: ‘prize contest’ is grouped within ‘Identity’, which is counter to our expectations, but can be understood. We argued that a prize contest is an online event, like polls are, and thus belong to ‘Group formation’. Events bring people together and can contribute to their common ground. But a prize contest can also be considered as an opportunity to express identity, by allowing participants to show their knowledge of the dance scene and dance music;

- **Factor 2 with Conversation & Grounding, Social Presence**: ‘member search’ is clustered within ‘Conversation & Grounding, Social Presence’. Although the other features express compensation for lack of non-verbal cues and social presence within a message, ‘member search’ may be compared to sending private messages, in as far as being able to quickly find a certain member may heighten a feeling of social presence of the platform as such;

<table>
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</tr>
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<td>Reaction on parties in agenda</td>
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<td>0.02</td>
<td>0.07</td>
<td>0.09</td>
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<td>Reaction on photos</td>
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<td>0.05</td>
<td>0.06</td>
<td>0.08</td>
<td>0.03</td>
<td>0.82</td>
</tr>
</tbody>
</table>
**Factor 3** corresponds well with *Governance*;

**Factor 4** with *Resources, supplied*. Interestingly, ‘mailing list’ is grouped within *Group formation*. This could mean a mailing list is more valued because of a sense of belonging to the community than because of the information it provides;

**Factor 5** with *Group formation*, combined with *Conversation & Grounding, Communication Tools*: ‘message board’ seems a bit odd here, since it’s not immediately clear why and how ‘forum’ and ‘message board’ should be placed in different categories. One could reason, though, that the sheer opportunity to converse is a minimal requirement for relationship formation. Since it is even harder to understand why ‘forum’ should be grouped within ‘Resources, created by adding’, and ‘forum’ still has 0.30 in factor 5 we will categorize it within it “Group formation” in our further analysis;

**Factor 6** with *Resources, created by reacting*: apart from ‘forum’ the factor corresponds well;

**Factor 7** corresponds well with *Conversation & Grounding, tele-presence*.

The last step in this research is to relate the results of the factor analysis to the respondents evaluation of the sites. The results of Pearson’s Correlation between site rating and factor scores can be found in Table 4.

### Table 4. Correlating Site evaluation with factors

<table>
<thead>
<tr>
<th>Rating websites</th>
<th>Clubcharts</th>
<th>Livesets</th>
<th>Phono</th>
<th>Beatfreakx</th>
<th>Groovetrackers</th>
<th>Partyflock</th>
<th>Technoart</th>
<th>Partyscene</th>
<th>Dancelinx</th>
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</tr>
<tr>
<td>Sig.</td>
<td></td>
<td>0.92</td>
<td>0.81</td>
<td>0.82</td>
<td>0.62</td>
<td>0.12</td>
<td>0.19</td>
<td>0.75</td>
<td>0.17</td>
<td>0.37</td>
</tr>
</tbody>
</table>

**PC** is Pearson’s Correlation; **Bold** is Sign. < 0.05

When examining Table 4, we see that websites that are rated higher show more significant relationships with categories of website features. This indicates that website features to a certain extent do contribute to the appreciation of community sites within the dance scene. To community dance sites website features connected with ‘Identity’ (Factor 1) and ‘Resources, supplied’ (Factor 4) seem most relevant, followed by features connected to ‘Conversation & Grounding, Social Presence’ (Factor 2) and ‘Resources, created by adding’ (Factor 7). Remarkably, features connected to ‘Governance’ (Factor 3), ‘Group Formation’ (Factor 5), and ‘Resources, created by reacting’ (Factor 6) show only a significant relationship with a single community site. Personalized representation and information design (‘Conversation & Grounding, tele-presence’, Factor 7) show no significant relationships with any of the selected dance community sites. We should keep in mind, however, that we performed a correlation analysis on overall appreciation of sites and ratings of website features. We did not consider yet online behavior, (un)familiarity of websites, (not) subscribed to websites, frequency of visits and posts), cultural behavior (favorite genre, frequency of party
visits), and demographic differences (gender, age). We also did not yet analyze differences in implementation of website features between sites.

5. CONCLUSION

We feel that one of the strong points of this research is that we compared the appreciation of members of a number of online communities, and thus empirically validated the importance of website features, rather than presenting a case study of one specific community. Of course we will need do further research to find out to what degree the factors we found can be generalized to communities in other domains.

Research-informed guidelines may help (starting) community developers and operators in further developing their online community platform. The aim of this research was to translate literature-based success factors into categories of website features. Website features are more concrete and easier to implement than success factors, and categorizing makes them better to understand and to handle for operators.

Our research suggests to online dance community operators that the appreciation of their members of the online environment can be described in eight categories of website features:

1. Resources, supplied;
2. Resources, created-by-reaction;
3. Resources, created-by-adding;
4. Conversation & Grounding, social presence, tele-presence;
5. Conversation & Grounding, tele-presence;
6. Identity;
7. Group Formation;
8. Governance.

Website features belonging to the categories ‘Identity’ and ‘Resources, supplied’ are the most relevant to implement in online dance community websites, followed by features belonging to ‘Conversation & Grounding, Social Presence’ and ‘Resources, Added’.

Further research, incorporating online and cultural behavior into our analysis, and comparing how website features are implemented on the various sites, will show more precisely to what extent website features contribute to the appreciation of dance community sites.

Our research also helps researchers to empirically explore socio-technical relations (Resnick, 2001) in terms of predicting relationships between the appreciation of different types of online communities and specific combinations of categories of website features. Research like this would ask for an empirically grounded typology of online communities as well. However, typologies of online communities fall beyond the scope of this paper.

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AN EMPIRICAL STUDY ON AN ONTOLOGY MANIPULATION GROUPWARE USABILITY

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ABSTRACT

As an ontology represents a domain view shared by some users, we believe that a collectively designed ontology is more powerful than an imposed one. With the growing availability of large and specialized online ontologies the questions about collectively designed ontologies have become even more important. To support the cooperative development of ontologies a tool called COE has been developed. In this paper we discuss groupware support and present an experiment carried out with water resources and ontology engineering specialists. The main goals of this experiment are to create in a collaborative way a well-formed ontology about water resources and propose improvements to COE using a heuristic evaluation extended methodology, as we believe that when the groupware’s interface is improved consequently the collaboration process is improved too, making it more efficient.

KEYWORDS

Groupware, Groupware Collaboration, Heuristic Evaluation Methodology, Ontology and Water Resources.

1. INTRODUCTION

The collectively work, at least potentially, can produce better results than the individual one. The advent of virtual organizations, geographically dispersed companies and partnerships between companies, increases demand of distributed collaborative work. Computer Supported Cooperative Work (CSCW) is a research area which studies the collaborative work through computer systems called groupware, which supports communication, coordination and cooperation between the members of a work group even if they are distributed in time and space. [Rezende 2003]

Although its advantages the collaborative work demand an additional effort for members’ coordination. Without coordination good part of communication efforts will not be used to advantage in the cooperation. The coordination must prevent interpersonal conflicts that can harm the group. To make collaboration possible it’s necessary to have information about what is happening, which is supplied through awareness elements that capture and condense information collected during participants’ interaction. [Rezende 2003]

Commercial real-time distributed groupware are now readily available due to improvements in hardware, network connectivity and the demands of increasingly distributed organizations. Nowadays, with the exception of games and instant messaging, most real-time groupware are not widely used. A reason for this is that groupware has serious usability problems in how it supports group work - collaborative systems are, at best, awkward to use. [Gutwin 2002] The poor usability of current groupware results in part from the lack of practical and inexpensive groupware evaluation methodologies. [Grudin 1988] The CSCW community had been developing and validating techniques that make groupware evaluation cost-effective within typical software project constraints; therefore, most existing methods are too expensive and rarely seen outside research projects. [Baker 2002]
1.1 Motivation

Ontology [Gruber 1993] is a formal specification of concepts and their relationships. By defining a common vocabulary, ontologies reduce concept definition mistakes, allow shared understanding, improve communication and give a more detailed description of resources. Ontologies have crossed the borders of philosophy achieving an important position in Computer Science.

In a multidisciplinary group each person may have his/her own “personal ontology”, but a shared ontology must be constructed for work to be effective. We believe that a collectively designed ontology is more powerful than an imposed one. In the collectively built ontology, each person can provide input on the shared representation and an agreement must be reached at some point. Therefore, a tool to support ontologies’ cooperative development will be useful not only to achieve the goal of creating ontologies but also to help individuals to have better performance in the project. [Rezende 2005a]

The need for a number of individuals to work together raises problems in the CSCW domain: the fact that these individuals come from different backgrounds means that they will have difficulty interacting and understanding each other, which may compromise the project. Thus, it becomes necessary to establish a common language to improve cooperation. In this fashion, knowledge exchange between all involved in the process becomes easier, as does re-use of objects previously created and stored. [Rezende 2005a]

New technologies such as high-speed networks allow real-time cooperative work. In this sense, the peer-to-peer (P2P) approach can greatly contribute to cooperative work. For instance, P2P architecture permits direct interaction between peers, which promotes more dynamic applications. P2P applications are naturally not-centralized and this fact allows applications to form small cooperation groups without the presence of a central server, which could become stressed by the number of connections. In other words, the P2P architecture offers a more robust and fault-resilient environment for cooperative work. [Xexeo 2004]

The necessity of this work appeared from the development of knowledge management systems for COPPE/UFRJ Hydrology Laboratory (LabHID). An important aspect which makes these systems efficient in an environment where the activities are strongly conditioned to the domain is that during the information processing and analysis, limitations and rules imposed by this domain are relevant. Because of its characteristics we can use ontologies to make this aspect respected. In the LabHID the ontologies are used to guarantee that all media will be classified and easily identified to be re-used. To have a common vocabulary between the laboratory systems and all the members (which are from different areas or institutions) it is necessary to develop a unique ontology.

1.2 Collaborative Ontology Editor (COE)

Because their use becomes more common in a wide variety of applications, with many projects developing new ontologies, it’s possible to find two or more different ontologies representing the same or similar knowledge [Gruber 1993]. Taking into account that ontology creation can be a complex and time-consuming process, a tool that enables share and re-use of ontologies is considered of great utility.

COE [Xexeo 2004] is a P2P application designed to allow ontology developers to share their knowledge. It provides many activities: ontology creation, edition, share, re-use, and other traditional P2P mechanisms. It’s implemented on top of COPPEER1; therefore, its users can also Figure 1. COE Interface take advantages of non-specific collaboration tools provided by it, such as instant messaging (chat) and file exchange tool. COE provides a visual interface [Figure 1] where users can manipulate the ontology in a graphical or textual form. It uses hyperbolic trees as the main abstraction to manipulate the ontology. The user can navigate on the ontology (moving nodes to the center of the image), insert, remove, and move nodes (and their corresponding sub-trees), etc.

In this paper we are going to describe an experiment on tool support for collaborative ontology manipulation, discuss how COE can support collaborative ontology manipulation and evaluate its interface in the attempt to improve the collaboration process. COE was chosen because it is an ontology manipulation tool developed by our research group and we need to raise requirements to improve it. Our previous results in the experiment indicated that the ontology designer achieved a reduction in time dedicated to the creation of

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1 COPPEER [Xexeo 2004] is a framework for creating very flexible collaborative P2P applications. It provides non-specific collaboration tools as plug-ins.
a new ontology as well as obtained ontologies with better quality. We also explore the usability points that can be improved on COE.

The remainder of this paper is organized as follows: section 2 briefly introduces evaluation methods and presents the heuristic methodology used in the experiment. Section 3 shows our experiment which evaluates tool support for collaborative ontology manipulation and explores the usability points that can be improved in COE. Section 4 discusses the experiment results and conclusions are given in section 5.

2. HEURISTIC EVALUATION METHODOLOGY FOR GROUPWARE

As stated before, good real time groupware products are hard to develop, in part because evaluating their support for basic teamwork activities is difficult and costly. To address this problem the heuristic evaluation (HE) was created. The HE is a low cost evaluation methodology to diagnosis interface usability problems accepted by Human-Computer Interface (HCI) community. [Baker 2002]

According to Nielsen (1994) there are 10 heuristics that must be used in the usability evaluation of systems in general. This initial set had been extended by the HCI community. In a summarized way we can say that the heuristics approaches the following topics: simple and natural dialogue, user language, interface navigation, consistency, feedback, shortcuts, error messages, system help and documentation, prevention of error, flexibility, user privacy, etc.

The existing methodologies to evaluate groupware are extensions of general software interface evaluation methodologies. In multi-user systems the participant needs to interact with both the software and the other participants using computer support. The aspects considered in single-user software interface evaluation are important but not sufficient to enclose all the existing dimensions of interaction in multi-user systems, so, it’s necessary to identify which aspects must be evaluated as well as the methods to be used for its evaluation.

To evaluate multi-user systems there are several evaluation methodologies, and the 3 most important are: Groupware Heuristic Evaluation (GHE) method [Baker 2001], Groupware Walkthrough [Pinelle 2002] and Communicability [Prates 2002].

1. **GHE Method**: is an adaptation from Nielsen’s popular HE [Nielsen 1994]. This method uses heuristics and guidelines to identify usability problems which happen during group collaboration. [Baker 2001]

2. **Groupware Walkthrough**: is an extension of cognitive walkthrough [Ereback 1994] that includes considerations about teamwork complexities. Two important components of this method are the task model (to identify and analyze real-word collaborative tasks) and the walkthrough process (to assess the system support to tasks). [Pinelle 2002]

3. **Communicability**: is a method to evaluate the project communicability. Although it is an inspection method, it uses the user participation in a controlled environment. The user behavior is analyzed from the interaction between user and system. Through this method we identify ruptures in the interaction and get a map of critical interactive points in the experiment context beyond the perception of joined collapses causes. [Prates 2002]

Although there is no definition about which methodology is the best, most of the other methodologies are variations of one from the three cited here. In the experiment we used a methodology which is an extension of the GHE method. To the collaboration problems evaluated in the GHE method we added new heuristics which identify awareness problems. The new heuristics are presented in section 4.1.

3. THE EMPIRICAL STUDY

In the following two sections we are going to describe our study on tool support for collaborative ontology manipulation and the usability points that can be improved on COE.

3.1 Research Approach and Hypotheses

**Interface Usability**: Due to the tool support we need to identify the usability points that can be improved on COE. This way, we believe that we can try to validate the GHE extended method or even partially validate it. Moreover, try to find new important heuristics by the experiment inspection.
Collaborative Integration: The main goal of collaborative work in our study is to identify how people collaborate and negotiate to create a single ontology by integrating different ontologies. The considered hypothesis is that the groupware used in the experiment to facilitate the ontology integration is a tool which improves the group work easing collaboration between members.

Water Resources Ontology: We also want to validate the ontology created by a non-specialist in [Bonfim 2005]. The ontology was built as a hierarchical structure using hyponymy (is-a relation) to be used in the COPPE/UFRJ Hydrology Laboratory (LabHID), where subjects related to Brazilian hydrological basins had been studying. Amongst the countless possibilities this ontology will be used to identify and classify metadata and scientific models used by the research group. Another purpose is to use this ontology to facilitate communication with external institutions. To validate the existing ontology we created a new one in the same domain but with specialists.

3.2 Experiment Process

The experiment were carried out in 4 stages: in the “first” stage each participant creates an individual ontology (distinct domain parts). The subjects were 10 students from civil engineering graduate program and the domain selected was water resources (WR). It should be pointed that all the students are specialists on the domain. To guarantee ontology quality, in the “second” stage a group of 15 students from computer engineering undergraduate program were invited to transform the badly formed ontologies - created in stage 1 - into well formed ontologies. This stage became necessary because WR specialists weren’t ontology designers. In “stage 3” all participants (25) collaborated to create a single ontology (whole domain). In “stage 4” the WR specialists validated the ontology created by the non-specialist.

As stated before, one of the goals of this experiment is to validate an ontology created by a non-specialist. This ontology has around 120 concepts. In the first stage the concepts were divided in groups of 40 (with overlap) and each participant created his/her own ontology with the concepts fed using COE. It was defined that participants have autonomy to add new related concepts but all the concepts fed must be used. Another experiment goal involves COE’s interface improvement. In this case we observed each participant creating his/her own ontology in attempt to evaluate the heuristics proposed by Nielsen (1994). The participant could consult a database where he/she would find other ontologies.

Before the beginning of the first stage a brief training was carried out aimed at strengthening ontology concepts and training participants in COE. The tutorial created was available during all the experiment.

In the third stage a new goal was added: evaluate collaborative work in the collectively construction of the single ontology. It’s important to remember that this ontology is the one which will be used to validate the ontology created in [Bonfim 2005]. The experiment consisted in isolating the students in such a way to allow them only communicate through COE. In the first step pairs had been organized to create just 1 ontology (each pair has 2 ontologies to integrate, which are the ontologies created in the experiment first stage). After this we had 12 ontologies. This process was repeated until only 1 ontology was left.

To create a single ontology group’s members need to reach an agreement about concepts and its relations. As this is a very difficult task to do in a big group we decided to begin with small groups and gradually present participants to the negotiation problem. [Bonfim 2005]

3.3 Threats to Validity

As any empirical study, this experiment exhibits a number of threats to internal and external validity.

Internal Validity: The primary threat is the selection of subjects and their assignments to particular treatments. To ensure comparability of team performance we randomly selected students to form them. A second threat arises from the fact that we didn’t control the inspection effort. Third threat is data consistency, which such as process conformance, was much easier to ensure during the experiment due to tool support.

External Validity: Regarding external validity, we took specifications from a real-world application context to develop an inspection object representing a realistic situation. The results were obtained through the “in loco” observation of the predefined activities, the questionnaire answers, video capture and messages

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2 A well formed ontology do not have modeling errors on its purpose, for example, concepts that are presented as classes but that must be described as instances, errors in the hierarchic structure and others.
exchanged. The subjects were students participating in a university class. As pointed out in the literature [Sauer 2000] students may not be representative of real developers, however, Höst (2000) observes no significant differences between them for small judgment tasks. According to Tichy (2001), using students as subjects is acceptable if they are appropriately trained and if data is used to establish a trend. These conditions are both met in our case.

4. RESULTS

In this section we are going to describe key empirical results regarding tool support for collaborative ontology manipulation. We analyze defect discrimination performance (a) including team discussions and (b) fully automated, and present information on meeting effort (see hypotheses in section 3.1). We also compare the results from the tool-based meeting with data from paper-based inspections, where possible.

4.1 COE Interface Usability

At this point we analyze if the participants collaborative work (creation of a single ontology) had been improved by tool support. In the attempt to evaluate COE interface usability we choose the GHE extended methodology. This methodology was chosen by some reasons, among them: it encloses Nielsen (1994) heuristics to evaluate systems in general and approaches collaborative and awareness questions. Figure 2 shows an example of an initial ontology created in COE.

At this moment, we are going to show COE’s usability problems and the support lack of some characteristics of a group work, supplying the heuristics that had been violated by such problems. Table 1 presents the evaluated heuristics. The first eight are from GHE methodology, and the others are the extension proposed.

Table 1. Groupware Evaluation Metodology

<table>
<thead>
<tr>
<th>Heuristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (X) Provide means for intentional and appropriate verbal communication</td>
</tr>
<tr>
<td>2. (X) Provide means for intentional and appropriate gestural communication</td>
</tr>
<tr>
<td>3. (X) Provide consequential communication of individual’s embodiment</td>
</tr>
<tr>
<td>4. ( ) Provide consequential communication of shared media</td>
</tr>
<tr>
<td>5. (X) Provide protection</td>
</tr>
<tr>
<td>6. ( ) Manage transitions between tightly and loosely-coupled collaboration</td>
</tr>
<tr>
<td>7. ( ) Support people in their actions’ coordination</td>
</tr>
<tr>
<td>8. (X) Facilitate finding collaborators and establishing contact</td>
</tr>
<tr>
<td>9. ( ) Provide shared workspace with resources and devices</td>
</tr>
<tr>
<td>10. (X) Support tools integration</td>
</tr>
<tr>
<td>11. (X) Support awareness in a low level</td>
</tr>
</tbody>
</table>

Figure 2. COE’s Interface
The heuristics marked can be evaluated in COE because this groupware pretends to support these characteristics. As stated before, data collection was made by using questionnaire, video, messages log and user observation. This way, the respective problems had been found with the heuristics violated in accordance with the groupware proposal, as well as its possible solutions.

Here are defined questions and variables beyond the obtained results. These variables were used to measure collaboration degree between participants.

**Evaluated dimension: Collaborative work level**

**Questions:**
- Q1 - Communication: degree of interaction and participation in quarrels and dialogues
- Q2 - Collective design: degree of contribution
- Q3 - Coordination: degree of concentration and organization
- Q4 - Awareness: degree of process understanding

Table 2 summarizes variables observed during the experiment through registered and perceived evidences on the questions presented for the evaluation

<table>
<thead>
<tr>
<th>Question</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>V1.1: Amount of exchanged messages</td>
</tr>
<tr>
<td></td>
<td>V1.2: Quality of exchanged messages</td>
</tr>
<tr>
<td>Q2</td>
<td>V2.1: Amount of contributions in a collectively product construction</td>
</tr>
<tr>
<td></td>
<td>V2.2: Quality of contributions in a collectively product construction</td>
</tr>
<tr>
<td></td>
<td>V2.3: Construction/inference on the contributions of other members of the group</td>
</tr>
<tr>
<td>Q3</td>
<td>V3.1 Presence of leadership</td>
</tr>
<tr>
<td></td>
<td>V3.2 Fulfillment of the tasks</td>
</tr>
<tr>
<td>Q4</td>
<td>V4.1 Agreement on the tasks and their relations</td>
</tr>
</tbody>
</table>

The following results were obtained through “in loco” observation of predefined activities, questionnaire answers of each participant, video capture of the participant activities and messages exchanged by the participants.

As regards the messages, we verified that the number of exchanged messages decreased and the quality improved during the experiment. This was an expected result because it is normal to initiate with many badly elaborated messages and finish with a lesser number of messages, which are better elaborated. We still verified that the group had problems with coordination. They delayed about 1 hour organizing themselves, when an acceptable delay is around half an hour. Despite the coordination problems, 75% of the participants finished the tasks in an adequate time. Negotiation problems were well solved in most cases. This can be explained by the fact that the participants are from the same research group or share similar ideas.

### 4.2 Water Resources Ontology

Finally we reach the final stage. At this point the specialists evaluated the ontology created by a non-specialist and found 15 news terms which were added to the final ontology. Some relations were incorrect or
non-existent (15%) and many properties (names and values) were added (40%). Restrictions and instances did not suffer great changes (10%). Figure 3 shows a sketch of the WR final ontology.

Figure 3. Water Resources Final Ontology

5. CONCLUSIONS AND FUTURE WORK

In this paper we described an empirical evaluation of tool support for collaborative ontology manipulation and evaluate its interface because when groupware’s interface is improved, collaboration process is improved too making it more efficient. The research integrates concepts from the areas of CSCW, ontology engineering, WR, as well as verification and validation.

We focused on the performance of tool-supported where the main purpose was to observe collaborative characteristic. Our empirical data illustrates that tool supports resulted in a medium performance and the found requirements will be used to improve the tool. Examples of found requirements are: create a chat where each participant has a message with a personalized format; signal arrival messages when the chat window is minimized; allow public and private chat; devices protection; and add coordination elements.

The heuristics added to the GHE methodology had even facilitated the identification of inefficient support or even the lack of awareness support offered by the evaluated groupware. These new heuristics had also allowed a not ambiguity in problems identification because it facilitates the directly identification of problems using violated heuristic.

The experimental use of COE showed evidence that when it’s used by the ontology designer, the hypotheses where he/she will achieve a reduction in the time dedicated to the creation of a new ontology, as well as obtain ontologies with better quality, were confirmed. In order to evaluate the attainment of goal, new experiments may be aimed in obtaining qualitative and quantitative data that would enable the verification of the hypotheses under consideration.

Here were presented part of the obtained results. Complete results can be found in [Rezende 2005b]. It is necessary to point out that some operational problems had limited the good progress of the task, such as memory and internet access problems.

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CAN VIRTUAL COMMUNITIES BE A NEW COMPETITIVE BUSINESS MODEL IN BANKING? THE CUSTOMERS VIEW

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ABSTRACT
With the rapid growth of the Internet, there are a number of business opportunities that are offered by the Internet, as well as a number of challenges and threats. The rise of the electronic commerce change the behaviour of customers and bring about the creation of virtual communities (VC) which implies that businesses, such as banks, must expand their horizons as the advent of this technology threaten the existing channels of business. It requires companies understand the full range of products and services demanded by the virtual community customers, and to take advantage of the technology that allows customers to move seamlessly from information gathering to completion of a transaction, interacting with the various providers of product and services as necessary. This paper presents the results of an exploratory study of 400 banking customers in the UK. The study investigates the range of services a banking VC should offer, reports on customer willingness to join a VC, and discusses the potential of VCs to attract and retain customers.

KEYWORDS
Virtual Communities, Electronic banking, financial services, customer services.

1. INTRODUCTION TO VIRTUAL COMMUNITIES

As a general communication channel, the Internet gave rise to the possibility of widespread electronic commerce (eC). eC is the idea of conducting business electronically over the Internet. It provides businesses with ubiquitous access to their customers, and significantly, this expands the opportunity to satisfy demand for products, services, and information of each customer. On-line banking is as common and convenient as banking by telephone or fax.

Virtual Communities (VCs) are the newly emerging communities as a result of the effects of the Internet on society. A VC can be thought of as an online corporate lounge - a place where employees and customers gather and exchange ideas, a place where problems are solved and new ideas are born; perhaps most importantly, a place where trust and loyalty co-evolve. In VCs people interact, communicate, share experience, exchange information, chat, and develop relationships on-line, based on similar interests rather than appearance or geographic location. The implication of virtual communities is that people can now communicate more freely with a greater number of individuals without the restrictions of location, mobility,
or space. Moreover, finding individuals with similar interests has never been easier than it has become with the invention of the Internet.

A VC is a multidisciplinary concept, thus exposed to several definitions (Jin 2002; Preece 2000; Fox and Roberts 1999). A VC can be defined as a group of people who communicate with each other via electronic media, such as the Internet, share common interests, yet their geographical location, physical interaction or ethnic origin do not impose any constraints for the formation of the community (Barnatt 1998; Romm et al 1997). Another definition (Preece 2000) states that a VC consists of people, who interact socially as they strive to satisfy their own needs or perform special roles, such as leading or moderating, a shared purpose, such as an interest, need, information exchange, or service that provides a reason for the community, policies, in the form of tacit assumptions, protocols, rules and laws that guide people’s interactions and computer systems, to support and mediate social interaction and facilitate a sense of togetherness.

The number of VCs continues to grow (Johnson 2001; Wachter et. al. 2000; Anderson 1999; Kozinets 1999; Cothrel and Williams 1999). Many VCs accommodate individuals from different backgrounds, interests and ideas. There are examples of VCs whose members share a common interest e.g. for the environment ‘URL: http://www.gca.ca’, or facilitate the communication between farmers ‘URL: http://www.agri-ville.com’ (Deitel et al 2001). Furthermore, there are age-related VCs such as the ‘URL: http://www.elderweb.com’, or gender related ones such as the ‘URL: http://www.oxygen.com’. Some communities organise and encourage discussions around political and social issues such as the ‘URL: http://www.youthactivism.com’, which centres its interest on young people under the age of 18 (Deitel et al 2001). Sometimes, as in the case of ‘URL: http://www.mymanchester.com’, VCs reflect real communities. A number of villages or cities around the UK have developed their own VC where their people can exchange their ideas, discuss their problems and express their needs with respect to the place they live (Chen 2001; Rao 1998). VCs can also be formed for some time only for the purpose of letting their members to attend an important, e.g. a concert, a meeting, a lecture, etc. The communities stop to exist with the end of the event (Chen 2001). VCs can be said they have shared goals and ideas, they exhibit growth and some degree of stability as well as loyalty on behalf of their members, but they are not so robust as the face-to-face communities (Romm et al 1997).

It is argued (Armstrong and Hagel 1996) that organisers of a VC should strive to foster the development of stronger relationships among members of the VC, who may also be its organiser’s customers, by providing all of the following four Types of Communities that reflect consumer needs:

- **Communities of transactions**, facilitate the needs for the buying and selling of products and services or the exchange of information.
- **Communities of interest** that bring people with a common preoccupation about a topic, such as sports, cars, medical issues, etc. together.
- **Communities of fantasy**, which support the need for interpersonal interactions, games and social experimentation in artificial environments.
- **Communities of relationship** that bring people with related experiences together for mutual support.

Currently, most communities support only one of the four consumer needs, thus missing the opportunity to fully exploit the potential of VCs (Rothaermel and Sugiyama 2001; Armstrong and Hagel 1996). However, it is stated (Barnatt 1998) that it is difficult for financial sector companies to develop VCs that address all the above consumer needs. Therefore financial organisations should decide which existing VC to support and offer their services rather than trying to develop their own one.

The purpose of this study is to investigate the potential of virtual communities for consumers’ loyalty based on customers' perspectives in banking in the UK. Traditionally, banks attract large numbers of customers. They use the branch system and mass marketing techniques to attract deposit accounts and sell loans. With the emergence of new technologies, competing financial service providers are arriving, bringing with them sophisticated services that are focused on attracting more profitable customers. Also, customer base is forever changing, in the sense that customers are becoming more increasingly comfortable with technology. Therefore, they are demanding new financial services, and are willing to go anywhere to get the products and services they demand. In order for the banks to maintain their one-to-one relationships with the customers and also to retain them, they need to be able to interact with the customers and improve the quality of their services. This however can only be possible if they could organise and establish their own Internet-based virtual communities. Also, customer base is changing, and is changing forever, in the sense that
customers are becoming more increasingly comfortable with technology. Therefore, they are demanding new financial services, and are willing to go anywhere to get the products and services they demand.

1.1 Research Objectives and Methodology

This study investigates the following questions:

- What are the services a VC should offer in order to improve customer satisfaction and loyalty?
- Can VCs represent a feature in banking that can attract and retain customers?
- Are customers willing to participate in a VC and take part in its design and development?

The results of the study are useful for academic research as well as for practitioners who would consider the development of a VC as a business option in their strategy. This research study was conducted through a questionnaire survey, carried out amongst banking customers in the UK. Out of 600 questionnaires that were sent out, 400 complete and valid responses were returned, which gives a response rate of 67%, that is significantly over the average of 20%. The questions were designed so that they reflect issue related to customer loyalty and customer satisfaction and of course features of VCs. The validity of the questions was checked by academics and practitioners. As a result, some questions were rephrased in order to improve their clarity. A five-point scale (‘Not at all’, ‘Little’, ‘Moderate’, ‘Strongly’, ‘Don’t Know’) was used in order to allow the respondents to report the extent to which they expect and value a particular service from a VC. However, space was allocated on the form for reporting any other service they would expect from a VC that was omitted in the questionnaire. This research questionnaire consists of 3 sections, namely: Consumer's profile, the most Favourable Features of a Virtual Community and reasons for joining a Virtual Communities.

2. RESULTS ANALYSIS

2.1 Respondents Profile

The profile of the customer participated in this survey are summarised in the following table:

<table>
<thead>
<tr>
<th>Table 1. Customers Professions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profession</td>
</tr>
<tr>
<td>Care/Domestic Assistant</td>
</tr>
<tr>
<td>Teacher/Student</td>
</tr>
<tr>
<td>Engineer/Technician</td>
</tr>
<tr>
<td>Medical Practitioner/Nurse</td>
</tr>
<tr>
<td>Security Guard/Bus Driver</td>
</tr>
<tr>
<td>Civil servant/Secretary</td>
</tr>
<tr>
<td>Administrative/Banker</td>
</tr>
<tr>
<td>Trader</td>
</tr>
<tr>
<td>Accountant/Social worker</td>
</tr>
<tr>
<td>Catering Assistant/Cook</td>
</tr>
<tr>
<td>Cashier/Sales Assistant</td>
</tr>
<tr>
<td>Customer care</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

The second part of customer profile relates to the respondents’ age categories. It is very important for the banks to know the age range of those that are mostly using the Internet for shopping and paying, as well as using the online banking. The result is shown below in Table 2.
Table 2. Customers Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
</table>
| 18-35  | 173   | 43.3%
| 36-45  | 135   | 33.8%
| 46-55  | 76    | 18.8%
| 56-65  | 17    | 4.3%
| Total  | 400   | 100.0%

Table 3 reveals that 247 respondents out of 400 were computer literate, which represents 62% of total. This confirms the trend that the population is increasingly becoming computer literate.

Table 3 Customers Computer Literacy

<table>
<thead>
<tr>
<th>Computer Literate</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
</table>
| No                | 153   | 38.3%
| Yes               | 247   | 61.8%
| Total             | 400   | 100.0%

2.2 Are customers willing to join a VC?

Customers were asked to state to what extent they believe that a VC would create a better environment for them to enjoy banking services. Figure 1 summarises the results.

![Figure 1. Do you believe you can be treated better in a VC?](image)

The results indicate that most of the participants consider a VC as a feature that would create an environment where they would be treated in a better way. The interaction with other customers but also with the bank that fosters the development of the VC seems to deliver a business benefit, which can be translated to customer increased satisfaction. Further the customers were asked to say if they are willing to join a VC. Figure 2 shows their responses.
Figure 2. Responses to question ‘Are you willing to join a VC?’

Figure 2, indicates supportively to figure 1 that customers view VCs as a positive feature within the banking services’ spectrum. 61% would consider joining a VC which is an indication of the VCs’ business potential. It is important though to investigate the reasons why customers decide to join or not a banking VC. Figures 4 and 5 show the main reasons.

Table 4. Reasons for joining a VC

<table>
<thead>
<tr>
<th>Reasons to join a Virtual Community</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share information</td>
<td>56</td>
<td>14.0%</td>
</tr>
<tr>
<td>Get advise</td>
<td>11</td>
<td>2.8%</td>
</tr>
<tr>
<td>Socialise</td>
<td>31</td>
<td>7.8%</td>
</tr>
<tr>
<td>Bargains</td>
<td>18</td>
<td>4.5%</td>
</tr>
<tr>
<td>Communicate with other people</td>
<td>33</td>
<td>8.3%</td>
</tr>
<tr>
<td>Meet with other people</td>
<td>21</td>
<td>5.3%</td>
</tr>
<tr>
<td>Share experience</td>
<td>33</td>
<td>8.3%</td>
</tr>
<tr>
<td>Engage in discussion</td>
<td>77</td>
<td>19.3%</td>
</tr>
<tr>
<td>Support people</td>
<td>60</td>
<td>15.0%</td>
</tr>
<tr>
<td>Advise people</td>
<td>60</td>
<td>15.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>400</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 5. Reasons for not joining a VC

<table>
<thead>
<tr>
<th>Reasons not to join Virtual Community</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have no idea of VC</td>
<td>79</td>
<td>19.8%</td>
</tr>
<tr>
<td>Not interested</td>
<td>87</td>
<td>21.8%</td>
</tr>
<tr>
<td>Internet not secured</td>
<td>131</td>
<td>32.8%</td>
</tr>
<tr>
<td>Impersonality</td>
<td>100</td>
<td>25.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>400</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Tables 6 and 7 show respectively the percentages of the respondents that would like to be invited by their Bank to participate in the development of a VC, and those that would like to change their bank in order to join another bank that gives them the opportunity to use a VC. The results indicate that customers are concerned about the security of the Internet. This implies that respondents have not fully understood that VCs are supposed to cultivate and ensure security on transactions. On the other hand by letting customers experience a VC their main concern would possibly disappear thus leaving their positive views of VCs to dominate.

Table 6. Responses to the question of participating in the development of Virtual Community.

<table>
<thead>
<tr>
<th>Would you be interested to be called by your Bank to participate in the development of Virtual Community?</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>400</td>
<td></td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>181</td>
<td>45.3%</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>219</td>
<td>54.8%</td>
</tr>
<tr>
<td><strong>100.0%</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7. Responses to the question of whether they would consider switching to another bank which gives customers the opportunity to use a Virtual Community.

<table>
<thead>
<tr>
<th>Do you think that you would change your bank in order to join another bank which gives you the opportunity to use a Virtual Community?</th>
<th>Count</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>189</td>
<td>211</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>47.3%</td>
<td>52.8%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

In analysing the above responses, it seems that some respondents are willing to join a virtual community if it is organised, for the fact that they are looking for ways to connect and interact with other people who share similar interests. It appears that people want to connect with other members of the community, and participate in discussion groups and socialise/chat with other members online. Despite the indication that many respondents have never experienced a VC, it is obvious that they are willing to participate in developing one, and more importantly there is an indication (although weak) that some of them would possibly change their bank for one that offers VC services.

2.3 VC Services in Banking

The results analysis indicates the following:

- 37% of the respondents moderately believed that support of their transactions is a valuable feature of a virtual community, while 30% also strongly believed that.
- 40% of the respondents strongly believed that facilitating information sharing among customers is a valuable feature of a virtual community, while 32% also believed so moderately.
- 36% of the respondents moderately believed that characteristics such as satisfying customers' queries, offering the ability to exchange experiences on specific issues, of common interest is a valuable feature of a virtual community, while 43% also strongly believed the same thing.
- 31% of the respondents moderately believed that the opportunity to order products/services is a valuable feature of a virtual community, and 44% believed the same strongly.
- 31% of the respondents moderately believed that the opportunity to socialise with other customers of their bank, or develop new common interests is a valuable feature of a virtual community, and 36% also strongly believed the same thing.
- 31% of the respondents moderately believed that having an emotionless relationship with other customer and their bank, is a valuable feature of a virtual community, and 32% also strongly believed that.
- 32% respondents moderately believed that the opportunity to engage in leisure activities e.g. games, and social activities e.g. chatting, are valuable features of a virtual community, while 36% strongly believed the same.
- 31% of the respondents moderately believed that a virtual community could give them that something extra that would encourage them to remain with their bank, while 36% also strongly believed that.

The study therefore indicates that customers are willing to receive not only services that foster social relationships but they are also strongly interested in managing their transactions and their businesses with their financial provider through a VC.

3. CONCLUSION

There is need for more research in order to investigate the ability of VCs to become an IT application that will not only improve customer loyalty, but it will create a completely new environment for the development of the digital economy. Research studies should include samples from other business sectors and other countries. It is also important to highlight the opportunity to study VCs through chats and forums and examine the views of non-business VC members for the potential of business VCs. Many organisations are
now waking up to the business opportunities that are offered by the Internet by integrating online communities with their web sites so as to enhance their position in the rapidly growing web-based community space. They have realised the importance of customers' loyalty as far as their business is concerned. The potential of virtual community is known to be for interaction, allowing users to connect with other members, offering them a high degree of personalisation, encourages loyalty, and provides significant opportunities for highly targeted advertising. The integration of this community distinguishes a company's services among other competitors. Banks have now realised the importance of their customers, because banking is about relationship and trust. Customer is the driving factor in this analysis and their focus must not be lost. Banks have known that they need to keep their existing customers in order to increase revenues. Banks in UK have also recognised that in order to retain their customers, they need to establish a closer relationship with them so as to prevent them from defecting to competitors that offer more competitive products.

This research study that has drawn on a UK based banking customers sample, indicates there is business potential for VC in the financial sector. It is the social interaction and the secure environment that will potentially enable suppliers and customer to interact in a closer manner, change their communication and collaboration, thus improving the quality of services and customers’ loyalty and satisfaction.

REFERENCES


PEER-TO-PEER BUSINESS COMMUNITIES: MAPPING PUBLIC CHOREOGRAPHY PROTOCOLS TO INDIVIDUAL IMPLEMENTATION MECHANISMS

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ABSTRACT
This paper explores certain issues of business-oriented Web Based Communities also referred to as Virtual Organisations or Virtual Enterprises. One of the important B2B and Virtual Enterprise (VE) implementation aspects is support of commonly agreed collaboration scenarios between the peers. In order to for the scenarios be understood and accepted by the members of a VE, the former need to be specified in a standard, machine-readable form and mapped to the implementation mechanisms of the VE participants. Such specifications, which describe the sequence and the format of message exchange between the collaboration participants, are known as choreographies. We discuss the challenges of constructing architecture for B2B interactions based on choreographies and Service Oriented Architecture (SOA), Web Services in particular. One of the WS-* specifications, which attempts to address business process integration issues is the Web Services Choreography Definition Language (WS-CDL). In this paper we present an approach to harmonisation of the "global" or neutral definition of business collaborations, which WS-CDL is used for, with partner-specific implementations, which can differ in terms of platform, environment, implementation technology, etc. By introducing the concept of pluggable business service handlers we draw on work carried out by the ebXML initiative, business services interfaces, in particular. We analyse a possibility to use flexible business service handlers, which would smoothen the transition between public and private business processes by using flexible mapping techniques.

KEYWORDS
Choreography, Service Oriented Architecture, B2B, Web Services, ebXML

1. INTRODUCTION
Modern architectures and implementations of Virtual Enterprises are increasingly based on the concept of Service-Oriented Architectures (SOA) (He 2003). SOA is a framework, which represents individual business functions as reusable services in order to implement complex business applications and processes efficiently. Furthermore, SOA is an approach to IT that considers business processes as reusable components or services which are loosely-coupled and that are platform and implementation neutral (Weaver 2005). Firstly, we would like to emphasise the need of choreography support for SOA-based e-business solutions and Web Services in particular. We also provide a brief overview of major efforts in this area before presenting a possible solution of choreography usage in Web Services based B2B collaborations.
The SOA approach allows to design solutions as assemblies of services in which the assembly description is a managed, well-defined first-class aspect of the solution, and hence, amenable to analysis, change, and evolution. The solution can then be viewed as a choreographed set of service interactions (Weaver 2005). We see the aspect of change and evolution as the key to successful adoption of choreography-based collaboration specification.

Recent developments in Web Services field provide promising opportunities for integrating data, applications and business processes. The latter, however, is the most complex case of integration as it requires strong support for both business process semantics and technical infrastructure in order to tackle heterogeneity at all levels. According to Wombacher et al. (2004), in today's B2B solutions landscape loosely coupled business processes are quite rare. Despite many promising advancements, Web Services technology faces a number of issue to address heterogeneity at different levels of integration. Usage of simple stateless Web Services is not sufficient for implementing business processes while static binding does not use full potential of loosely coupled systems and the SOA advantages (Wombacher 2004).

The rest of this paper is structured as follows. Section 2 briefly discusses the motivation for choreography in B2B collaborations and differentiates between the choreography and orchestration. Section 3 introduces the Web Services Choreography Description Language and some other choreography alternatives; Section 4 describes the main concepts of our approach and relates it to the ebXML (Enabling Electronic Business with ebXML 2000) framework followed by Section 5, which concludes the paper.

2. MOTIVATION

Vinoski (2001) argues that Web Services choreographies must take business processes into account: trivial Web Services solve only trivial issues; non-trivial web services must play a part in business processes. Business-to-business integration (B2Bi) requires standardized choreographies, i.e. definitions of the "conversations" between cooperating applications that allow them to work together correctly (Vinoski 2001). Simply put, choreography is a model of the sequence of operations, states, and conditions that control the interactions involved in the participating services (Web Services Architecture 2004). The interaction prescribed by a choreography results in the completion of some useful function. Examples include the placement of an order, information about its delivery and eventual payment, or putting the system into a well-defined error state. Gortmaker et al. (2004) have presented an extensive of choreography definitions along with a thorough discussion of choreography and orchestration.

For the sake of clarity we would like to note the difference between choreography and orchestration, as these two terms are being used improperly sometimes, which causes confusion. Figure 1 depicts inter-relation between the choreography and orchestration in business collaboration context.
Orchestration specifies the behaviour of a participant in a choreography by defining a set of "active" rules that are executed to infer what to do next, once the rule is computed, the orchestration runtime executes the corresponding activity(ies). Orchestration assumes existence of an entity, which is the central point of control and governs overall workflow of activities, effectively composing a new service from existing services. The standardization of orchestration and the emergence of a new application model will also benefit from a robust B2B layer, such as ebXML, in the Web services stack. As a matter of fact, orchestration could take its full dimension from the extension of the business semantics to the application model (Dubray 2004).

Choreography, as explained before, is meant to be enacted by peers without an intermediary, at runtime, the choreography definition can be used to verify that everything is proceeding according to plan. Choreography can also be used to generate a public interface, e.g. abstract BPEL (WS-BPEL 2005) that can be used to tie in internal activities to support the choreography. Dubray (2004) also differentiates between the two concepts by arguing that choreography defines the fabric of an SOA while orchestration, helps to build "processing entities" – non-trivial services, which can perform tasks, needed to support complex business interactions. Ross-Talbot (2005) defines choreography as a description of the peer to peer externally observable interactions that exist between services. The interactions are described from a global or neutral point of view and not from any one services perspective. Choreography can be used to generate the necessary behavioural contract for each of the peers; further non-observable logic (code) maybe required to manifest the full set of service implementations (Ross-Talbot 2005).

3. CHOREOGRAPHY

The considerations mentioned above and some earlier developments, such as Web Service Choreography Interface (WSCI 2002), ebXML Business Process Specification Schema (ebBP 2006) served as input for W3C to establish the Web Services Choreography Working Group and begin work towards a language that can be used to describe collaboration protocols of cooperating participants, which act as peers and their interactions may be long-lived and stateful. Web Services Choreography Requirements document (WS-CHOR 2004), provides the following definition of choreography: "Web Services Choreography concerns the observable interactions of services with their users. Any user of a Web Service, automated or otherwise, is a client of that service. These users may, in turn, be other Web Services, applications or human beings. A specific set of interactions maybe related over time to some form of collaboration grouping that is initiated at some source and runs throughout a set of Web Services and their client. A choreography description is a multi-party contract that describes from global view point the external observable behaviour across multiple clients (which are generally Web Services but not exclusively so) in which external observable behaviour is defined as the presence or absence of messages that are exchanged between a Web Service and it's clients.” (WS-CHOR 2004).

Goland (2003) contributed notably to these requirements by advocating the need for complementary but separate languages – choreography programming languages and choreography description languages. Goland (2003) showed rather clearly, using motivating use cases, the difference (from choreography point of view) between executable languages such as Java, C#, BPEL and similar, and declarative description languages, which capture a global view of messaging activity and are not designed to provide information about how participants implement their individual tasks. Goland (2004) also explained the need for generating role-specific code skeletons from choreography description in order to facilitate faster and more convenient implementation of individual functionality. The choreography description language uses roles to differentiate between the participants in choreographies. We will discuss this aspect in greater level of detail in subsequent sections.

The result of the mentioned W3C WS Choreography Working Group effort is WS-CDL language (WS-CDL 2005), which is the means to define a technical multi-party contract, mentioned above. WS-CDL specification is aimed at being able to precisely describe collaborations between any types of participants regardless of the supporting platform or programming model used by the implementation of the hosting environment, thus addressing heterogeneity issues (WS-CDL 2005). Choreographies must also completely hide component-level implementation details. Moreover, the same choreography definition (potentially involving any number of parties or processes) needs to be usable by different parties operating in different contexts (industry, locale, etc.) with different software (e.g. application software) (WS-CDL 2005).
Choreography definition using WS-CDL allows building of more robust services because they can be validated statically and at runtime against a choreography description, verification absence of deadlocks and live-locks, etc. It also helps to ensure effective interoperability of services, which is guaranteed because services will have to conform to a common behavioural multi-party contract, mentioned earlier (Ross-Talbot & Brown 2005).

However, compliance of the participating services to the common contract might result that the choreography enactment is hard coded into the implementations of the services and/or their composition mechanisms. This approach poses a two-fold problem: it reduces reusability of the services and also makes it difficult to change choreography description without a need for massive programmatic changes at the participating end-points. Goland (2003) discusses these issues from developers’ point of view in his contribution to WS Choreography requirements.

A possible alternative to global-contract choreography is a technique called mediation, where an intermediary agent is involved in communication between parties and ensures compliance of message flow to expected/requested behaviour of each party (Cimpian & Mocan 2005). A notable example of such approach is Web Service Modelling Ontology (WSMO) Choreography (Roman et al. 2005). WSMO is an ontology for describing various aspects related to Semantic Web services (Feier 2005).

The WSMO framework provides support for choreography and orchestration as part of interface definition of a WSMO service description. An interface describes how the functionality of the service can be achieved (i.e. how the capability of a service can be fulfilled) by providing a twofold view on the operational competence of the service: Choreography decomposes a capability in terms of interaction with the service (service user's view) Orchestration decomposes a capability in terms of functionality required from other services (other service providers' view) With this distinction different decompositions of process/capabilities are provided to the top (service requester) and to the bottom (other service providers). This distinction reflects the difference between communication and cooperation. The choreography defines how to communicate with the web service in order to consume its functionality. The orchestration defines how the overall functionality is achieved by the cooperation of more elementary service providers (Roman & Lausen 2004). WSMO choreographies are based on the Abstract State Machines methodology. Cimpian & Mocan (2004) in their work describe a process mediation approach based on WSMO choreographies and Web Service Execution Environment (WSMX) (Cimpian et al. 2005), a reference implementation for WSMO.

4. SUGGESTED APPROACH

In this paper we propose software components called handlers to represent the logic of harmonizing public choreographed processes with private functionality of end-point services, as shown in Figure 2. Handlers are registered with and coordinated by a choreography support service, which, in turn, used by the end-point services to support global choreography contracts.

![Figure 2. Pluggable handlers map choreography to local mechanisms at run-time](image-url)
Configured with pluggable handlers choreography support service mediates two-way message exchange between the “outside world” and the local processing entities. Based on the available handlers, various request types and formats can be routed, translated, and fulfilled by the business services. Choreography support service can relatively easily be reconfigured, adapted, and extended as new processing entities need to be supported. In addition, dynamic selection of processing entities to play the prescribed roles, policy enforcement, trust and security support and other non-functional tasks can be performed by the handlers. The handlers can be implemented as a chain of message filter put in front of processing entities deployments. Handlers take a choreography definition, the role, which processing entity is supposed to play and maps the choreography messages to local operations at run-time.

4.1 The role and status of the ebXML

We call the handlers business service handlers, drawing a parallel with the naming used in ebXML framework (ebBP 2006). The original name for these components in ebXML framework was Business Service Interface (BSI), which can be described as a piece of software that handles incoming and outgoing messages at either end of the transport (Enabling Electronic Business with ebXML 2000). The ebXML concept of a business transaction and the semantics behind it are central to predictable, enforceable e-business. It is expected that any Business Service Interface (BSI) will be capable of managing a transaction according to these semantics. Dubray (2003) explains the purpose of ebXML BSI in his overview of ebXML: "The Business Service Interface (BSI) should enforce the business collaboration protocol (ebXML BPSS). At any point in time, the BSI is able to determine if a message makes sense from a business perspective (is format correct? did it come on time? in the right sequence? ...). The BSI may be directly communicating with an application, but it is certainly wise to use a broker that will dispatch ebXML requests and responses to and from your business applications. Typically, this broker is going to be a business process management system. ". This explanation actually outlines the core functionality of BSI and justifies the need of pluggable brokers to support a variety of business process management systems. The OASIS ebXML Business Process (ebBP) Technical Committee (TC) later discussed a possibility to differentiate between Business Services Interface and Business Service Handler (BSH) in order to separate the abstract interface from its implementations. By proposing the name change to business service handler, the ebBP committee harmonised the naming between the business and messaging domains - the ebXML Message Service Specification (ebMS 2002) defines the Message Service Interface and Handler separately.

In ebBP Specification v 2.0.1 (ebBP 2006) the BSI is defined from a different perspective: as a logical definition for a party's actions, exposed as business services. It may be seen as a logical shared definition at different nodes. Logically, a BSI is a partner's implementation of the shared definition of business states and actions relevant to a common business goal. The BSI specifies the allowed set of business process and business object states of a business process, and the rules governing transitions between those states. In the context of the ebBP technical specification, only the shared business process is being managed. The interface to the BSI is through business messages and signals (ebBP 2006). This defines the functionality of the BSI closely to the functionality of an individual partner required to support WS-CDL based common multi-party contract. Therefore the ebXML BPSS and W3C WS-CDL define substantially similar approach to enactment of common business goal and idea of pluggable business handlers follows this paradigm.

The ebBP technical specification does not, however, specify how the BSI is implemented. For example, the BSI may be enabled through a BSI-aware business application or through behaviour implemented as a part of a Message Service Interface component. The business application may business signals that are sent (realized) by the Message Service Handler (ebBP 2006). Similarly, WS-CDL (2005) does not specify how collaborating parties implement/map their services to comply with the common contract. We think that it useful to turn to the ebBP TC work when architecting choreographed Web Services solutions, as the ebBP v2.0 specification takes Web Services into account and explicitly relies on choreographed collaborations (no relation to WS-CDL is defined yet; the ebBP TC, however, is working on ebBP and WS-CDL layering). An ebBP Choreography is an ordering of Business Activities within a Business Collaboration and is specified in terms of Business States and transitions between those Business States. Execution of the backend systems, which instruct the BSI to send or receive messages, advances the state of a collaboration. Similarly to WS-CDL, there is no execution engine associated to the collaboration itself. Although WS-CDL and ebBP address similar problem domains, the divergent foci of the two enables them to be layerable - while WS-
CDL focuses primarily on the web service perspective, ebBP describes the pure business message flow and state alignment. As such they are not mutually exclusive.

4.2 Operation Mapping

One more notable aspect of ebBP v2.0 specification is mapping of Business Transaction patterns to abstract operations through the OperationMapping constructs (still work in progress) (ebBP 2006). An operation mapping specifies a possible mapping of a business transaction activity to a set of Web Services operation invocations to enable the participation of non-ebXML capable business partner in an ebXML relationship. An ebBP definition does not itself contain a reference to a WSDL file, but rather references to operation names which can be deferred with specific WSDL files specified at the Collaboration Protocol Profile (ebBP 2006).

The goal of the operation mapping is to offer a flexible mapping scheme to map all document and signal interchanges to any combination of Web Services operation interactions. The mapping is also designed to define an operation mapping on both sides of a Business Transaction Activity (BTA). BTA represents the performance of a Business Transaction within a collaboration and is similar to WS-CDL interaction. This means that the ebBP specification can be used to define the abstract behaviour of complex collaborations between Web Services even in the case where no role in the collaboration is capable of ebXML (ebBP 2006).

Barreto (2005) argues that WS-CDL and ebBP could be used in a loosely coupled, yet complementary manner, where WS-CDL supports the choreography based on endpoint references related to WSDL, while ebBP specifies the operation mapping to the recognized business transaction patterns. This association is beneficial and useful where complex activities occur in the collaboration environment.

If one or more parties wish to participate on the basis of one or more Web Service definitions the corresponding WSDL file(s) associated to the BTA(s) that is(are) representing the ebXML compliant party may be generated and may be referenced in the Collaboration Protocol Agreement (CPA) (Sachs 2001) if necessary. Guided by the Collaboration Protocol Profiles (CPP) (Sachs 2001) and CPA specifications the resulting XML document then may become the configuration file for one or more Business Service Interfaces (BSI), i.e. the software that may manage either partner's participation in the collaboration (ebBP 2006). This facility may be used not only in conjunction with the ebXML CPA but also with other configuration capabilities to enable the use hybrid ebXML and web services in business message exchange. We think that this principle of generated configuration artefact is also suitable to configure run-time operation our proposed business service handlers.

The concepts found in ebBP v2.0 specification, therefore, provide several benefits for mapping choreography contracts to the end-point implementations:

- There are clear signs and concrete steps to support Web Services at WSDL operations level. The use of run-time correlation and endpoint references based on emerging addressing mechanisms such as WS-Addressing, WS-MessageDelivery etc. is recommended.
- The ebBP operation mapping is designed to support not only Web Services but other implementation techniques as well.
- The ebBP v2.0 specification suggests flexible approach to operation mapping (and common contract enforcement, in turn) by allowing operations to be mapped both in collaboration description and the partner‟s endpoints.

Where the ebBP schema is used but the OperationMapping is not explicitly defined, the partners should manage the service mappings. Through a business service, the OperationMapping MAY also support Business Transactions defined in other than XML where different identification mechanisms are used. This allows the binding of service and business endpoints (ebBP 2006).

Therefore, ebBP (2006) serves as a blueprint for architecting choreography-based solutions in general, not only ebXML compliant systems. The ebBP specification is being created (or closely watched) partially by the same individuals as WS-CDL specification, which creates synergy between the two efforts. We took into account many ideas described in ebBP specification and this will greatly help in our future work on this topic.
5. CONCLUSIONS

In this paper we have introduced an approach to the issue of choreography support in heterogeneous peer-to-peer business interactions. We base our concepts on the assumption that service choreographies can be mapped to end-point operations using either rich service universal descriptions or end-point specific operation mappings. In both cases it is possible to derive programmatically the configuration artefacts, which can be used to configure business service handlers dynamically at the runtime. This possibility is attractive from many points of view, the most important perhaps being clean separation of business services interfaces and business services implementation.

Pluggable business service handlers can also be used for various other purposes – policy enforcement, trust and security support, collaboration correctness monitoring, QoS monitoring, transaction logging, etc. Choreography languages, such as WS-CDL can perhaps be enhanced to support declarative specification of the mentioned aspects for subsequent programmatic propagation of these specifications to the service endpoints and mapping to the end-point specific mechanisms.

These ideas make basis for future research in this area alongside with detailed design of the pluggable business handler framework, which is described in this paper at conceptual level and many decisions still need to be made. Standard operation mappings between choreographies and implementation languages such as Java, C#, BPEL are one of the main issues in this area along with rich service description and matchmaking problems. It is a promising sign that the ebXML BPPS specification takes into account these issues and drives the effort to solve them in standard interoperable manner, as support of the open standards is crucial for adoption of solutions.

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Short Papers
THE EFFECT OF A MANDATORY LAPTOP PROGRAM ON FACULTY MEMBERS’ SENSE OF COMMUNITY WITH THEIR STUDENTS

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ABSTRACT
The advent of the World Wide Web and the increased use of computers have allowed almost everyone to communicate with others electronically. This technology has also changed the face of higher education. Communication between professors and students, and among students, has potentially increased due to the ease and speed of exchanging information electronically. This study reviews the results of a pilot study that evaluated the perceptions of a group of university faculty about whether the presence of mandatory laptop usage by all students in a Midwestern university had affected their interactions with their students, possibly affecting their sense of community.

KEYWORDS
Electronic communication, faculty-student communication

1. INTRODUCTION
The use of computers in higher education has changed the way in which students and faculty interact. Students are able to ask questions easily and efficiently outside the classroom, contact a professor to set up meeting times, and explain absences and problems in a written manner which can be read somewhat at the convenience of the professor. Conversely, professors are able to share information with students by e-mailing individual students or by making handouts and assignments available on-line, e-mailing an entire class, and providing resources more efficiently than in the past. However, the presence of laptop computers during campus classes has led to both positive and negative consequences. This paper outlines the results of a survey done with the faculty in one college of a university in which every full-time student is required to have a laptop computer. The survey yielded mixed results in terms of the faculty members’ perceptions of whether this program had increased or decreased their communication opportunities with students.

2. REVIEW OF LITERATURE
Searching dictionaries for definitions of the term “community” yields various definitions, but all focus on a sense of unification. Definitions include “the people who live in a particular place or region and usually are linked by some common interests” (American Heritage Dictionary of the English Language, Fourth Edition, 2000), “a unified body of individuals: as a: the people with common interests living in a particular area; b: an interacting population of various kinds of individuals (as species) in a common location” (Merriam-Webster’s Dictionary of Law, 1999). Regardless of the exact wording, the implication is clear that this term implies a sense of unification and interaction.

A Google search of the World Wide Web for the term “web-based communities” yielded 3,580,000 hits on January 4, 2006. Again, the concept implies unification of people with common interests or characteristics. Additionally, the people in these groups are able to interact with each other by using the web.

For many reasons, the Web has the potential of facilitating communication among varying groups of people (Casey, 2001; Nixon and Jones, 2000). Costs of communicating online are miniscule compared to
airmail. Speed and ability to interact with individuals from any location have been greatly aided by the use of
desktop computers, laptop computers, and hand-held computers, as opposed to fax machines and other types
of transmission devices that were not easily portable or affordable to individuals. The ability to use a
computer to communicate with individuals around the world has become a commonly used skill by most
individuals in most countries around the world.

With this increase in the use of e-mail, instant messaging, and documents being sent to others by way of
e-mail attachments, communication among individuals has increased in both speed and frequency. Increased
communication often leads to an increased feeling of “community”—the sense of belonging to a group and
interacting with others of like minds. Many companies, such as the San Francisco-based eGroups company,
have offered a variety of web-based community-making tools such as private and public email lists,
password-protected Web sites, online meetings, and shared calendars (Kuchinskas, 2000).

Because of the acceptance of computer use in industry today, American schools at all levels have focused
on developing students’ computer skills. Standards have been developed regarding the level of education that
high school students in the United States should receive in terms of developing computer skills. By 2004, 49
states had adopted, modified, or referenced the National Educational Technology Standards (NETS) in state
secretary stated “The technology that has dramatically changed the world outside our schools is now
changing the learning and teaching environment within them.” (U. S. Department of Education, 2004).

Colleges and universities provide classes to help students develop technical skills in a broad array of
computer techniques, from creating documents to creating presentations to programming computers.
Computer competency is necessary not only for citizens to function efficiently on a personal level but also to
develop, advance, and succeed in their professional lives. (Orr, Allen, and Poindexter, 2001).

2.1 University program

Given that background, a university in the Midwestern United States instituted a mandatory computer laptop
program in the fall of 2000. The program began as a small pilot program in 1998, followed by a larger pilot
program in 1999. The mandatory program was phased in, starting with freshmen and sophomores in 2000,
and required at higher levels as those students moved through their school years. Initially, all students
received the same brand and model of laptop computer. By 2003, those students majoring in art and design
fields were issued a brand and model that is more commonly used in that field. However, communication
between all faculty and all students can be handled through common software programs. All full-time
students are required to rent laptops each semester, and troubleshooting and maintenance support is provided
by the university.

One key advantage to this system, which cannot possibly be overstated, is that EVERY full-time student,
regardless of socioeconomic background, has access to the same technology. At this point in our experience,
all incoming full-time students, regardless of class standing, are required to participate in the program.

Initially, the computer rental fee was a separate fee. This seemed to create two problems. One problem
was that students identified this fee as a separate but required fee, and many were uninformed enough about
technology costs that they thought the fee was unreasonably high. Considering that the fee included rental of
the machine, use of the software loaded onto the machine, and repair services, the fee is considered to be very
reasonable. Secondly, because it was separate, many grant and student loan programs did not cover the
computer rental fee. The university has since combined the fee as part of the tuition, which is reasonable now
that all students are required to participate in the program. This has removed the presence of a separate fee as
an irritant and has caused this fee to be covered by financial aid programs.

In the past, not all families, nor all students, had convenient access to computers. Distance issues, cable
access, and financial difficulties prevented some students from having daily computer access. That prevented
professors from being able to assume that their communications with students were being received in a
timely way and prevented them from requiring certain computer-related activities.

The presence of this technology on campus has changed the way in which professors can teach and
communicate with students. Professors now know that all students should be able to receive information
almost all the time, barring the occasional equipment malfunction. Through the use of WebCT, professors
can give and receive assignments via an on-line environment. Powerpoint presentations can be made
available for students to peruse during class or during their individual study times. Real-time chats and
asynchronous discussion boards are used in many classes for students to be able to discuss issues relating to
class. Both hybrid and totally web-based courses are increasing in number. A program has been developed
that allows students in at least one of the colleges to make on-line individual appointments with faculty in
order to receive advising regarding scheduling classes for the next semester. Another campus-specific
computer program allows faculty members to e-mail information to an entire class by simply using the course
sequence number as the address to which the e-mail is being sent.

Faculty have realized that this campus program has affected their teaching in what might be seen as more
negative ways also. Many now include a section on “appropriate use of laptops” in their syllabi, warning
students that web-surfing and instant messaging during class tend not to be behaviors that lead to student
success. These problems, however, are seen as minor in comparison to the gains that students make in their
comfort level in using technology and the ease with which professors can communicate with students.
Several professors who teach freshmen and sophomore classes forbid the in-class use of laptops at all
because they have found that most student at this level do not have the maturity to concentrate on class
material when the opportunity to instant message and surf is right at their fingertips. These same professors,
however, will notify entire classes via e-mail to bring their laptops to class on certain days in order to
participate in computer assignments during class.

2.2 Pilot Study

In an effort to gauge how the mandatory laptop program and its resulting change in campus culture has
affected interactions between students and faculty, a pilot program was done with the members of one
college of the university. Members of the business faculty voluntarily completed a questionnaire focusing on
their use of computer technology in their classes and in communicating with their students. A total of 19 out
of 27 surveys were completed.

The first questions focused on whether faculty reported they used the “class e-mail” function. Seventeen
faculty reported using this function. The number of times this function was used ranged from two to fifty
with a median of ten. Faculty who used this function were then asked whether they believed sending class e-
mails improved their communication with students. Sixteen faculty stated they believed so, and one faculty
member did not think so. Regarding the students’ performance, eight faculty believed sending class e-mails
improved student performance, five did not think so, and four were not sure or did not answer.

Faculty members were asked how many hours a week they spend interacting with individual students
electronically (e-mail, discussion board, etc.) The range of answers was from one half to twenty hours per
week, with a mean of eight hours.

All faculty then answered whether they thought that electronic interactions with students have improved
communication between the faculty member and his/her students, and whether they believed such
interactions improved the students’ performances. Seventeen believed that electronic interactions had
improved communication between themselves and their students; two did not. Eleven faculty members
believed that students’ performances were improved as a result of such communication. Five did not believe
so, and three did not answer the question.

Fourteen faculty believed that students meet with them less because of electronic interactions. Five
faculty believed that electronic interactions negatively affects their relationships with students. Five did not
believe these interactions negatively affect their student relationships; nine did not answer the question.

Faculty members were asked whether, excluding office visits, they would prefer to have students
communicate with them by phone or by e-mail. Seven of the nineteen responding preferred phone contact,
and twelve preferred e-mail contact.

Eleven faculty reported that they use the campus online appointment scheduler to allow students to set up
advising appointments. Four reported that the use of this scheduler increased the number of advisees who
meet with them, and four did not believe this had an effect.

3. CONCLUSION

There has been a significant change, as shown by the above data, in how faculty on this campus communicate
with students. Use of the required laptops and related software has allowed both faculty members and
students to increase their communication and contacts with each other. This increased availability, however, comes at a cost, especially to faculty members who are now spending up to twenty hours per week, as reported in this study, communicating electronically with students. Anecdotal evidence is that student expectations of faculty availability, their speed of response to students, and faculty willingness to communicate via e-mail have increased. It is highly likely, therefore, that faculty members are spending more time than ever before in actual dialogue with students, either as a class group, or individually.

Results from this study appear to yield mixed results. Of the seventeen faculty members who use the opportunity to send an entire class a course-related e-mail, sixteen reported a belief that doing so improved their communication with their students. Given the increased interaction between faculty and students, one could hypothesize an increased sense of community. It does not appear, however, that this practice affects student performance significantly. Only eight faculty members believed that such a practice improved student performance. However, given the lack of controls and the small sample size in this study, those results cannot be determined.

The divided opinions on the question of whether electronic interactions affect their relationships with students are interesting. Five faculty members agreed with a negative effect, five did not, and almost twice as many (nine) did not answer the question. This may imply an inability to determine what the effect may have been. Since unification around a common interest and interactions are the hallmarks of “community”, it is important to know what is actually happening here. Are electronic interactions replacing “the personal touch”? Is more or less communication occurring because of the electronic medium? Does the content and the particular discipline involved affect the outcome? Further research with more detailed questions and a larger sample needs to be done in order to determine more specific answers.

This research study is severely limited by being only a pilot study with a very small sample in one college of one university with a mandatory laptop program. However, it is likely that students in this college are somewhat typical in terms of how often and how students use computers to communicate with each other and with their faculty.

Further research needs to be done as the number of colleges and universities who require a mandatory computer program increases. The presence of such a program does seem to affect the behaviors and expectations of students, and definitely affects how faculty carry out their assigned duties of teaching and interacting with their students. While use of the electronic tools known as computers has assisted faculty in providing more resources to students, it appears likely, based on the results of this survey, that they have also increased the workload burden by increasing student access to faculty and student expectations of faculty response.

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COLLABORATION SUPPORT FOR BIBLIOGRAPHIC DATA

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ABSTRACT
In many research settings, bibliographies are a central resource for collecting information about related work, keeping track of the own research record, and annotating this information with remarks. By its very nature, this information should be shared between researchers within a research group and maybe in larger organizational units (for example research institutes) as well. However, most tools used for managing bibliographic data do not support collaboration. Using ShaRef, users can share bibliographic information, collaborate, and publish and export data using a variety of output channels. ShaRef's goal is to make sharing of and collaboration with bibliographic information easier than it is today.

1. INTRODUCTION
Research is based not only on innovation, but also depends heavily on knowing about other innovations and understanding the implications of these for the own work. Thus, research is a task which depends on knowing about other research, and in most cases today, this is accomplished by using bibliographies, which are often annotated with additional remarks. From the knowledge management point of view, bibliography management is the closest activity comparable to formal knowledge management that most researchers will ever practice [10].

Surprisingly, only few tools support collaboration and sharing with bibliographic data, most users today use stand-alone software tools, the most popular being BibTeX and EndNote. The Shared References (ShaRef) project’s goal is to build a tool which is open, supports document preparation with both LaTeX and Office/OpenOffice, and supports collaboration and sharing with bibliographic data. Additionally, ShaRef is targeted to be a building block within a general information management infrastructure, and thus is designed to cooperate with other applications, for example content management systems for integrating publication data, or publication databases for purposes such as collecting publication data for compiling publication lists for research groups, institutes, departments, or even complete universities.

In this paper, we concentrate on the aspects of ShaRef which are central for supporting communities of collaborating researchers, and the way they can contribute their information and knowledge to others. The relevant aspects are on the one hand ShaRef’s sharing and collaboration facilities, which are described in Section 4.1. These facilities allow researchers to jointly work with bibliographic data, thus aggregating information and knowledge about their particular field of expertise. In addition to this, Section 4.2 describes the ways in which the information can be published and exported, thus allowing people outside of the research community to benefit.

2. DATA MODEL
ShaRef uses a hypermedia-inspired data model [11] shown in Figure 1. While bibliographic data is represented using standard fields comparable to the Dublin Core Metadata Element Set [5], ShaRef also supports different kinds of relationships between references, and different ways to describe references.
Figure 1. ShaRef Data Model

Shadows and Cross-References are two different ways to reuse existing references. Shadows are a way to create a live link to an existing reference (comparable to Unix Symbolic Links), any changes in the original reference will be reflected in the shadow. A shadow can have additional annotations, but no other additional fields. Cross-References are a way to reuse parts of a reference, they are inspired by BibTeX’s crossref field, which is an easy way to reuse parts of a reference, for example a volume of proceedings or a book with articles by different authors.  

Associations describe semantic relationships between publications (i.e., the resources described by references), for example the fact that one publication is an updated version of the other. There is no built-in set of association semantics in ShaRef, but different user communities can define and reuse association types by using ShaRef concept of shared bibliographies. Keywords are a way to describe concepts, and keyword definition can be referenced from within references, or from within other keyword definitions. As with associations, there also is no set of predefined keywords in ShaRef, but different user communities can define and reuse association types by using ShaRef concept of shared bibliographies.

A Bibliography is a set of entries (which may be references, shadows, and association or keyword definitions), this concept is resembling a file in BibTeX or a database in EndNote. The concept of a bibliography is important in ShaRef because the bibliography is the unit of access management and control. Bibliographies have owners, writers, and readers, and access rights of users for a bibliography and the entries within it are enforced using the identity of a user and the access control information for this bibliography.

Finally, all bibliographies of a ShaRef installation constitute the so-called Database, and again this concept is important because it defines the limits of what references between ShaRef entries can address. Thus, it is only possible to reuse references and association and keyword definitions in the realm of one ShaRef database, everything outside of the database may be addressed as a Web resource with a URI, but is no longer part of ShaRef’s built-in data model.

Since ShaRef supports access management and control, it needs a way to identify and authenticate users. ShaRef uses a user and group management concept with a simple model where groups may contain groups, and this way it is easily possible to create any kind of structure which is required to control access to ShaRef data. Users may be identified and authenticated using a built-in mechanism, or by using an external service, such as an existing authentication service where people are already registered.

3. APPLICATION SCENARIO

A typical application scenario (and the setting the design use cases were based on) is a research group working on a particular topic. ShaRef in this case serves as the central repository for collecting publication data about this topic (both related work and the own publications). This publication data can be either
traditional bibliographic data (books, journal articles, conference papers, and similar forms of publication),
but it may also be data about Web resources, which in most cases simply have a URI and a title. In this case,
ShaRef also serves as a “centralized bookmark” repository, and the advantage in comparison to other
bookmark management software is that all ShaRef concepts such as associations and keywords can also be
applied to describing bookmarks, and that the bookmarks can be related to traditional bibliographic data (for
example, they can be associated with a book).

As a starting point, researchers can import their existing bibliographies into ShaRef, using its import
filters. They can decide to either put everything in a common project bibliography, or to keep personal
bibliographies and make these available to other project members. Additionally, available publication data
may be imported into the system, for a computer networking research group for example the Internet RFC
database, which is available as an XML document at http://www.rfc-editor.org/rfc.html. Using ShaRef’s open XML data model, it is easy to write an import filter transforming this information into
ShaRef data. After this transformation, this publication data can be imported into the system as well, and it
is available to be used in bibliographies or associations from other references.

Regardless of how the system is being used, the information and knowledge inside the ShaRef system can
be used for working directly with the system (browsing reference data, updating it, or inserting new entries),
but it should also be made available to others, such as in the following examples:

- **Reading Lists**: For new project members, people interested in the research group’s field, or scholarly
  activities, it may be useful to be able to create targeted reading lists. By creating a separate
  bibliography and populating it with shadows of all entries that should be part of the list, it is possible
  to create a list which is not a snapshot, but a live view of the research group’s bibliography as it
  evolves. New shadows can be added to the reading list whenever new references are found to be a
  useful addition to the list.

- **Document Preparation**: When creating documents, project group members may use different
  document preparation systems, and they will thus require different bibliography formats. These
  formats can be exported and then used for document preparation. ShaRef also allows to publish
  these bibliography formats, which means that it is possible to download the most recent version of a
  set of references at any time.

The reference information is stored in a central database and can be used using one of the available clients
(Java or Web-based are the current implementations), but it can also be made available through configuring
publishing channels, which publish the information through a URI. This makes it possible for any user with a
Web browser to access this information, and it can also be reused by applications retrieving the information
through a simple HTTP GET (this design is often referred to as an **HTTP Web Service**).

The latter possibility (the HTTP Web Service) can be used to re-use ShaRef data inside other systems.
Rather than exporting the data and copying it into the Web site (which creates redundancy and thus update
problems), it is possible to dynamically include the data from within ShaRef through the HTTP Web Service,
which can then be rendered as an integral part of the Web site.

### 4. SUPPORTING COMMUNITIES

The general design goal of the ShaRef system has been to support communities of collaborating researchers
in their activity of gathering, reviewing, and modifying information about scholarly resources. Since a new
tool cannot be expected to be used by everybody, the design has been made as open as possible, allowing to
include other users in the community as well.

This general design guideline is shown in Figure 2, which shows the two different ShaRef clients on the
left side (a Java-based and a Web-based client), and the two most important other scenarios where the
publication data can be used, which are Web browsers, and any applications processing publication data.

While the design has been centered around the idea of being non-exclusive, there are a number of
activities which can only carried out while staying inside of the system (i.e., on the left side of the figure),
and these are described in Section 4.1. Other activities, however, are possible without using the system itself.

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1. http://dret.net/rfc-index/ shows (as a ShaRef HTML export) how such a transformation of an existing publication database into the
ShaRef system can create an highly interlinked information repository.
(i.e., on the right side of the figure) but by only using data which has been produced by the system, and these activities are described in Section 4.2.

4.1 Sharing and Collaboration

Because the system should support well-defined user groups, it has not been designed to be an anonymous system. In order to assign access rights to data and to control the authorization of users to access data, it is necessary to introduce the concepts of access control and authentication as described by Tolone et al. [8]. To better support larger communities and groups of users, a user and group management and access control system has been designed and integrated into the system [6]. Using this component, it is possible to manage users, create groups of users, and assign access rights to bibliographies.

The unit of access control in ShaRef is the bibliography, it is not possible to use access control on a finer level (i.e., on bibliography entries). This makes the system easier to understand and easier to manage, but in some cases it may force users to split bibliographies for access control reasons only. The design decision was to accept these cases with the goal to create an easier-to-use system.

Since in many research settings users are already registered through some registration service, the authentication task can either be processed within the system, or by an external service. In this case, a user logging in to the system supplies the user name and the password, which are then forwarded to the external service. If the external service authenticates the user, this external authentication is accepted by ShaRef and no internal authentication is performed.

After a user has logged in, the identity is known throughout the session and can be used for access control. A user can be a member of one or more groups. Users and/or groups can be members of groups (cyclic structures are prohibited). The idea is that hierarchical structures of organizations can thus be easily reflected in the organization of the users and groups. Determining whether a user is authorized for some action is thus equivalent to testing whether this user is directly or indirectly (through group membership) authorized for this action.

Sharing of data is accomplished by assigning access rights to a bibliography which then can be accessed (in read or write modes) by the users and/or groups which have been granted access. Thus, it is easily possible to create personal bibliographies (no read access for anybody) or fully public bibliographies (read or even write access for everybody). Anything is between can be accomplished by using the user and group management features, and this usually involves some kind of coordinated setup of the group structure so that the required access structure can be implemented. By combining the user and group management facilities with the data model aspects of bibliographies and shadows, it is possible to setup many different scenarios.

Collaboration either takes place indirectly and synchronously by working with the same bibliographies, and in this case the collaboration’s goal is to evolve and improve the bibliography data. There also is a messaging feature which allows a more direct form of collaboration, allowing users to send messages to other users or groups. These messages may either be text messages, or they may contain bibliographic data, which can then be reused by the recipient in every way supported by the system, for example by exporting it.
4.2 Publishing and Exporting

The Web-based client makes it easy for users to use the system, but still requires users to log on and authenticate themselves, and then it provides the interface for managing bibliographic data. For some users, this may already be more than they want, or it may simply be too complicated to log on to the system in order to simply browse through some bibliographic data.

Through the publishing mechanism, data can be made available through a publishing channel, which is a dedicated URI where the publishing data can be retrieved. This publishing data can be retrieved at any time and is a live view of the bibliographic data inside the system. The publishing mechanism can be described as a sequence of three steps:

1. **What?** As a first step, it must be decided which data to publish. This is like a find function, it allows users to define the data source in terms of a bibliography and an optional filter.
2. **How?** After selecting what to publish, it must be decided how to publish it. This involves selecting the publishing format (XML, HTML, BibTeX, EndNote), and the options for this format.
3. **Where?** As the final step, the selected publishing format must be made available at a known URI. It is possible to either specify a URI (or rather a part of it, because the prefix is determined by the server name of the installation), or to let the system specify a URI.

Publishing of contents is a convenient way to let collaboration partners share bibliography data in the format of their choice. The only restriction is that this data is read-only data, because it is published through the system in the required target format, but any modifications of the data have to made within the system.

Another possibility for linking the bibliography data inside the system with the outside world are OpenURL [1] URIs. These URIs allow users to follow links into their preferred library catalog. They have to configure the prefix of their library's OpenURL server, and then can follow links from their ShaRef bibliography into this library catalog. On the implementation side, this is achieved by encoding the publication metadata, which is then received and analyzed by the library server. This makes it easier for users to use their personal data to find data in other systems, and in the same spirit we generate links to Google, which make it easy to search the Web for resources related to a publication's metadata.

5. DISCUSSION

In the following sections, we discuss related work, the contributions which make ShaRef an interesting candidate for cooperation in communities of collaborating researchers, and future work that we have in mind for future developments of the system.

5.1 Related Work

The ShaRef system as it has been presented in this paper is unique in its combination of features for bibliography management, sharing, and import and export/publishing. Since the most popular tools for bibliography management are single-user tools, a number of Web-based platforms such as CiteULike or free software such as JabRef or BibShare [3] have been developed. These solutions lack the authentication and access control features of ShaRef, which are essential in research settings where collaboration should be supported, but must be controlled. Targeting the same or similar ideas as ShaRef, commercial products such as RefWorks or Net Snippets are available. These solutions lack the open approach of ShaRef, which is based on an open and XML-based data model and has been designed to work in an open environment.

Apart from Web-based and free or commercial products, there are also a number of research projects which are targeting similar ideas. The ClaiMaker [9] system is more advanced in the area of how to associate publications (it has a built-in ontology which allows reasoning with these associations), but lacks the general usability issues such as easy integration into a heterogeneous environment of existing bibliographies. The Bibster [4] project focuses on formalizing semantics and a peer-to-peer architecture, but also lacks the features which would make it usable in a heterogeneous environment. The Hunter Gatherer [7] approach is not targeted at publication data but at excerpts of Web pages, but it focuses on the question of how people work when interaction is introduced in the information gathering process.
5.2 Contributions

The main contribution of ShaRef is the combination of features which make it a useful addition to a general infrastructure of knowledge tools within organizations. The user and group management concept can be used to reflect organizational as well as task-oriented groups, and thus enables users to form communities that they find useful for information sharing. Deploying ShaRef inside an organization in most cases requires some form of configuration and customization, and the open XML-based design is ideally suited to accomplish this by allowing new transformations of import and/or export/publishing formats to be supported by the system.

5.3 Future Work

One area of improvement would be a full API through a Web Service interface such as WSDL/SOAP, which would expose the publishing interface. Currently, publishing has to be configured through the Web-based client, and the HTTP-based Web Service can only be used to retrieve the data being published. Depending on requirements from other applications, such an interface may be added in the future.

6. CONCLUSIONS

The ShaRef system has been designed to support groups of collaborating researchers. Its primary task is the shared management of publication data, and this is accomplished through a data model of access-controlled bibliographies. The goal of the system design is to be non-exclusive, which is implemented through an open XML-based data model, supporting import and export of other formats. Furthermore, the export and publishing features allow users which are not using the system itself to reuse the system’s data in other applications, for example in document preparation systems.

Apart from the above features, the system also supports scenarios where data need to be reused in different contexts, such as the management of publication lists in organizations, and the reuse of publication data for different activities, for example reading lists for lectures or courses.

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THE REALM OF THE GAME GEEK: SUPPORTING CREATIVITY IN AN ONLINE COMMUNITY

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ABSTRACT
This paper explores the importance of online communities designed to support the creativity of tertiary students enrolled in Computer Science studies. Online discussion forums provide university students with a supportive and nurturing environment and a community where they can share knowledge and ideas. The authors draw on findings derived from a study of first year Computer Science students enrolled in a Games Design and Development unit. Of particular interest is the ways in which the participants develop and control the environment in order to enhance their own creative expression.

KEYWORDS
Games culture, online communities, games technology, creativity support systems.

1. INTRODUCTION
This study explores the development of on-line communities amongst computer science students (enrolled in a games design and development stream) at a tertiary level. Specifically, the aim of this study is to demonstrate the ways in which online communities developed for, and by, the participants, nurture and support those whom have been traditionally marginalised as “geeky” and “anti-social”: games students (herein referred to as ‘game geeks’ – with their permission!). In addition the study discusses the function of those online communities as not only supportive of the social and cultural needs of the games geeks, but also as a key agent in enhancing the intellectual needs of the students via the establishment of creativity support systems (CSS). The authors anticipate that this study will demystify the prevailing myth of the game geek as an anti-social creature incapable of communicating. Games geeks readily adopt and adapt to the online discussion environment as they feel both comfortable and in control. An on-line environment offers a high degree of security for the games geek as it is an environment with which they are both familiar and often knowledgeable. Such an environment is therefore an excellent space for developing and enhancing the skills with which they may have less confidence. As a highly supportive and nurturing social environment the online community also functions as a facilitator for the games student’s, hitherto latent, creativity.

2. ONLINE DISCUSSIONS: GAMES GEEKS SET THE AGENDA
As Sheard and Carbone argue, the eager uptake of the Internet has seen a major shift in the way people interact, thus leading to the development of online communities (Sheard and Carbone 2004). According to Vesna, the aim of any online community is to facilitate the advancement of social consciousness and collective intelligence (Vesna 2004). Vesna (2004) suggests that the qualities a person requires to form an online community are: a need to connect, a willingness to collaborate, and the ability to embrace the fact that the work may change form and be re-appropriated in the process (Vesna 2004 pp 249). The aim of online communities is often centred around a specific topic and some online discussions are advertised on the basis of the topic for discussion (Sheard and Carbone 2004). The online community in this study is an online discussion forum that is located within the online learning facility provided by Deakin University in Victoria,
Australia: Deakin Studies Online (DSO). This online discussion facility is usually mediated by the unit leader, an academic, and confined to discussion of unit-relevant topics. Each discussion is made available to students from the start of the university semester, and is predominantly used for a period of 13 weeks, whereupon the unit ceases and the students start discussions again in a new unit. However, in this study, the games students’ online environment comprises open discussion where collaboration with both peers and staff is actively encouraged. This sharing of both the production and dissemination of knowledge was encouraged between students and staff in the online discussions, as a means of offering the students a sense of agency not generally experienced within the university’s online facilities. Furthermore the determination of the discussion agenda was left to the students. When permitted such a level of agency the students maintained high levels of contribution in the online discussions. Further evidence of this is discussed in a recent study by the authors: ‘Game Geek’s Goss: linguistic creativity in young males’ (Blashki and Nichol 2005).

2.1 Online discussions as a creativity support system

According to Mace, creativity manifests in four components: person, process, product and the environment (Mace 1997). Of these four, the creative environment (in conjunction with IT) is the focus of this research as it has the potential to engage with, and encourage, the latent creativity of game geeks. Creativity, particularly in conjunction with the design and application of information technology (IT), is gaining momentum in research. Known as creativity support systems (CSS), the IT aids creativity by supporting the user rather than emulating creativity (which is the domain of artificial intelligence). It is important to note that the emphasis is firmly placed on the supportive aspects of a CSS as the focus of this study is not the development of software or hardware incorporating creativity, but rather a largely non-cognitive approach. Shneiderman (2000), Candy and Edmonds (2002) and (Csikszentmihalyi 1996) similarly suggest that creativity support systems should enable collaboration with peers, mentors and teachers. In this study the online discussion forum available to the games geeks comprises the CSS. The benefit of a computer-based CSS for games students is that they are particularly receptive to online communication and subsequent development of an online community. Based on work by Ekvall (1999), Prather and Gundry (2003) and (Lauer 1994) and out of own research into CSS (Blashki and Nichol 2005) the following factors are particularly conducive to creativity: freedom, challenge, conflict, debate, idea support, tolerance for uncertainty and ambiguity, trust and openness, idea time, playful humour, sufficient resources, supervisory arrangements, and work group supports. By harnessing the right factors in the environment there is a strong potential role for online communication and collaboration to support creativity in games students.

3. RESEARCH ENQUIRY

The participants of this study are tertiary level games students, both male and female, who are currently enrolled in the games design and development stream at Deakin University in Victoria, Australia. Two units within the games stream, Games Fundamentals and Audio Visual Elements of Games are the focus of the study, and where the participants of the study were gathered. The participants’ involvement in the study was voluntary and all participants are over the age of 18. The methodological approach used in this study was carefully selected to reinforce the pedagogic philosophy within the games units being taught. Overall the methodological perspective is qualitative however, it was imperative that we shared the power of the knowledge production with the game students being researched. Equal value was accorded to the postings of all participants whether student or staff. Within such a methodological framework, emphasis was not just on the description, understanding and explanation of the group behaviour, nor on the knowledge produced or the methodology employed in gathering the data but rather, on who determined the discussion agenda in the first place (Blashki and Nichol 2005). Such a methodology thus advocates the replacement of existing forms of social organization within a University environment. Whilst clearly, data/evidence has been collected it emerges from the experiences of the participants. This project’s epistemological foundations are thus not to be sourced in inevitably negative contrasts with quantitative frameworks. Whilst reliability, replicability and universality may be the hallmark of quantitative research, such terms have little applicability in this project. It is however, genuinely “scientific” in its emphasis on careful observation of the behaviour of the participants as they manage to effect and manage change within their own social milieu.
4. RESULTS AND DISCUSSION

The games students under study in this research were enrolled in 2 units comprising of; Games fundamentals (1st year level, 1st semester) and Audio Visual Elements of Games (2nd Year, 2nd semester). For the unit Game Fundamentals, out of 295 students, a total of 48% or 143 participated, as shown in figure 1. For the unit Audio Visual Elements of Games, out of 90 students, a total of 24% or 20 participated, as shown in figure 2.

Figure 1. Student participation in games fundamentals unit

Figure 2. Student participation in audio visual elements of games

Enthusiasm for the Games Fundamentals unit in 1st semester was exemplified by the record number of messages posted in the first two weeks of the unit in the online discussions topics. Figure 3 shows the level of contribution by students in a number of different discussions in Games fundamentals.

Figure 3. Student posts by number of each topic

From figure 3 it can be seen that the most ‘popular’ topics were; games discussion area, favourite game and students talk (1st semester). All three areas offered students unrestricted access and use and this was reflected in the plethora of discussions created by the students. In the games discussion topic alone, some of the discussions included: females and gaming, games sales, best game of all time, gaming systems, unique/underrated game play, favourite puzzle game, and the games convention to name a few. A total of 29 topics were created in this area alone. Of particular note is that students initiated all discussion threads. The staff interjected at various times however, the substantial input and flow of the discussions were by the students.

In line with the methodological approach of this study, the staff shared the roles of dissemination of knowledge and the determination of the discussion agenda with the students and on more than one occasion acquired new knowledge from the student participants:

“Noob or Newb is gamer speak for someone who is new to something and is being picked on by leet (1337) players that think they are too good to explain the working of the game to them”

This example was in reply to a staff member’s confusion when referred to as a “newb” in the online discussion. Figure 3 indicates the high number of posts for each topic of discussion. Furthermore, within each topic thread there was a complex branching of topics and high levels of interaction between participants. The
sense of community established, and the ability of that community to aid in the expression of creativity amongst the students, can be broken down and expressed via the 12 components of a creative environment. The factors are presented here, however in the online communities each factor is embedded and inextricably bound up with, the others.

4.1 Freedom

In the online discussion forum, and as described in the methodological approach, freedom is the independence of the members of the community in setting of the discussion agenda. Furthermore, the initiative to acquire and share information (sharing the power of knowledge production) needs to be apparent in a creative environment, and the online discussions facilitated this:

“Just curious as to which game everyone is going to choose for assignment 1? I’m most likely going to go for World of Warcraft, for the simple reason, I wouldn’t be able to stop playing it enough to be able to play another game for a long enough time to analyse. LOL. What bout everyone else?”

From this post, students debated their selection of topics for assignment 1 and benefited from the debate by refining the scope of their assignments. Freedom, as exemplified in the online discussion and the methodological approach, is a key factor in establishing the creative environment for the games geeks. Ekvall (1999) concludes that if there is too much control and restraint the environment quickly becomes “boring” and “irrelevant” as was expressed anecdotally by the students in a comparison with other units where they did not have the same freedom.

4.2 Challenge

Challenge arises in many forms and is often associated with the work under consideration within the creative environment. Challenge as defined by Ekvall (1999) offers a sense involvement in the community and is advantageous for any creative endeavour. In the online discussion under study, the topic of ‘Females and Games’ provided an area of challenge for many of the students. With a large majority of the geek cohort comprising of males, the presence of a few strong female voices intensified the debate on females and games:

“It’s probably accurate that the majority of ‘gamers’ are men, but there are lots of reasons for that beyond ‘chicks don’t play games’”

One of the female students challenged the males of the geek cohort to think of an idea for a game that encompasses the interests of both genders:

“Animal Crossing?”

“Animal Crossing... LOL, before 5 mins of play, but not after”

Interestingly, the female’s rejoinder was met with acquiescence and a further attempt to satisfy the demands of the challenge. After much discussion, the conclusion was reached by participants in the thread that games should be directed to genre types rather than dictated by the needs of gender, which students (uncannily) felt were arbitrary divisions that were unhelpful in determining a person’s game style or preference.

4.3 Conflict and debate

Conflict is inevitably integral to the maintenance of both freedom and knowledge production in an online community and the creative environment, as conflict often results in the discovery of creative ideas. Constructive conflict is often noted as debate in the online community however conflict may also be regarded as destructive to a creative environment, particularly if personally directed. This occurred on some occasions in the online community of games geeks:

“...you need to detach you eyes from your monitor and go outside”

However, such comments are often replied to with humour and a gentle rebuff:

“Are you aware of the irony in telling me to go outside via an online bulletin board?”

Debate in any setting is common and often started due to conflicting viewpoints, ideas and differing experiences and knowledge. In an environment of high debate all voices should be heard, and ideas enthusiastically put forward (Ekvall 1999).
4.4 Idea time/ support

A creative environment should allow time for elaboration of ideas. At the moments when ideas are rife, the environment support the discussion and testing of those ideas. (Ekvall 1999). In the online discussions, idea time occurred on many occasions and often without staff intervention. “Idea support” determines the ability of an environment to support ideas in a positive yet constructive way. Staff and peers both have a role in idea support. It need not be conspicuous or overt and may be as simple as references to something a person has done. For example in a linguistic game of verbal sparring, a winner was referred to as “cool”:

“how did it start off at SIF!!!!!!!!!!!!
and end up with ROFLcopter
SIF change phil’s topic LOL
though ROFLcopter is cool”

4.5 Trust and openness and playful/ humour

Definitive explanations of trust and openness within an online community are notoriously difficult to measure. However, the balance between the provision of trust and openness, whilst also supporting conflict and challenge within the same environment presents certain the maintenance of both stability and creativity. Playful and/or Humorous discussion in an online community is essential to maintain the sense of collaboration and co-operation. Playfulness and humour are key facilitators of creative ideas (Ekvall 1999).

On many occasions in the online discussions, playful behaviour was used:

I missed my first lecture and people are talking about WoW....like wow... I don’t have the game but it sounds really good...well I’m just playing solitaire but I think it’s the most exciting games...*jokes*”

Furthermore, the students instigated humour on many occasions. One student in the student talk of semester 2 started a thread parodying academic titles, beginning with ‘Dr > Professor’.

Imagine this... your sitting in a theatre enjoying your favourite opera...and then the leading lady drops...and someone yells out...Is there a Doctor in the house. Dr Hobbs rushes to the stage and performs his magic and she is saved. Now imagine a scenario where they call for a doctor and Prof Blashki runs on the stage...The woman dies...Professors should not perform surgery”

The joke receives a reply from the Professor relating a humorous story designed to entertain the thread participants even further. Interestingly, the Professor’s reply, and attempt to participate in the parody of academics, was met with;

I worry about your level of maturity Kathy

4.6 Sufficient resources

Sufficient resources covers a broad range of issues, and in a creativity support system it can often refer to the hardware, software and peripherals available. However in this study, sufficient resources are defined as the availability of the online discussion forum to the students. In addition, within the discussions students readily listed relevant, funny or helpful links to information they had found on the Internet.

4.7 Supervisory arrangements and work group supports

In a creative environment a supervisory presence as well as peer support is beneficial, as it allows students to connect with staff in such a way that assists in the facilitation of the online community and building of relationships between peers to build the community. In this study the supervisory arrangements between students and staff resulted in a different type of relationship. Sharing the power of knowledge production is a concept reinforced in both the research and by the staff involved in the project. Not only does collaboration with staff and peers form the online community, the use of the English language also established norms within the community. Online communication such as leet speak and hacker lingo were not adopted in a serious sense, however it was often used by both staff and students as a form of irony or parody of the community itself (Blashki & Nichol 2005). Of particular importance is the type of support received from staff and peers as this encourages feelings of trust and openness within the group.
4.8 Limitations of the current online community for games geeks

The online discussions for the games geeks inevitably suffered from the limitations of the forum’s location within the university setting. For example after a 13-week semester the online discussion effectively ceases to exist. This results in relationships, trust, openness and many other factors that might hinder a student’s contribution, requiring initiation all over again for a new semester and a new unit. However, there are benefits to the discussions beginning and ending with each semester. Each semester of new discussion allows for new members to enter the discussion at the same level as other students, even if some students have discussion links from the previous semester. This assists in reducing hierarchies of knowledge production. Furthermore, it also compels the discussion threads to move direction. From the results collected in this study, a large majority of students who contributed in the 1st semester’s online community, also contributed to the 2nd semester, thus the games geeks community was maintained during the semester changeover. Whilst a discussion of the effects of the abrupt cessation of discussions (and thus support) from each semester is not within the scope of this paper, clearly time-tabling human communication does have an effect on the online community of students. Indeed, one of the difficulties encountered was a growing division, exacerbated by both the geographical and time distance that split the community into two factions. It was evident that each campus-centric group was fiercely loyal and supportive to both the members of their group and interestingly the staff member who had taught them, but equally as dismissive of the other group and their staff member. This was quickly recognised and after one particularly heated on-line confrontation the teaching allocation for the following semester was altered to ensure that each campus had exposure to different teaching staff.

5. CONCLUSION

The socially marginalised game geek is encouraged to actively participate in creative communication processes when immersed in a supportive and nurturing on-line community. The support of the games geek’s creativity is achieved indirectly via the environments, as the 12 factors of the creative environment have illustrated. This study of game geeks could be further applied to meet the creativity needs of other traditionally technically oriented students. Future work for this study includes research into the University discussion forum facility, and in what ways the technology may be improved to offer greater support for students, in order to harness and apply their latent creativity.

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PEER-BLOG-PEER: THE SWISS KNIFE

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ABSTRACT
Web-based support for teaching requires appropriate backing for identity, communication and collaboration. This paper assesses widely available approaches for teaching support, namely, personal web pages, computer-mediated communication, wikis and blogs along these three dimensions, and argues that blogs communities based on P2P architectures offer the potential to fulfil these requirements.

KEYWORDS
EduBlog, Peer-Blog-Peer, teaching, P2P network, blog based collaborative communities, information sharing

1. INTRODUCTION
Blogmania is percolating all around, and teaching has not been an exception (Roberts, 2004). Blogs are catching on among students, and lecturers are considering moving their Web content from HTML pages to posts in a blog. This paper provides some insights on the adequacy of blogs as a teaching medium, and argues that blog communities based on P2P architectures offer the potential to match most of the requirements for teaching.

To sustain such statement, distinct web-based approaches have been compared. Specifically, personal web pages, computer-mediated communication, wikis and blogs are evaluated in their support to identity, communication and collaboration. Similar comparisons have been conducted by other authors. Peter Baumgartner (Baumgartner, 2004) has compared blogs with other kinds of content management systems (CMS) from a pedagogical perspective. Susan C. Herring (Herring et al., 2004) places blogs in between standard web pages and asynchronous computer-mediated communication (CMC) where the comparison is stated in terms of symmetry of communicative exchange and multimodality. Similarly, Elmine Wijnia (Wijnia, 2004) states that blogs forms a bridge in the spectrum of communication channels on the internet between traditional web pages and an internet forum. All these authors conclude that blogs have special properties for learning and communication.

The rest of this paper is organized as follow. Section 2 introduces the evaluation framework, which indicates the relevance and gradations on the notions of identity, communication and collaboration. This evaluation framework is then used in section 3 to compare popular teaching-support tooling such as personal Web pages, CMC, wikis and blogs. This comparison serves to argue the need for P2P architectures based on blogs. The conclusion section ends this paper.

2. THE EVALUATION FRAMEWORK
Based on our own experience as lecturers at the university, the teaching medium can be characterized as follows:
- Eminently personal. Based on some general guidelines set by the government, the teacher is free to decide the contents of the syllabus.
“Social-intensive”. An intense social interaction occurs either on a communicative or collaborative level among students (both in classrooms and tutorships), teachers (teaching & research seminars) and external institutions (interchange programs, courses).

"Knowledge-intensive". Abundant documentation is distributed, classified and assimilated during the teaching process.

Matching these characteristics requires distinct technical enablers. Specifically we focus on three key aspects: identity, communication and collaboration.

**Identity** refers to those features that differentiate a person from others. Likewise, identity is how others perceive people, and which includes concepts such as reputation and behavioral transparency. The Virtual Identity influences the interactions taking place in Virtual Environments (Nabeth, 2005). The identity dimension is graduated as: **Anonymous**, **Alias** (pseudonym that do not identify the individual), **Name** (minimal personal information), **Personal Profile** (detailed personal information).

**Communication** is the transmission of information among one or more publishers and one or more recipients. Communication patterns include: **Allocution** (flow of information from a centralized unit that controls the information towards a group of decentralized units), **Consultation** (a centralized unit offers the information and the decentralized units decide which information consult), **Registration** (the decentralized units can produce the information that gathers a central unit), **Conversation** (exchange of information among decentralized units) (Dijk, 2001) (Wijnia, 2004).

**Collaboration** involves the joint accomplishment of a certain task. Collaboration models include **Library** (a place where materials are being used frequently), **Solicitation** (which involves requests from a small set of requestors and multiple responses from respondents), **Team** (to facilitate the activities of a team at the development of a task or product), **Community** (to facilitate the activities of a community to share information), **Process Support** (use of technology to automate a process or workflow) (Shelhammer, 2002).

This set our comparison framework along the identity, communication and collaboration dimensions.

This framework is used to evaluate some of the most popular approaches for teaching support, namely,

- Personal web pages, where the lecturer builds the publishing infrastructure from scratch in a personal way. Nowadays, web page generators simplify the administrator work.
- Computer-mediated communication (CMC) facilitates communication among users by using text message interchange (Stafford and Gonier, 2004). Despite their functional differences, forums, news, chats, e-mails, etc., can be classified within this category.
- Wikis, where the web page itself is the means of collaboration. The changes are registered and immediately reflected on the web page. These modifications can be compared among them, reedited and, even, rejected. The best known example is the Wikipedia encyclopedia (Wikimedia, 2005).
- Blogs, which collect entries or post that gather opinions from the blogger (editor of the blog), related commentaries that have been sent by other participants (readers of the blog) and trackbacks (links to other blogs) (Williams and Jacobs, 2004). Posts can be archived and retrieved by publication date or by category. Blogs used for educational purposes are known as edublogs. For an introduction to this subject see (Orihuela and Santos, 2004) (Lara, 2005).

### 3. TOOLS COMPARISON

This section arranges personal home pages, CMC, wikis and blogs along the comparison framework established in the previous section. The outcome is shown in table 1 where the last column indicates which requirements must fulfil an ideal tool.

#### 3.1 Personal Home Page

Quoting Daniel Chandler (Chandler, 1998), personal home pages are online multi-media texts which address the question, ‘Who Am I?’. In general, a lot of personal information is provided: name, biographical details, personal qualities, interests, hobbies, friends, etc. In these sense, **Identity** is a **Personal Profile**.

The author publishes the information on the web page whereas the readers decide which information to consult. Therefore, in this case, **Communication** could be classified as **Consultation** (Wijnia, 2004), and
**Collaboration** as Library. Some web pages offer the possibility of filling forms to evaluate them. Hence, it enables a Solicitation kind of Collaboration.

### 3.2 CMC

The CMC is essentially communication based on text messages and supports bidirectional symmetric communication. The type of **Identity** in CMC is Alias because the user is usually identified by an alias or e-mail address, but sometimes Anonymously too. **Communication** is classified as Conversation (Wijnia, 2004). On the other hand, **Collaboration** is Community since there is an exchange of information.

### 3.3 Wiki

The objective of wikis is to develop a web page by allowing anybody to check or to modify the contents. A discussion area is available for opinion exchange about the proposed modifications. Thus, **Collaboration** is of a Library, Solicitation, Team and Community type (Campanini et al., 2004).

**Communication** is Consultation, since it is possible to check the contents, and Registration, because the contributions received are saved.

Finally, participation may take place Anonymously, by means of an Alias, with a Name, or with a Personal Profile.

| Table 1. Arranging tools along the identity, communication and collaboration dimensions. |
|----------------------------------|------------------|----------------|---------|----------------|
|                                 | Personal Web Page | CMC            | Wiki    | Blog            | Requirements |
| **Identity**                     | Anonymous        | X              | X       |                 |              |
|                                 | Alias            | X              | X       | X               |              |
|                                 | Name             | X              |         | X               |              |
|                                 | Personal profile | X              | X       |                 | X            |
| **Communication**               | Allocution       |                | X       | X               |              |
|                                 | Consultation     |                |         | X               | X            |
|                                 | Registration     |                | X       |                 | X            |
|                                 | Conversation     |                | X       |                 | X            |
| **Collaboration**               | Library          |                | X       |                 | X            |
|                                 | Solicitation     |                | X       |                 | X            |
|                                 | Team             |                | X       |                 | X            |
|                                 | Community        |                | X       |                 | X            |
|                                 | Process Support  |                |         |                 | X            |

### 3.4 Blog

Blogs are mainly personal. Such is the case of teachers’ blogs. The blog shows the Personal Profile and reflects the personality, the interests and the training of the blogger. Readers can only write comments on the post.

Wijnia (Wijnia, 2004) classifies blogs as enablers of a Consultation, Registration and Conversation communicative type.

With regard to the **Collaboration**, blogs are consultative and therefore, support the Library type. On the other hand, the blogger could invite readers to contribute with comments by creating Solicitation collaboration. Efimova and Fiedler (Efimova and Fiedler, 2004) concluded that blogging has social effects like community-forming.
4. BLOG BASED COLLABORATION COMMUNITY

As shown in table 1, blogs fulfil all the Identity and Communication requirements. However, they fail in the Collaboration dimension. Blogs fulfil more requirements than CMC and Personal Home Pages, but they are not as good as wikis for Collaboration.

Despite this weakness, blogs have the potential to adjust better to the teaching work. Baumgartner marks (Baumgartner, 2004) two important properties. First, blogs are the only tools which are mainly oriented to the subjective world of the learner. Remember, the teacher is forced to be a learner in his/her lifelong learning. Secondly, blogs have the inherent tendency to cross the boundaries of the teaching environment as they organise the discussion across a network of linked websites. This unstructured network emerges on the web. Efimova and Fiedler (Efimova and Fiedler, 2004) reported that the simple distribution of knowledge published on blogs leads to association and the emergency of learning networks.

In order to adopt blogs as teaching supporting tools, their Collaboration dimension must be improved. In this sense, blogs must have functionalities to structure the collaboration network and in this way to obtain Team and Process Support type Collaboration.

To this end, a first approach could be to leverage current blog infrastructure with chats, file sharing and other similar tooling. A similar undertaken was conducted in (Vogel et al., 2004) to enhance e-mail clients as a collaborative tool. However, this will defeat simplicity, a hallmark for blog practitioners.

An alternative is to create blog nets, combining blogs with P2P information exchange architectures in order to take advantage of their qualities. According to Milojicic (Milojicic et al., 2002), collaborative P2P applications aim to allow application level collaboration among users. The inherently ad-hoc nature of P2P technology makes it fit for user-level collaborative applications. These applications range from instant messaging and chat, to online games, to shared applications that can be used in business, educational, and home environments. P2P will continue to be a strong alternative for interoperability, scalability, anonymity, and fault resilience requirements.

By combining blogs with P2P architecture, a new tool is obtained: Peer-Blog-Peer. This new tool combines the advantages of both approaches. From the blog side: Individual interest of the blogger, Asymmetric interaction, Publishing information and Content management. From a P2P perspective: Group interest network, Symmetrical interaction among peers, Information exchange and Distribution protocol.

Peer-Blog-Peer could enable the following functionalities:

- Creation of virtual communities of collaboration. Teachers who want to collaborate could agree for sharing a post.
- Posts distribution. The shared post would be distributed among the blogs of the virtual community. The shared post would be the element of common work.
- Posts synchronization. When a shared post is modified in one of the blogs, the post is simultaneously distributed to the other blogs of the community.

Physically every blog would have a copy of the post, although they would virtually share the same post. This enables Team collaboration. The automation of distributing and synchronizing a post is an example of Process Support collaboration.

5. CONCLUSION

Based on the current popularity of blogs in academic environments and the current tooling for teaching support in the Web, this work argues for promoting blogs not only for content dissemination, but also for collaboration. A synergy between blogs and P2P architectures is proposed, which foster blog-based collaborative communities. Currently, Blojsom (Blojsom, 2005) is being modified to support these communities that will permit blog posts to be shared and synchronized automatically.
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MEASURING THE AFFECT THAT PLACING LECTURE NOTES ON THE WEB HAS ON LECTURE ATTENDANCE

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ABSTRACT
There is concern among many third level lecturers that placing their lecture notes on the web will cause attendance at their lectures to fall. At the same time, there is an increasing pressure on third level lecturers to place at least some lecture content on the web. This paper shows that there is nothing to be feared by placing lecture notes on the web. Having lecture notes on the web does not affect student attendance at lectures. In addition, the vast majority of students believe that having their lecture notes on the web is most useful when used in conjunction with class attendance. The ability to place lecture notes on the web should be viewed as just another tool that can be used to help lecturers to perform their job.
This paper is based on data collected from surveying 404 2nd year computing undergraduate students over the six year period from September 1999 up to June 2005.

KEYWORDS
elearning webnotes

1. INTRODUCTION

1.1 Why Class Attendance is Important

Lecture attendance is important because it supports learning. Lecturers elaborate on important or difficult topics, work through examples and refer to relevant information that is not contained in their notes. As a result of this, class attendance ensures that students properly understand the content of their notes.

Students who attend lectures get to contribute to discussions, ask questions and listen to the various comments that their peers and lecturer might have. This enhances the student’s subject content retention ability and improves their critical thinking skills.

By attending class, students get to know their lecturer's perspective on course material. This gives them an advantage when answering examination questions that are both written by and corrected by their lecturer.

By attending class, students get to know their lecturers. At a later stage in their studies, it is easier for students to approach lecturers who taught them. The same lecturers are more inclined to act as project supervisors and to offer general academic, career or life guidance to students they know. On an individual level, many lecturers become role models for students they have taught.

For most students, college represents the first opportunity for them to be fully in control of their own lives. Regular class attendance requires discipline, effort and good time management. These are crucial life skills that all people need to develop if they are to be successful.

Lectures help lecturers identify which topics students are finding easy and which topics they are having difficulty with. Feedback from lectures enables lecturers to make appropriate adjustments to their lecture content and presentation style so as to achieve the best learning outcome for their students.

Lectures help lecturers identify which students are struggling with course material. Spotting weak students early affords lecturers the opportunity to take timely remedial measures to help improve these
students’ course performance. The earlier that intervention occurs, the greater the chance is that the lecturer will be able to successfully help a weak student.

1.2 Literature Review

Student attendance is important. This fact has been well researched. Early studies, such as (Jones 1931) and (Anikeeff 1954) found that high a level of class attendance was directly linked to high student grades.

More recent studies, such as those conducted by Ledman and by Clump et al, also found that class attendance has a significant affect on student grades. Ledman got his students to take unannounced tests on course content, which the students had not studied for (Ledman 2002). Ledman found that the students who had a good class attendance record performed better in the unannounced tests than did the students who had a bad class attendance record. Clump et al researched both the short and long term affects that class attendance has on student examination results and found that attendance has a significant affect on grades (Clump et al 2003). Clump et al support the root argument of this paper, stating that, “Even in the era where students can gain immediate access to course information, student attendance remains essential for success in a course”.

Too many lecturers are eager to blame external forces as being the major cause for students failing to turn up for their classes. The evidence suggests otherwise. Gump shows that students are motivated to attend lectures if they find the lecturer or the material interesting (Gump 2004). When lecturers show real interest and excitement for their subject, this is usually reflected in their students’ level of enthusiasm for the subject. Fjortoft also showed that the attitude of lecturers, together with the timing of project deadlines, are two extremely important factors that impact on student attendance (Fjortoft 2005). Van Blerkom reported similar findings. He found that students most frequently miss classes because they need to complete other course work, find the class boring, are ill or have social obligations (Van Blerkom, 1992). Although colleges cannot stop their students from being ill (students tend not to have any control over this either) or having weddings to attend, they do have control over assignment deadlines. In addition, individual lecturers have control over how they present their subject to their students. The above evidence suggests that lecturers placing their notes on the web, will, in itself, not negatively affect class attendance. By simply putting lecture notes on the web and continuing with classes as before, lecturers should not see a fall in class attendance. However, by using web notes in such a way that it makes their lectures more interesting could result in an increase in class attendance. There is nothing to lose and plenty to gain for lecturers who put their notes on the web.

Most students believe that class attendance is important. As part of a study on the affect that web based course delivery has on examination results and student satisfaction, Woo and Kimmick split students into two control groups; one taught using traditional lectures and the other taught using web based material (Woo and Kimmick 2004). Although they were not required to attend lectures, 73% of the students in the web based course delivery control group choose to attend at least 3 of the 10 lectures in the study. Merry and Ritzer found that only 8% of students believed that getting second-hand lecture notes from a missed class to be as useful as attending the actual lecture (Merry and Ritzer 2001). The students who thought that getting notes from a friend was as good as attending class tended to have significantly lower grades than the students who believed that attendance was more useful than second-hand notes. In the same survey, the majority of students stated that they believed there is a significant correlation between class attendance and examination results.

Students who do attend lectures often have difficulty transcribing and organising their lecture notes. This can lead to feelings of not understanding the subject, which in turn leads to student absenteeism (Elliot and Manford 2005). Various note-taking methods have been suggested to help students transcribe and organise their lecture notes. The most universally used note-taking method is the Cornell Note-Taking System, which was developed by Walter Pauk (Pauk 1989).

Having their lecture notes available on the web removes the need for note-taking and enables students to engage more fully in their lecture. Web notes also remove the possibility of students transcribing their notes incorrectly. Having lecture notes on the web ensures that if a student does miss a lecture, they have a better chance of catching up with their course work.
Rather than viewing their websites as something that will affect student attendance, most lecturers who placed their notes on the web felt that their websites had become a fundamental and valuable part of their course delivery (Witt 2003).

2. METHODOLOGY

2.1 Web Notes Usage

From the beginning, the lecture notes used in this survey were placed on the web primarily to enable students to print a complete set of notes for off-line examination study.

The lecture notes were used as part of lecture delivery in a very simple fashion. A typical lecture consisted of the lecturer displaying the current topic’s webpage on an overhead screen. As the lecturer scrolled through the webpage, various points were elaborated on. Depending on the topic, relevant external websites might have been displayed, and their content discussed.

2.2 Data

The data used in this survey was collected over a six year period, in the academic years from September 1999 to June 2005. The surveyed students were all 2nd year computing undergraduates at Dundalk Institute of Technology, Ireland (DKIT 2006). The students had their course notes for the subject “Interactive Multimedia” available on the web (O’Reilly 2006). During the six year period of the study, students took five other subjects at the same time that they took Interactive Multimedia. All of these five subjects were delivered in a traditional manner and no notes were available on the web for any of the five subjects. All of the subjects taken by these students were of the same duration, running from September to June.

The number of respondents to the survey was roughly the same in each year, ranging from a low of 62 students to a high of 71 students in any given year. The total number of students surveyed was 404.

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2.3 Analysis

Question 1:

Do you attend Interactive Multimedia lectures:

a) More than you attend most other subjects’ lectures
b) The same as you attend most other subjects’ lectures
c) Less than you attend most other subjects’ lectures
Between 84% and 92% of students attended Interactive Multimedia lectures the same amount of time as they attended other classes. This represents the vast majority of students.

With the exception of 2001, the number of students who attended Interactive Multimedia lectures more than they attended other subjects’ lectures showed little variation, being between 3% and 9%. In the year 2001, 14% of students stated that they attended Interactive Multimedia lectures more than they attended other subjects’ lectures.

In most years, the number of students who attended Interactive Multimedia less than they attended other subjects’ lectures represented the smallest response group. With the exception of 2001, the number of students who attended Interactive Multimedia less than they attended other subjects’ lectures showed minimal variation, being between 4% and 6%. In 2001, only 1% of students stated that they attended other subjects’ lectures more than they attended Interactive Multimedia lectures.

**Question 2:**
Do you feel that the Interactive Multimedia website:
- a) Means you no longer gain anything from attending lectures
- b) Is only useful when combined with attending lectures

The vast majority of students in every year stated that the Interactive multimedia website was only useful when combined with attending lectures. The percentage of students who stated that having the notes on the web was only useful when combined with attending lectures ranged from a low of 87% to a high of 93%. The consistently high proportions of students who felt that the Interactive Multimedia website was only useful when combined with attending lectures should give a huge measure of comfort to any lecturer who is contemplating placing their lecture notes on the web.

**Question 3:**
Would you like the notes from other subjects to be placed on the WWW:
- a) Yes
- b) No
Up to 96% of students in some years, and at least 90% of students in every year, were in favour of other subjects’ notes being placed on the web. This suggests that students find practical benefits from having their notes available on the web. From question 1, we know that students tend to attend lectures where the notes are available on the web as much as they attend other lectures. This suggests that students get other benefits from having their notes available on the web. Students must, therefore, be using their web notes to some good purpose in terms of their studies. This, in itself, should offer reason enough for lecturers to put their lecture notes on the web.

**Question 4:**
Do you find that using the *Interactive Multimedia* website for lecture delivery is:

- a) Better than writing notes from an acetate
- b) No different to writing notes from an acetate
- c) Worse than writing notes from an acetate

With the exception of 2004, the percentage of students who believed that using the web notes for lecture delivery was better than writing notes from an acetate was between 74% and 76%. The figure for 2004 was 69%.

A large minority of students in every year felt that using the *Interactive Multimedia* website for lecture delivery was no different to writing notes from an acetate. This group of students ranged between 19% and 25% in various years. Various reasons could be put forward to explain why so many students felt that using the *Interactive Multimedia* website for lecture delivery was no different to writing notes from an acetate. Perhaps some students find it boring to have to sit through a lecture where the lecturer scrolls through screens of information. Perhaps, some students find that they covered less material, and were therefore examined on less material, when using acetates for lecture delivery. Perhaps some students are creatures of habit and simply object to anything that is different. Of these three possibilities, the evidence points to the first possibility, where students find it boring to have to sit through a lecture of scrolling screens. The other two options contradict the results of question 3, which found that the overwhelming majority of students would like to see notes from other subjects placed on the web.
Between 0% and 7% of students actually found that using the *Interactive Multimedia* website for lecture delivery was worse than writing notes from an acetate. This data, when taken with the large minority of students who felt that lecture delivery using the web notes was no different to writing from acetates, reinforces the evidence that the way in which the web notes were being used for lecture delivery during the period of this study was not optimal.

3. CONCLUSION

This paper shows that putting lecture notes on the web does not have a negative affect on class attendance. Lecturers should consider the web to be just another tool that can be used to help them do their job. At its simplest, such as the way in which it was used over the course of this study, placing notes on the web will not affect class attendance. Used properly, web based notes can make lectures more interesting and help increase class attendance.

The data shows that the vast majority of students want other subjects notes to be placed on the web. This suggests that students find the web notes to be a useful tool.

A significant minority of students found that the use of the web notes for lecture delivery was no different to the use of acetates and a small minority of students found that the use of the web notes for lecture delivery to be worse than using acetates. This suggests that, during the period of this survey, the way in which the web notes were used for lecture delivery was inappropriate.

Given that we now know that having lecture notes on the web does not negatively affect class attendance, the next stage of research must be into ways in which web notes can best be used to make lectures exciting again. There is ample opportunity for research into the various ways in which web notes can be expanded to encourage the natural inquisitiveness, enthusiasm and energy that all students possess in abundance.

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ABSTRACT
This research-in-progress addresses the role of computer-assisted instruction (CAI) in helping to build community among students enrolled in face-to-face university courses. The current paper presents a brief introduction to the concept of community, particularly in terms of online learning environments. The importance of empirical testing for the presence of community among learners in CAI-enhanced courses is stressed. This short-paper attempts to lay the conceptual foundation for later empirical testing for the impact of CAI on community-building in university classrooms.

KEYWORDS
Online learning community, computer-assisted instruction, courseware

1. INTRODUCTION
The use of computer technology to assist traditional classroom instruction, as well as to facilitate distance education, has become ubiquitous in institutions of higher education (Willis, 1994). Colleges and universities are facing new demands to provide educational programs to a growing body of potential students, many of whom are older than recent high school graduates and juggling conflicting obligations of education, employment, and families. Many administrators also believe that increasingly computer-savvy students desire more technology-supported flexibility and choice in how classes are delivered. The drive to satisfy existing students, reach potential students who were previously disadvantaged by the structure of traditional classroom education, and exploit opportunities to more efficiently utilize human and physical resources has made computer-assisted instruction (CAI) a very appealing prospect for many education decision-makers (Waschull, 2001).

The scope of CAI employed in a particular educational setting can range from the extreme of fully online, web-based distance education courses to much more limited use of the Internet to post static classroom material. Commercially produced “courseware”, such as WebCT (WebCT, 2005) or Blackboard (Blackboard, 2005), has been adopted by many universities to support both distance education initiatives and the enhancement of traditional face-to-face classroom instruction. There is considerable debate concerning the benefits and limitations of CAI for universities, faculties, and, most importantly, the educational success of students (Clark, 2003; Gunn, 1999; Noble, 1998). Fully online courses have received the lion’s share of research attention (e.g., Benigno & Trentin, 2000; Sullivan, 2001; Terry, 2000), and by comparison, very little is known about the use of CAI as an enhancement to traditional classroom-based college and university courses. The current study addresses this gap in the existing CAI literature.

This research-in-progress addresses the role of CAI in helping to build a sense of community among students enrolled in face-to-face university courses. This short paper provides a brief conceptual foundation for future empirical testing of the impact of CAI on community-building in university classrooms. When completed, this research will address the following questions: 1) What is an online community and how is it...
related to learning; 2) How can community be identified or measured; and 3) Can CAI courseware tools be used to build community in face-to-face courses?

2. COMMUNITY

In common parlance, the term community has traditionally described a geographically defined locality—typically, a neighborhood, or block, or building—and the people who reside and interact within its boundaries. Over the past decades, however, community has become increasingly associated with voluntary, socially defined groups, with less focus on physical proximity between members. Some sociologists (i.e., Oldenburg, 1997, Goodwin, 1974) argue that growing mobility and suburbanization of residential patterns during the last half of the 20th century is largely responsible for this shift. As relationships between neighbours have become more tenuous, identification with voluntary, relational networks of shared interests, experiences, or practice has taken on more significance. Based on a survey of a long history of community-focused research in the sociology literature, Brint (2001) offers a formal definition of community as an aggregate “…of people who share common activities and/or beliefs and who are bound together principally by relations of affect, loyalty, common values, and/or personal concern” (pg. 9). Frequently, these new communities are based on relationships formed through face-to-face interactions and members may, in fact, come from a particular geographic region or locale. Importantly, however, geographic boundaries have become of secondary importance as communication technology makes it easier to share information and maintain relationships across physical distance.

Researchers in the field of community psychology, an applied branch of social psychology concerned with the ways individuals interact with their environment and how this interaction influences individual and community well-being (Orford, 1992), have devoted significant efforts over the past several decades to understanding how individuals experience communities. In a landmark study, McMillan and Chavis (1986) defined sense of community (SOC) as “a feeling that members have of belonging and being important to each other, and a shared faith that members’ needs will be met by the commitment to be together” (p. 9) and presented a measurable SOC model. The model described four dimensions of SOC: 1) Membership, encompassing feelings of emotional safety and identification with the group; 2) Influence, representing a sense of reciprocal influence between the individual and other members of the group; 3) Satisfaction of needs, reflecting the group’s ability to facilitate achievement of needs through cooperative action; and 4) Emotional connection, comprising emotional support from group membership. McMillan and Chavis modeled SOC to embrace communities conceptualized as geographic locales (i.e., neighborhoods) or relational networks (i.e., groups formed based on activities or interests). Research based on the McMillan and Chavis model has shown SOC to be positively related to various aspects of well-being, including life satisfaction (Prezza & Costantini, 1998), social and political participation (Chavis & Wandersman, 1990; Davidson & Cotter, 1989), and perceptions of safety (Perkins & Taylor, 1996). Specifically, in higher education settings, SOC has been shown to be positively related to student satisfaction and higher student retention rates (Tinto, 1993; Ashar & Skenes, 1993).

3. ONLINE COMMUNITIES

Community is a term that has become almost ubiquitous in any discussion of the Internet. The term ‘Internet community’ is used to denote all those who are involved with the use, development, or support of the Internet. Membership in this broadly defined community is extended to include a vast assortment of entities, including individuals who use the Internet as a communication medium or to access information, entertainment, services, or products; commercial enterprises who conduct business via the Internet; content creators, designers, and architects who populate, create resources, and support the network; and governmental agencies and other groups who have some vested interest in the development or control of the Internet. In a narrower sense, the term ‘online community’ is used to describe a group of individuals who interact primarily via web-based communication tools (i.e., e-mail, bulletin boards, threaded discussions, chat-rooms, instant messaging, video conferencing, or other electronic forums). Online communities can be categorized as falling within classes, or genres, based primarily on purpose. Three genres identified to help
organize a discussion of online communities are: 1) commercial online communities, 2) non-commercial online communities, and 3) educational online communities.

Commercial online communities are supported, and frequently established and controlled, by commercial enterprises for the key purpose of advancing their marketing and advertising goals. As early as the mid-1990s, companies began to recognize the benefits of building relationships with customers, or potential customers, by creating opportunities for them to interact socially via company-provided online discussions, chat rooms, file sharing, and personal web pages (Anderson, 1997). The value of such communities to their corporate sponsors is derived from the community as a source of market intelligence, a network for building customer loyalty and attracting new customers, an audience for subtle marketing messages, and a desirable demographic group for advertisers (Hagel & Armstrong, 1997). This perceived value of commercial online communities is evidenced by the increasing investments made by companies in community-supporting software tools, as well as the attractiveness of major web-based community sites in financial markets and as acquisition targets (Werry, 2003).

Online communities also exist in the non-profit sphere, focusing on topics such as social and political activism, personal development, avocational interests, and socializing. These online communities are typically established by existing non-commercial special interest groups or informally by individuals or small groups who splinter away from other face-to-face or online communities. The purpose for these non-commercial communities is typically to support the interpersonal or informational needs of their participants and, perhaps, to further the diffusion of their ideas, interests, or other agendas. Community-supporting online tools and webspace is generally provided by individuals, universities, or non-profit organizations.

The third genre of online community represents what has come to be commonly referred to as online learning communities. Focusing specifically on education, these communities consist of individuals who are engaged in some form of learning via an electronic forum, which may be informally organized by participants or be supported and delivered by an educational institution, professional association, or other organization. The growth in distance education, both at degree-granting institutions of higher education and as part of various certification and professional development programs, has brought considerable attention to online learning communities. It is this form of online community that is of particular interest in this research.

4. ONLINE LEARNING COMMUNITIES

Online learning communities became a topic of considerable interest to educators in the 1980s and 1990s as concern emerged about the lack of collaborative learning support in many early CAI courseware tools (Baker, 1985; Kagan, 1994). At this time, theories of social learning, which argue that students learn more when they are active participants in the learning process and that learning is enhanced through student interaction, group task completion, and shared reflective discourse, were gaining acceptance. CAI was viewed as an opportunity to support collaborative learning initiatives through the facilitation of online learning communities (Graves, 1992). By interacting electronically, either in CAI-enhanced, face-to-face courses or in fully online courses, members of online learning communities are able to enrich their own personal learning experiences and develop higher-order cognitive knowledge via information exchange, task cooperation, and social support from other members of the community.

There are mixed opinions in the social science literature about the potential of CAI and computer-mediated communication, in general, to promote interaction and social relationships. Some authors argue that overall communication within a social network is restricted when computer-mediated communication is used (Hollingshead & McGrath, 1995; Sarbough-Thompson & Feldman, 1998), group identity is reduced, and social ties are diminished (Shapiro, et al, 2002). Morgan and Tam (1999) suggest that students communicating electronically in fully online learning programs are more likely to experience feelings of isolation and alienation from the school and other students. Other authors are more optimistic about the community-building potential of CAI. Supporters of social media theory argue that computer-supported communication media can encode and transmit all symbolic and social information that is supported by face-to-face exchange (Short, et al., 1976). They claim that face-to-face presence is not necessary to create the feeling of involvement and “presence” in a social exchange, a claim that has been born out by some empirical research (Francescato, et al., 2006). Research has also demonstrated that CAI can be an effective tool to support cooperative learning and the acquisition of higher order skills (Brachman & DeBonte, 1997; Butler,
1995), although most of this research has been conducted in primary and secondary educational environments.

5. EMPIRICAL TESTING & FURTHER WORK

While there are some research results suggesting potential for CAI to support online learning communities, it is still not documented that this potential is being realized. Kling & Courtright (2003) lament the overly casual use of the term community to describe any group of learners participating in electronic forums. They argue that this trend is the result of wishful thinking rather than critical evaluation of the actual outcomes of CAI. Other authors concur with Kling & Courtright’s concerns, suggesting that use of the term community has become a buzzword that evokes pleasant and affirmative associations (Clark, 2003) and, perhaps, an overused tool for selling courseware packages to universities (Sauer, 2003). If CAI is to be viewed as a viable channel for building community among students in college classrooms, its usefulness must be validated through empirical observation and testing rather than assumption or wishful thinking (Haythornthwaite, et al., 2000; Kling & Courtright, 2003).

This short paper has presented a brief introduction to the conceptual foundation for an empirical study of CAI and learning communities. Future work will focus on designing and implementing a field research project to evaluate the impact of CAI courseware tools on sense of community in university classrooms. The setting of interest will be courses utilizing a hybrid format, face-to-face courses that have been enhanced with CAI courseware support, such as WebCT or Blackboard. Courses will be selected for the study that are incorporating use of online communication and collaboration tools—such as e-mail, threaded-discussion, chat rooms, team work spaces—as a significant component of the overall course plan. Other courses that are using no, or a reduced set of, courseware tools will be included in the study for comparison purposes. Sense of community will be measured using the Sense of Community Index (SCI), an instrument, initially developed and validated by McMillan and Chavis (1986) and modified to its brief form by Chavis, et al. (1986). When completed, this work will answer Kling & Courtright’s (2003) and Haythornthwaite, et al.’s (2000) calls for a more objective and rational evaluation of the effectiveness of CAI and online courseware tools for transforming groups of students into learning communities.

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TOWARDS BUILDING (MORE EFFECTIVE) ONLINE COLLABORATIVE TEAMS

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ABSTRACT
The purpose of this paper is a contribution to improve the understanding of what can make Online Collaborative Teams (OCT) effective. This is done by identifying what can be considered best practices for individual team members, best practices for leaders of OCT, and best practices for the organizations that the teams are a part of. Best practices in these categories were identified from: (1) the existing literature related to online teams; and, (2) collaborative work literature. The paper concludes with implications for organizations and potential research directions.

KEYWORDS
Online teams, online collaboration, collaborative work, management and organizational practices.

1. INTRODUCTION
The use of teams as fundamental building blocks in organizations is growing (Furst et al, 1999), as is the frequency of geographically distributed teams, which we call online collaborative teams (OCT). OCT are now being used by many organizations to enhance the productivity of their employees and to cover a diversity of skills and resources. OCT are groups of individuals who perform interdependent tasks, share responsibility for outcomes, and work together from different locations. Information technology can support their activities by reducing travel costs, enabling expertise to be captured where it is located, and speeding up team communication and coordination processes. Unfortunately, these geographically dispersed teams are not always productive. For example, team members may have difficulties in coordinating work with their remote colleagues, or they may be uncomfortable using the technology.

Although working in geographically distributed teams is becoming more wide-spread in organizations today, how to do it effectively is not fully understood. The purpose of this paper is to improve our understanding of what makes OCT effective. This will be done by identifying the best practices that individuals in OCT should follow (i.e., the team members), the best practices for leaders of OCT, and the best practices for the organizations of which the virtual teams are a part.

Ideas for best practices were identified from two major sources:
1. Business press and academic literature related to online teams.
2. Traditional team literature and collaborative work literature.

Our paper is organized as follows. The paper presents more background on the sources of what we can call the best practices. The best practices are presented in the following sections: "Organizational Practices", "Management Practices", and "Team Member Practices". Presented in the last section is a summary of the findings and some concluding remarks.
2. **BEST PRACTICES**

2.1 **Some notes on the sources**

As mentioned above, the ideas for best practices were identified from reviews of various bodies of literature. This section provides background of the approaches used for the literature reviews.

There are several "how-to" books on virtual teamwork and online collaboration. We reviewed some of these to identify best practices (e.g. Duarte & Snyder, 2001; Fisher & Fisher, 2001; Grenier & Metes, 1995; Haywood, 1998; Lipnack & Stamps, 1997; O'Hara-Devereaux & Johansen, 1994). We also searched the academic literature for articles that dealt with best practices for OCT.

Groups in organizations have been formally studied for over half a century, resulting in thousands of studies and a huge body of literature (Guzzo & Shea, 1992). Fortunately, there are already several reviews of the knowledge in this field (e.g., Bettenhausen, 1991; Cohen, 1994; Cohen & Bailey, 1997; Goodman, Ravlin, & Schminke, 1987; Guzzo & Shea, 1992; Holland et al, 2000), and these reviews were used as the basis for our understanding of traditional team best practices.

2.2 **Organizational practices**

Organizational practices are the ones that organizations need to follow to create, develop, and support successfully OCT. We identified six general organizational-level topics: selecting appropriate team members, providing resources and support, having appropriate human resources policies, giving the team autonomy, using standard procedures, and having an organizational culture that encourages sharing and communication.

2.3 **Management practices**

Management practices are practice ideas relating to the leadership and management of the team. For self-managed teams, some of these activities may come from within the team and some may come from the entity they report to, or both. This section considers general team leader best practices: setting goals and direction, providing feedback, building trust, empowering team members, motivating team members, having appropriate leadership styles, and developing self-control mechanisms for team members.

2.4 **Team member practices**

Suggestions for what makes individuals effective members of OCT include specific behaviours as well as attitudes and beliefs that individuals should have. Four general characteristics of successful members of OCT are communicating effectively, having appropriate skills, being motivated, and being supportive of other team members.

2.5 **Overview**

The above-identified practices are all interconnected. Organizational Practices influence and are influenced by Management and Team Member Practices, and therefore we feel that OCT best practices should be regarded as a whole. If the Organization fosters sharing and communication, for instance, team members will feel empowered and consequently more motivated.

Figure 1 illustrates our view of OCT best practices, emphasizing the relationships that are established among them.
To take just one example from each of the considered sections, **diversity in team member selection** is one of the most important elements for the success of an OCT and one of its major assets. Working in an OCT can produce a diversity of backgrounds, experiences, ideas, thoughts, competencies, perspectives, and views. Diversity stimulates interest and makes it more rewarding and fun to work in OCT, because there is the opportunity to learn about new cultures and interact with people beyond one’s own work location. The importance of creating teams with the appropriate mix of skills and individual traits has been extensively identified in the traditional team literature. Virtually all team models of effectiveness include team composition as an important input variable (e.g., Bettenhausen, 1991; Cohen, 1994). The collective knowledge and skills of a team will impact the team's ability to carry out its task.

One of the most important things that team leaders need to do is to build **trust** between themselves and the team and within the team (Duarte & Snyder, 2001; Fisher & Fisher, 2001; O'Hara-Devereaux & Johansen, 1994). Fisher and Fisher (2001) suggested that without trust, productivity suffers, as team members play politics and spend time covering themselves instead of working on real issues that affect customers. To build trust, it is important for team leaders to communicate openly and frequently with team members. Perhaps the single most important variable that affects trust is honesty. Leaders who demonstrate openness about their actions will find that members respond with sincerity. Furthermore, team leaders should admit their mistakes instead of trying to cover them up. Leaders should do what they say they will do and make their actions visible.

**Effective communication** is essential in order to build a successful team. Communication involves transferring ideas, sharing information, listening and internalizing the ideas of others, and notifying team members of any problems or issues. Online collaborative work depends on a high level of communications and trust. Teams must develop skills to work with information and communication technologies in stressful situations, with a variety of competencies in people from several locations and organizations (Grenier & Metes, 1995). When in doubt, OCT members should always communicate with the other members of the team. The literature suggests that team members should not worry if they have nothing in particular to say; communication builds the ability to communicate. An informal e-mail sent to another team member strengthens the social network, which increases the ability to respond when important problems or questions arise. Communication builds trust, which in turn, builds better communication; this is a positive feedback loop that OCT want to feed, not constrain (Grenier & Metes, 1995). In addition to communicating within a team, traditional team research also found that team members' external communication influenced its effectiveness (Cohen & Bailey, 1997). Communication with managers above the team in the organizational hierarchy leads to higher team performance, as these activities usually involve lobbying management for resources and seeking protection and support.
3. SUMMARY AND CONCLUSION

The recommendations for OCT best practices identified in the sections above are presented below as a brief recap of the main themes:

- Organizations must foster a supportive environment for the team, in terms of providing necessary resources, team autonomy, and recognition and reward systems that are tied to the results that the team and individuals achieve.
- Organizations must design teams that have the necessary diversity, in terms of skills, access to knowledge and resources, and backgrounds.
- Team leaders of OCT have to establish clear goals and expectations such that a team can have a focus and a direction to pursue. If possible, building passion for a cause can be a powerful stimulus for everyone in the team to pull together in the same direction.
- Individuals need certain skills to be effective members of OCT. Required skills include technical skills to carry out assigned parts of the team's task, interpersonal skills, teaming skills, and skills to use electronic communication and information-sharing tools.
- Individuals have to be motivated and self-disciplined so that they can manage themselves and their time effectively.

While this paper attempted to identify the best practices for members of OCT, leaders of OCT, and the organizations that OCT work in, it has not identified which are most important. In other words, some of the practices may have a stronger influence on team success than others. Some questions that future research should address include:

- Which of the best practices are most critical for team effectiveness?
- Does the impact of certain practices on effectiveness vary depending on the task and the organizational context?
- Does one set of practices (i.e., individual, managerial, or organizational) take precedence, such that those practices have to be in place before the other practices have a positive effect?

Understanding what practices are important leads to other questions, such as:

- How does an organization ensure that best practices are followed?
- Can training programs be developed for managers and leaders and for members of OCT? What should be in these training programs, and how should they be delivered?
- Can policies be developed and norms established in organizations such that supportive practices, which research suggests lead to effective virtual work, are followed? How can this be done most effectively?

The answer to some of the questions above is undoubtedly "yes," but there are many questions remaining as to "how." There are many opportunities for future research in this area. The findings from this research could help organizations create and maintain more effective Online Collaborative Teams. Given the growing use of OCT in organizations today, the need for more understanding of how to make these teams work well is great. We hope this paper has made a contribution in that direction, and we look forward to other researchers and practitioners answering some of the questions posed above.

REFERENCES


PARTICIPATORY DESIGN: AN ISSUE FOR WEB-BASED COMMUNITY DEVELOPMENT?!

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ABSTRACT
Participatory Design aims to increase both software quality and the users’ control over their work environment. We discuss why this is a good match for web-based community development based upon our experience with groupware development for a virtual freelancer network. The presented case study indicates that the choice of methodology was crucial to understand and cooperatively react to changing requirements that needed to be resolved on an organizational level.

KEYWORDS
Participatory design, web-based communities, software development, involvement.

1. INTRODUCTION
Participatory design – including users as equal partners in software development processes – was introduced as a means both for enhancing software quality and for empowering employees to influence the way their work environment and routines are shaped (Schuler & Namioka 1993, Asaro 2000). Participatory design (or PD) views software development as a social activity (Nygaard 1986) and was motivated by the European labor movement following the goal of humanization and democratization of work (Floyd et al. 1989). As a consequence, most PD projects center around a single, traditional user organization, where stakeholders are identifiable and often available for cooperation, and where tasks are well defined (Clement et al. 1992).

Our previous work in the field of web-based communities showed that participation – especially regarding technology adoption – is also an essential factor for the success of community development processes (Finck & Janneck 2005, Janneck & Finck 2006, Janneck & Finck, in preparation): members who took on an active role in establishing, adapting, and moderating technology use were especially committed to the community, made crucial contributions and did much to keep it alive. They identified strongly with it and also benefited more from the community. These results indicate that apart from increasing software quality, involving members in decision processes and enabling them to take part in shaping their community – in other words, empowering community members – might strengthen the community and alleviate the rate of passive involvement or lurking, a well-known problem in web-based communities (e.g. Preece 2000).

However, applying PD to web-based communities presents a number of challenges: stakeholders are less apparent or physically accessible and monetary incentives are usually not available (Greenbaum et al. 1994). Observations of decentralized community building in a learning community indicated that members worked rather towards independent goals within a larger vision than a single large design (O’Day et al. 1996). PD research also begins to include the dynamical and political nature of design processes and stresses the importance of involving community members (Korpela et al 1998; Puri et al. 2004). Diffuse and fluid community boundaries result in difficulties for applying PD to virtual networks (Törpel 2001).

In this paper, we take a look at what can be learned from PD for web-based community development and how traditional PD methods can be applied to web-based communities. We present our experiences of a PD process within a virtual network of freelancers to shed some light on these issues.

1 All authors contributed equally to this paper.
2. PARTICIPATORY DESIGN IN A WEB-BASED COMMUNITY

2.1 Research Setting: A Virtual Network of Freelancers

The community investigated here is a network of freelance IT and management consulting professionals. It was founded in 1997 as a pool for consultants to exchange experiences, knowledge and work results, offering its members vocational training, several occupational working groups and contacts to potential clients. Today, about 20 members belong to the community. The network’s organizational and technical infrastructure is completely self-organized by its members without formal hierarchies or roles, thus relying on the members’ involvement and commitment. The members stress the importance of working together on an equal footing as well as on a voluntary basis. Financial resources are scarce.

The network exists both physically and virtually: Members meet regularly to hold workshops and trainings. However, since they live and work distributed all over the country, the network is only sustainable as such through the use of information technology. Even more, using a web-based platform for communication is part of the self-conception of being a network member. All in all, the network can be characterized as a stable self-organized web-based community (cf. Janneck & Finck 2006, Janneck & Finck, in preparation).

In the past, several project management systems were tested within the network before we got involved as a research group. However, with each of them usage turned out to be unsatisfactorily low, even though the network members stressed the general necessity of communicating online. The network members blamed this on the respective software, which they regarded as unsuitable for their tasks.

We therefore decided to implement a groupware system that was to be continually adapted and developed according to the networks' needs. Since we knew little about the network’s work practices in the beginning and soon found that the individual members’ work situations, preferences, and also experiences and skills concerning IT use varied greatly, we regarded it necessary to involve as many users as possible in the development process to increase their influence on tasks that should be supported by the software. As the self-organized nature of the network did not allow for a ‘top-down’, management-dictated approach, we also needed to make sure that user acceptance was high. These conditions made PD methodology a logical choice.

2.2 The Participatory Design Process

We kicked off the development process with a workshop, inviting all network members. Twelve members took part. To learn about the network’s organizational practices and the requirements for technology use, we conducted group interviews, addressing the history and the role of the community, the usage of the platform and communicative customs among members. In addition, members filled out a questionnaire concerning their work situation as freelancers and the situation within the network and brainstormed on the promises, possibilities, and pitfalls of software support.

In the following 18 months of working with the network, participative processes, both targeting software quality and promotion, were established on two different levels of intensity. This was necessary because not all members of the network were equally available for cooperation due to regional distribution and also a lack of monetary incentives for all (cf. Greenbaum et al. 1994; Törpel 2001).

- **Close cooperation with key users:** We invited two members who had a keen interest in technology use to work closely with us in developing the groupware. They also took on an active role in establishing, adapting, and moderating technology use in the community. Both turned out to have a central position within the community, one of them being the founder of the network and the other acting as a ‘technological champion’, making efforts to introduce new technologies, ideas, and influence technology use (cf. Scheepers 1999). With them we established three-monthly, periodical workshops. Furthermore, we held close contact via email and phone. They were paid a compensation for their work.

- **Continuous cooperation with all network members:** To involve the other network members, we presented new or revised features of the groupware regularly on network workshops. Initially, we also demonstrated software use and discussed scenarios of use with the members. Furthermore, members of the development team provided direct and personal customer care via email and telephone. This turned out to be a central instrument to win the network members’ trust, as we could both learn about use
problems and communicate responsiveness and supportiveness. We also invited the members to user workshops, which we organize yearly to enable a deeper exchange between users and developers and also among users from different contexts to establish a community of interest (Fischer 2004). Results of these workshops were documented in a format we call commented case studies, consisting of indexed and annotated typical cases of use written by real users, and an explanation of design decisions on the basis of these case studies. These commented case studies were designed as a means to distribute workshop results and communicate design decisions among a larger group of network members.

2.3 Outcome

During our project, we successfully used PD techniques to capture the continually changing software requirements. We adopted an incremental approach and a slow pace for introducing the groupware as we observed difficulties with the existing prototype rather than trying to analyze the totality of the community’s activities. In doing so, we relied heavily upon the key members who became champions of the groupware – they soon started to regard the software as being ‘their’ development instead of ‘ours’ and advocated its use within the community. This helped tremendously to foster acceptance in a community that was already quite weary of experimenting with software after several efforts had previously failed.

The adoption of PD methodology and the resulting close cooperation with the community members enabled us to gain deep-reaching glimpses of the organizational and social structures of the community that were vital to understand problems that arose during the project: more intensive use of the groupware platform compared to previous systems2 revealed unsolved issues and conflicts within the network – such as the imbalance between taking and giving information, or issues of reproduction and copyright – that had been less visible before. As solutions could be found on an organizational rather than on a technical level, software development and organizational development became closely intertwined. We acknowledged this by focusing less and less on functionality and more and more on moderating and negotiating the terms of technology use.

Our role as software developers changed over time: At first, we were viewed as ‘outsiders’ who were supposed to deliver a service to the network. This was reinforced by our concurrent role as ‘neutral’ observers and researchers. Working together closely with the community members, we slowly turned into ‘insiders’. Reciprocally, our network partners grew from ‘customers’ and ‘research subjects’ into co-developers and team members, ultimately interacting in a very informal and cordial way. We believe that the resulting team dynamics permitted us to penetrate deep into the community, and were a critical foundation for the profoundness of our analysis. However, as we had to learn later in the project, conflicts and quarrels also bear a higher risk of seriously affecting cooperation when personal involvement is high.

3. CONCLUSION

Evaluating the development process, we succeeded in establishing an ongoing dialogue within the community concerning the value of software support that touched upon deeper issues than just adding or removing concrete functionality. In doing so, the network members acquired a deeper understanding of their own work routines and network structures. However, this also meant that making decisions regarding software use always meant making decisions regarding their cooperation routines within the network. This organizational development – which is always inherent in software development processes from a PD point of view – disclosed a number of fundamental conflicts within the network that need to be resolved, which was beyond the scope of our involvement as developers.

We also believe that the community members learned to reflect on the applicability of software support – or acquired media literacy, to put it another way. We view PD and the close cooperation that resulted from it as the central catalyst for this process. We thus conclude that PD is a useful approach for meaningfully developing web-based communities – even if that means that web-based support will be established only for sub-communities and for specific tasks.

We draw from our case study that in web-based communities, typically lacking formal hierarchies, roles, and decision-making processes, end-user commitment is pivotal to initiate organizational or technical chan-

2 However, usage generally remained quite low. We reflect on this in Finck & Janneck (2005).
members want to be involved in decisions. Involving key users as proxies turned out to be a good compromise for encouraging other members to also participate in the process, although on a lower level of intensity. That way, PD enabled not only quality software development, but also – and this seems to be even more important for sustainable community development – fostered acceptance and commitment. We see evidence for an “empowerment” of the community as members actively assumed responsibility for the reorganization of their work environment and we witnessed their emancipation from a singular focus on technology and functionality to a reflection of organizational processes and structures.

In our case, the small size of the network and the closeness to key users allowed the application of traditional PD methodology, such as interviews or workshops. Involving members of larger online communities, possibly interacting anonymously, will present more challenges and needs to be studied in further research.

REFERENCES


USING E-LEARNING TO FACILITATE LEARNING IN A COMMUNITY OF PRACTITIONERS: FINDING AN APPROACH THAT SUITS

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ABSTRACT

In this paper the authors argue that with effective use of collaborative features of a Virtual Learning Environment and appropriate programme design, it is possible to create the conditions needed to foster a deep approach to learning in a community of practitioners. The paper has been written as part of a qualitative evaluation of student learning in a Leonardo da Vinci funded project, European Enhancement of Early Years Management Skills, (EEEYMS) which commenced in October 2003, and is coordinated by a University in the North West of England. The discussion will take into account a rationale for the use of e-learning and will discuss aspects that are of concern for the tutor such as:

- Facilitating construction of communities of learning
- Effective learning environment
- Maximising learning through the pedagogies used.

KEYWORDS
Communities of learning, problem based learning, e-moderating.

1. CONTEXT OF THE RESEARCH

The research has taken place in a university in the north-west of England. The practitioners who comprise the learning community are in positions of management in the Early Years sector and are undertaking one of the following two programmes: The Foundation Degree Management of Childcare Provision, or the Certificate in European Early Years Management, which are delivered on line. The latter is a programme that is part of the above mentioned EEEYMS project. Both programmes aim to give students the opportunity to share best management practice through collaboration with other colleagues from other European colleagues, gaining a knowledge and understanding of current theories, models and research relating to key aspects of their practice.

Management training for this group of practitioners has been provided in response to a number of factors. Firstly, there has been a huge rise in the Early Years profession in the UK in recent years. Since 1997, 920,000 places have been created, benefiting over 1.6 million children. (Sure Start 2005) and this sector continues to grow as the government plans to deliver additional childcare places. However, the National Audit Report 2004 points to the need for business training to promote sustainability of this new provision. (www.nao.org.uk 2005)

The learning that is discussed in this paper takes place within the Higher Education sector in the U.K, which has seen many changes within the last two decades; chiefly the huge expansion of the sector as a result of the widening participation agenda, with larger numbers of students in groups and a wide range of ability in some establishments. Biggs (2003, p.9) argues that this presents us as university teachers with opportunities to address the way in which we teach students in order to stimulate the use of “higher level cognitive processes that academic student students use spontaneously.”

Jarvis et. al. (2003) argue that the social context in which learning takes place has radically changed due to factors such as demography, globalisation, changes in work and in the economy, privatization, individualization and commoditisation. These changes, especially economic and demographic, have led to a
society that now has an increased emphasis on life-long learning, rather than the traditional view of education.

Technological advances and socio-cultural change means that it is now feasible to introduce e-learning as more and more people have access to the internet. The proportion of women accessing the internet in 2005 is 43.5% (www.ebusinesseurope.com 2005)

With an increase in student numbers on Professional Development programmes, and engaged in work based learning, as is the case with Foundation Degrees there is scope for increased use of this method of learning. Meredith (2003) notes that programmes delivered via e-learning are in a rapid growth area and that entrepreneurial business schools especially have introduced on-line programmes to increase their market share. This is hardly surprising given the changing nature of the financing of Higher Education.

It would seem, therefore, from the literature, that an e-learning approach would be appropriate as it is flexible and meets the needs of practitioners, who, because of the very nature of their work, find it difficult to take time off to attend classes and for whom travel to institutions might be difficult. What needs to be considered now are the reasons for engaging as a community, and how this might be achieved.

2. METHODOLOGY

This research explores mature students’ perspectives and experiences of online collaborative learning using a Problem Based Learning approach. Data was collected for an online group (N=25) on perceptions of learning outcomes achieved and reflective individual evaluations at key assessment points via an online questionnaire and on students’ views of the nature and delivery of the course through qualitative focus group discussions. It attempts to find how students experience learning in undertaking management education that utilises PBL as a key learning and teaching approach. As the focus of the research is on exploring perceptions and experience, qualitative comments were invited to encourage the ‘voice of the students’ to articulate those perceptions in more depth. This is particularly pertinent as the students are at a distance and “we need a way of giving our invisible and silent students a voice so that they can contribute to public evaluation processes” (Gilroy et al, 2001, p.17.)

3. WHAT IS EFFECTIVE TEACHING?

Effective teaching is the sum total of activities that best facilitate learning. Biggs (2003, p 56) sets the scene thus: ‘Effective teaching means setting up the teaching/learning context so that students are encouraged to react with the level of cognitive engagement that our objectives require.’ Tyler (1949, cited in Biggs 2003, p v) asserts that ‘Learning takes place through the active behaviour of the student: it is what he does that he learns, not what the teacher does.’ Biggs and Moore (1993) identify four factors which support good learning: a sound knowledge base; appropriate motivation; learner activity; self-monitoring.

4. TEACHING AND THE SUPPORT OF LEARNING

Biggs (2003) develops the notion of constructive alignment of teaching, originally espoused by Tyler (1949). Schuell (1986, cited in Biggs 2003, p23) argues ‘if students are to learn desired outcomes in a reasonably effective manner, then the teacher’s fundamental task is to get the students to engage in learning activities that are likely to result in their achieving those outcomes….what the student does in determining what is learned is more important than what the teacher does.’ Therefore we as teachers need to be more aware of the need to promote learning, rather than promote ourselves as ‘experts’. Saunders (2001) refers to the shift form the sage on the stage to the guide on the side as being particularly relevant to e-learning. We need to think of ways of enriching the learning experience for our students whilst considering contemporary theories of learning.

There is a long tradition in education of the use of experiential learning. This can be seen as the basis of all future learning. Miller and Boud (1996, cited in Jarvis et.al. 2003) summarise experiential learning as the
foundation of and stimulus for learning. From this learners can construct their own experience. They assert that learning is holistic; it is culturally and socially constructed and influenced by the prevailing socio-economic context. Weir and McGill (1989 cited in Jarvis et al. 2003) classify experiential learning into ‘villages’, the fourth village being personal growth and change. It could be argued that the fourth village can be realised only when other factors, which I will analyse next, come into play.

For individuals to have any meaningful experience of learning, a ‘deep’ approach to learning must be employed by the student and facilitated by the teacher. A deep approach ‘arises from a felt need to engage the task appropriately and meaningfully so that the student tries to use the most appropriate cognitive abilities for handling it.’ (Biggs 2003 p14) (Martin and Saljo 1976 cited in Duff 2004) The effective teacher therefore is concerned with designing activities and assessments that promote a deep approach to learning; a reaction to the teaching environment. This might include such strategies as questioning in order to elicit responses, utilising at the same time aspects of experiential learning and building on what the students actually know whilst challenging misconceptions. There is a need to also ensure that teaching is in depth, rather than breadth of curriculum.

The use of e-learning or online learning can support teaching and learning strategies which will encourage a deep approach to learning provided that the teacher utilises the technology to support the pedagogy rather than vice versa. Ramsay (2003, p.33) warns that some teachers link the use of V.L.E.s with a distancing effect between teachers and students and suggests that the reverse is in fact the case; ‘that a use of VLEs can resource enriched, although significantly re-formed, learning relations.’

It is possible to exploit technology to create conditions suited to fostering deep learning. Alexander and Boud (2001) argue that much of the potential for online learning is lost because much of the pedagogy of the learning has been transferred unreflectively from didactic traditional teaching. They argue that the physical environment makes some things possible and constrains others, but whatever environment is used it does not change the fundamental process of human learning. However, online learning has been referred to as just another learning environment. Whilst there is some merit in this view, as it suggests that the pedagogy comes first, and the technology later, we would argue that, rather than being just another environment, online is an eminently suitable environment for encouraging deep learning, particularly with a motivated group of students, and especially those involved in professional development programmes, who may have a common interest and identity. This fits in well with Alexander and Boud’s view of online learning as an example of learning from experience. The paper intends to demonstrate how this can be maximised.

Mayes (2001) argues that the main pedagogical consensus in online learning is around the notion of constructivism. This includes collaborative learning, using authentic tasks, dialogue between learners and teachers and reflection. This allows learners to construct knowledge and reflect with opportunities for reconstruction of new knowledge. Mayes also argues that this most effectively takes place in a way that reflects identity and learning communities. Wenger (1998) sees this situation of learning as an imperative for education.

If, as it has been argued, there is value in building upon existing knowledge and experience, that collaborative learning, reflection and the construction of knowledge are effective facilitators of deep learning, then it follows that forming communities of learning is beneficial. The questions are how do we create effective communities of learning; having created those communities, how do we promote learning, deep or otherwise; and how do we support the learning?

An intensive and carefully planned induction provided to the students can contribute to the sense of team and community building as the following evaluations by students who attended a 5 day residential at the host University illustrated:

- “I am still a bit anxious in how I will cope, although I am excited about this challenge”
- “Excellent opportunity for student liaison in the discussion of professional issues-relevant to Early Years”
- “The programme was very relaxed but the topics were taught in a way that we learnt all about the programme”

Of course, students have to become accustomed to a different way of socialising in this very different environment. A number of academics have expressed concern over this (Ramsey 2003), Salmon (2003) sees this as the second stage of the model of teaching and learning online, the first stage being access and motivation. ‘Stage two involves participants establishing their online identities and then finding others with whom to interact.’ (Salmon, 2003, p.29) Tutors course design must therefore include an induction programme which, as well as giving the students opportunities to develop practical skills, also includes
activities such as ice-breakers and small group work leading into group work online. Many online courses are exactly that and have no element of face to face work, but we have chosen to have a mix of the two, and feel that this is successful, given students evaluations of the induction programme. Attention to socialising is important as noted by Brown and Duguid (2000, cited in Salmon, 2003) and Salmon (2003, p.33) who suggests that ‘Online learning offers the ‘affordance of online socialising and networking. Affordance means that the technology enables or creates the opportunity, that is, it has an inherent social component’. Salmon (2003, p.33) therefore points out that “Sensitive and appropriate conference design and the e-moderator’s intervention cause the socialising to occur.” The following comment gives a view which supports the importance of the socialisation process:

“Working with other Early Years Managers, supporting one another, sharing and collaborating and encouraging one another whilst learning all the time and getting to talk to new people from different settings and approaches, have made some very good friends through this experience, for which I am grateful. Being able to study at a time which suits me (most of the time) no rigid timetable”

4.1 Use Of Problem Based Learning (Pbl)

Problem-based learning was the learning and teaching approach selected in the programmes being researched. It is intended that academic study is integrated with professional development and work-based learning. Because problem-based learning simulates everyday learning and problem-solving, knowledge is acquired in a working context, students learn the skills for seeking out the required knowledge when the occasion arises.

Problem-based learning involves practitioners working together in groups to complete assessments which are closely aligned to the concepts and learning outcomes of the modules. As they work together in groups they have the benefits of each other’s experience and learning and mutually constructing new knowledge or ways of seeing things. In a small group of online learners, students reported drawing on each other’s skills and expertise. Interestingly, some also commented that working online increased their confidence.

The following student remark, which was placed in the evaluation forum conveys a sense of enthusiasm and confidence:

“I am still totally aware that I am in the learning process, hence, I am thoroughly enjoying this process, as I can see myself with more confidence within my work environment, this module is truly relevant in understanding the dynamics of the whole process of organizations”

Students are also motivated by the interaction with a ‘real’ problem, as the problems are designed to be aligned to the nature of management issues in the sector. There is a large body of evidence in the literature to support the motivational aspects of collaboration on learning (Johnson and Johnson, 1989; Sharan and Shaulov, 1990) Wenger (1998) offers a perspective on learning that emphasises social learning processes within communities of practice where individuals engage in the negotiation of meaning and the mutual construction of knowledge. Comments placed in the forum demonstrate that these findings are relevant to our own groups:

“My motivation is high and I have a long career in management and I have really "searched" new ideas”

“yes I believe I have in the sense of taking responsibility for my learning, realising the importance it is to motivate, encourage and build on personal and professional developments”

The value of the use of ‘real’ problems is illustrated by the following comments:

“Hence, the relevance of these assignments have made me aware of how important and crucial it is for a leader to be effective in guiding it's team to effectiveness”

“One assignment left but I have gained a wealth of knowledge both about specific subjects and how to format reports etc. And believe it or not really enjoyed the process”

It could also be argued that this approach favours accelerated learning. Students engage with the indicative texts and apply their knowledge to the problems that have been set. Therefore there is no gap between the ‘theory’ and the ‘application of theory’ stage. Skills in academic writing are more quickly gained as no spoken discussion takes place and students think more carefully before putting thoughts into words, as students work on the problem online. Students endorse this view:
“Thought the group work was great and helped me personally with understanding of assignments and presentation of them, but sometimes the language barrier caused delay in everyone’s understanding, but we got their in the end and this was a great learning curve”

4.2 Facilitating the Learning

The teacher must fabricate a framework for effective learning to take place. Mayes and Fowler (1999, cited in Mayes 2003, p17) suggest that the learning must be mapped onto a ‘supportive technology.’ They identify three stages or modes that can be identified in the learning process. Firstly is conceptualisation where students come to an initial understanding of something new. The second stage, construction, involves activity on behalf of the learner which is intended to create new understanding. Feedback is used to facilitate this stage and dialogue is considered to be the driving force that moves the student through the processes or stages. Consolidation is considered to be the stage whereby there is full integration of the new understanding. Thus it can be seen that learning cycles occur which involve continually revisiting ideas and concepts in real contexts with the possibility of the re-construction of knowledge, which falls in with the processes involved in PBL.

Mayes (2003, p.19) argues that “it is in the dialogue that the main opportunity for teaching occurs – where the learners’ attention can be re-directed, misconceptions corrected, new questions posed, and answers given to the learners individual questions.” This poses challenges for teachers who will need to have the breadth as well as depth of their expertise continually at their disposal in addition to well developed skills of e-moderating. Students valued the opportunity to engage in online discussions and dialogue as the following comments illustrate:

“I was surprised at the outcome of our group work on line I could not see how it was going to work, but it does and for me it helped me overcome my fear of not being able to do the work. Having little confidence in my ability to produce work, talking to the rest of the group sharing problems and ideas helped.”

“I believe the outcomes were met, and the importance of this learning was utilised as we worked really hard as an electronic group, information sharing and general comments”

“Very important. Much more information can be gathered together than individual alone and many different views appears”

“It’s taken me along time to get my head round working in a group, especially over the internet but i think i have got alot out of it.”

5. STUDENT EXPERIENCE

Often there are questions about the altered role of the teacher. Haydon Blackey, (in Salmon 2000) sees the e-moderator’s main roles as being that of group facilitator, a developer and content provider. The following responses from students demonstrate their perceptions of the tutor’s approach.

“Tutor replied to every message I forwarded on to her, she also kept reassuring us in a supportive manner”

“Prompted issues on forums where needed”

“Answered queries and worries immediately, gave constructive feedback, which helped with the next assignment”

“Visible presence in forums without being too much into your face-great approach”

“I feel that the tutors have always listened and supported me very well with regard to studying questions or personal issues that are affecting my studies”

Coomey and Stephenson (2001) assert the need for student support as one of the issues that designers of online learning need to take into account.
6. CONCLUSIONS

This research has illustrated that Problem Based Learning online provides an excellent vehicle for collaborative learning, which, in turn, fosters deep learning. It demonstrates the importance of the facilitation of communities of learning as fundamental to a learning process which is motivational and inspires confidence in the learner’s abilities. The following student comment serves to sum her experience up:

“I have been given back some enthusiasm for Early Years working with other senior practitioners. I no longer feel isolated and I enjoy sharing problems in the workplace and having others suggest remedies. The module has refreshed and shown me different ideas I can develop for my organisation’s benefit and use”

Further and ongoing evaluations of students’ experiences of other modules within the programme will allow for an exploration of how other Learning and Teaching approaches might contribute to community building but the importance of collaborative learning must never be overlooked.

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SOCIAL ISSUES AS SUCCESS FACTORS FOR WEB-BASED COMMUNITIES

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ABSTRACT
Communities with good sociability have social policies that support the community’s purpose and are understandable, socially acceptable and practicable. Web-based community research builds on the research literature in areas as diverse as Computer Science, Human-Computer Interaction, Psychology, Sociology, Communication, and Library Science. This paper discusses web-based communities, and introduces the concept of social issues in web-based communities. A discussion of success factors for web-based communities is also presented.

KEYWORDS
Web-based communities, sociability, interaction, communication, e-moderation, online social policies

1. INTRODUCTION
We are entering a time when technological development seems to overwhelm us all in almost every area of our lives. One of the most expansive fields is the new global communication network known as cyberspace or simply the net. Cyberspace has brought around new ways to meet, communicate, work, shop, and live. This development will take time to understand and to include in our conception of what living in a society and in a world means. It is no surprise that there is a global interest in the study of this new world. Governments and companies worldwide are spending money and energy to find out how to make this technology contribute to their goals. One of the new concepts that have emerged in this scenario is “web-based communities”. This concept describes some of the new social "life forms" we are starting to see in cyberspace. Although the concept of web-based communities does not cover all these new "life forms" and definitely not all interesting aspects of cyberspace, the social issues connected with it are one of the most interesting phenomena in cyberspace.

The term “web-based community” is becoming increasingly popular. With the growth of the Internet, millions of people are taking part in these communities: businesses want to sell their products; support communities join people in similar circumstances; hobbyists trade experiences online. Building a web-based community does not consist of merely placing software on the Internet. The way people interact in a community contributes strongly to its long-term evolution. People’s behaviour cannot be controlled but it can be influenced. The community’s aim, individual roles, and policies set-up to guide behaviour influence how people behave. The web can support multiple forms of communication, each with its own criteria, and each with its own form of "community."

2. WHAT IS A WEB-BASED COMMUNITY?
Web-based communities emerged from a surprising intersection of human needs and technology. When the ubiquity of the telecommunications network combined with the information-structuring and storing capabilities of computers, a new communication medium appeared. The term web-based community is...
commonly used to describe various forms of computer-mediated communication, particularly long-term, textually mediated conversations among large groups. It is a group of people who may or may not meet face-to-face, and who exchange words and ideas through the mediation of computer networks and bulletin boards. It is not hard to understand, but it is slippery to define and tricky to measure. The situation is further complicated by the many different definitions of “web-based community” in use at once, since it is clearly a buzzword. Suffice it to say there are many interpretations of the term and it implies a number of different characteristics, including a shared purpose (focus on an interest, need, information, service, or support that provides a reason for belonging to the community); people (who interact with each other and who may take roles within the community); policies (language and protocols) and rituals (that bring a sense of history and accepted social norms) (Preece, 2000).

Communities are not all the same. Ideally, individual needs are compatible with the community’s, but sometimes they are not, so policies are needed to ensure harmony and deal with serious misconduct. Some policies and social protocols are widely known and accepted by most established Internet users, but others may be specific to a particular web-based community. Putting in place basic policies so that members know what to expect from each other provides a framework for initial social growth.

As the community develops and forms its own character, its social policies and structure also evolve. Successful communities are more likely to develop when early social planning constrains the community just enough to discourage inappropriate behaviour while facilitating the community’s evolution.

3. SOCIABILITY IN WEB-BASED COMMUNITIES

Sociability focuses on social planning and social processes, which jointly lead to good social policies. Sociability implies planning social policies that encourage the development of congenial and appropriate social interactions. By focusing on sociability, community planners can influence the potential success of web-based communities. Communities with good sociability have social policies that support their aim and are understandable, socially acceptable, and practical (Preece, 2000). We identified in the literature some important sociability guidelines:

Registration: users are often required to register to take part in some communities. But should people have to register? There are pros and cons. Having to go through a registration procedure may deter people who might otherwise simply drop in to see what is happening; however, it discourages casual visitors from disrupting the community. Some communities allow visitors for a limited period with limited privileges. Registration also enables managers to track demographic information that is important to some e-commerce communities.

Trust and Security: users need to feel their privacy is protected to communicate freely. Formal privacy statements should describe how personal information of community members will be used (Preece, 2000). Community members need to know that their conversations and personal data will not be sold. In e-commerce communities, users should be informed as to what protections are taken to ensure that their transactions will remain secure. Health-related communities, as well as other communities that deal with sensitive information, should have a disclaimer to protect both community members and the community itself. Policies that describe the ground rules for community interaction should be encouraged because they help set up an environment of trust.

Governance: this covers many issues from registration to moderation and democracy. The trick is to get just the right level of policies to set the community on a good course as it evolves. Too many rules, stated too forcefully, will deter people; not enough will provide too little structure. Developers wanting to influence governance, and hence social interactions in the community, rather than letting serendipity take its course need to work with potential community members. It is important to decide who will govern the community: its owners or its members. There should be rules for voting, and any other processes in which members participate. Policies should state the acceptable level of free speech, and the discouraged types of communication, such as racist, obscene, blasphemous and aggressive language. A short statement saying what is acceptable may be useful.

Conversational interaction between individuals or groups: real time and “slow time” conversation, such as instant messaging and collaborative teamwork spaces, respectively, should be provided.

Social feedback: this is important as it allows a group to rate the contributions of others, perhaps
implicitly, leading to the creation of digital reputation, a.k.a. karma (from the Slashdot web community model).

Social networks: this aims at explicitly creating and managing a digital expression of personal relationships, helping people to build new relationships. One example is the Friend Of A Friend (FOAF) proposed standard, an XML-based approach to define your interests, phone number, e-mail, and the degree and kind of relationships you have with others, including creating explicit links to their FOAF specifications. The heady interest in Web-based services like Ryze, Friendster, LinkedIn and others, which are explicitly social (or business) networking systems, is being driven by a growing awareness of the fluidity and flexibility of networking through the Internet.

Notification: contributing to a learning community and not receiving any feedback or acknowledgment quickly discourages and tends to extinguish further participation. Using tools such as RSS, instant messaging, or even email can provide notification to the user when new content or communication is entered into the web-based community. Quality tools will allow historical and persistent display and searching of these interventions so that the community can be searchable and span across significant lengths of time.

4. DEFINING AND MEASURING THE SUCCESS OF WEB-BASED COMMUNITIES

All community members, developers, and community leaders are expected to desire a successful web-based community; obviously, no one would want “their” community to fail. However, different stakeholders may have different definitions of success (Andrews, 2000). This section reviews some of the different points of view.

Founders: web-based communities are not spontaneously generated. There is usually an individual, or group of individuals, who is responsible for their creation. The founders spent time securing the technology, ensuring it was easy to use, and populating it. Regardless of the level of current involvement, these individuals are usually interested in the continuation of the community. They want to see that their work was not in vain. So for them, success is the continuous use of the community, as seen in the involvement of its members.

Leaders: community leaders are those who provide leadership within the community, offering a welcome to newcomers, advice to those who ask, and wisdom based on experience. They also tend to post frequently, play an active role and be well known among community members. This is not necessarily a unique and mutually exclusive classification. The leaders of a community might also be the community founders or its moderators, and are certainly community members. For them, success could be defined as whether their role is appreciated. If other community members say something along the lines of “thanks for your response; you always provide such helpful information,” this might be considered success. Community leaders might also define success as a large number of posts, because their leadership helps to “stir up” discussion in the community.

Moderators: moderators ensure that communication flows well, does not escalate into an all-out war, and that all messages posted are appropriate (Salmon, 2000). They hope community members will post responsible, appropriate messages, and do not try to incite other members. In the ideal world, there would be no need for moderators because all members would post on-topic, conversation would flow well and continuously, and no one would flame; their only role would be to welcome new people. However, in reality, the moderator must often reject posts as off-topic or inappropriate, keep discussions on topic and active, and remove people from the community. Moderators prefer to have few complaints, and little censorship. Many posts to reject might mean that either a posting policy needs to be created or that members need to be reminded of existing policy. The success of moderators might be based on the opinions of community members. If they are happy with the moderating, moderators feel that it is successful. Conversely, if members frequently complain, moderators feel that it is not successful. In sum, moderators might define success by the number of complaints, and rejected posts.

Members: they generally define success as “getting out of the community” what they came to the community for. For some, success could be gaining access to useful information; for others, meeting people and developing personal relationships. Some might enjoy a sense of community, of belonging (Salmon, 2000); others might enjoy a sense of support from those going through similar experiences (Preece, 2000);
others might enjoy “talking” without being ignored due to any physical characteristics or disabilities. With all these different definitions, how can one measure whether a community is successful from its members’ point of view? A number of techniques, such as interviews, surveys, and ethnography could be used to interact with community members.

Defining success in a web-based community is difficult. Defining and examining a number of quantitative measurements of the community is much easier. For instance, it is possible to measure the number of community members (based on the number of people who have subscribed, registered, or logged in), the number of posts per week, the number of posts related to the number of community members, the number of discussion threads, the number of posts read, and/or the amount of time spent in the web-based community.

The ability to measure these different facets of community life is linked to the specific technology that supports the web-based community. For instance, if the community is supported with a list server (which requires registration), we can determine the percentage of posters within the total population of community members. If users are required to login/logout to access community resources, we can determine the average amount of time per week members are logged in. Although all of these measurements are interesting and can provide useful information, none of them is necessarily a measurement of success. A community is not necessarily successful because there are 500 posts a week, or because 3000 people are subscribed, or 100% of community members have posted a message. There is not a single quantitative measurement that can determine success. Not all stakeholders define success in the same manner, so it is impossible to say, “this web-based community is successful.” Rather, it is preferable to learn more about how each stakeholder defines success, and then ascertain whether that stakeholder perceives the community as successful, based on their specific view of success.

5. SUCCESS FACTORS FOR WEB-BASED COMMUNITIES

There are a number of different considerations that can be addressed to have a successful web-based community. Appropriate and Responsible Moderation: a strong web-based community needs a good moderator. On the one hand, moderators should encourage free discussion and motivate people to build a community. On the other hand, they need to “step in” when a community member acts inappropriately or wants to harm the community.

A reason to communicate: people in web-based communities where there is no face-to-face contact interact online because they have shared experiences, interests, or goals. Regardless of whether they would even want to interact face-to-face, there is still a shared purpose that causes people to communicate. In fact, in some web-based communities, such as support communities, members may never be interested in meeting face-to-face.

A relatively stable leadership and membership: some web-based communities have very stable populations. “Old-time” community members know who the community members are, how to post appropriately, and what is considered acceptable behaviour in the community. Conversely, some communities have populations that turn over rapidly. For instance, many web-based communities for school-aged populations and communities based on trends (such as Pokemon) tend to have populations that change frequently.

The right level of registration: this might be as simple as sending a “subscription” message to a list server, supplying an e-mail address, or then users must provide their name, home address, phone number, and demographic information. There are at least two goals involved in requiring users to register: 1) population control, and 2) evaluation information. A “middle-of-the-road” approach to registration is favoured: it needs to be substantial enough that troublemakers or those not committed to the purpose of the community will not join, but it should be minimal enough not to scare potential community members away because of privacy concerns.
6. CONCLUSION

Millions of people participate in thousands of web-based communities. Some communities are narrowly defined whereas others have a broad range of members. What makes a community successful? This is a difficult question to answer because it depends on many factors and from whose perspective one defines success. Software design has been supported by well-tried and tested guidelines to ensure that systems are easy to use. However, unlike most software that serves a functional purpose, web-based communities are strongly social. Developers can control usability, but they cannot control sociability, however, they can do much to influence it. For instance, appropriate and responsible moderation, stable leadership, and an appropriate level of registration can positively influence the sociability of the community. This paper proposed guidelines for sociability that will help web-based community developers to build more successful communities.

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ABSTRACT

Design and manufacturing are important activities of the modern world, and as designers and manufacturers embrace globalization as part of their operational strategy, having a common view across their enterprise becomes a key factor in realizing improvements in collaboration and productivity. Design and Manufacturing interoperability is a strategy for achieving this common view and is being implemented by several enterprises and several web platforms are used to aim in this interoperability. For a successful design and manufacturing project, we need people with competence to operate and use specific equipment in all phases of the project. The equipment must be purchased, installed and understood – all without compromising that original design. If not, it can lead to negative consequences on the budget and on project schedule. Due to this, it is sometimes necessary to have a common vocabulary centered in equipment, also relating competences, processes, best practices, other equipment and other concepts. There are several kinds of methodologies in ontology construction, but all of them fail in the knowledge acquisition phase, and none of them is centered on equipment context. In this work, we described our proposal which is a methodology to create an ontology based on equipment and we describe an experience in a Brazilian Oil Company.

KEYWORDS

Ontology, Knowledge Acquisition, Knowledge Management, Knowledge Engineering, CSCW, human-machine interaction.

1. INTRODUCTION

A process, independently from being a design process or not, is a set of activities. Each activity has as input some resources, which can be data, information, knowledge, raw materials or processed materials (as fluid, for example). Each activity also provides resources, which can be input for another activity. For the execution of an activity, we need competences (needed competences to execute the tasks of the activity), pieces of equipment and tools.

Equipment has fundamental importance in a design and manufacturing process. If a piece of equipment does not work or it is sub-used, or anybody in the company does not possess the necessary competences to use it, the process is not completed. It means that the human-machine relation is responsible for the success of the whole process.

This human-machine relation involves a new concept: the cyborg. A cyborg is a cybernetic organism, a machine and organism hybrid, a creature of social reality as well as a creature of fiction. Manfred Clynes uses the example of a person riding a bicycle to describe this sort of synergism [1] where, after sufficient adaptation time, conscious effort is no longer needed in order to use the machine. He refers to this state as cyborgian. In some sense, after learning, knowing and adapting to the equipment in a design process, all the activities executed by a professional are faster, safer and more confident.

Analyzing this concept in a design process, we can identify several pieces of (important) equipment having been used in different processes, as shown in Figure 1. So, our proposal is to adopt an equipment centered vision, as in Figure 2, analyzing concepts, processes/activities, competences and resources as per equipment. For that, a common vocabulary is necessary, and this work envisions describing a methodology to create an ontology based on equipment.
There are several methodologies to ontology construction. However, there is a lack in using knowledge acquisition techniques in these methodologies, by generating output in a form suitable for direct input into ontology construction methodologies.

The thesis behind this paper is that it is possible to construct an ontology based on equipment, and that it can bring several benefits to design and manufacturing processes. In our methodology we use and exploit some knowledge acquisition techniques.

To exemplify these questions, we describe in this paper a case in a Brazilian Oil Company. This company was losing knowledge on its first level of the design and manufacturing chain: the firm was “forgetting” about its equipment. This then reflected on the entire production. Firstly, in section 2, we describe our proposal, as well as, the experience (section 3). Finally, we comment on the conclusions and our future works.

2. EQUIPMENT ONTOLOGY: OUR PROPOSAL

The Equipment Ontology Construction is divided in several steps, which are explained in section 2.1. The phase of knowledge acquisition is explained in more detail in section 2.2.

2.1 The Methodology

The methodology is divided in 4 steps:

- **Scope identification** – In this phase, the knowledge engineer specifies the reason why the ontology is been created, where it will be used, the processes which will be studied and the granularity of properties’ description.

- **Ontology Creation** – This phase is divided into i) Requirement Specification, ii) Knowledge Acquisition and iii) Representation. The “Requirement Specification” implies the definition of questions about the domain, questions which the ontology should answer. The “Knowledge Acquisition” is responsible for the identification of domain knowledge, concepts and property identification, the relation between concepts and domains restriction. This phase is explained in more detail in section 3.2. After that, in the “Representation” phase, an ontology language is chosen, and the ontology is represented in this language. For this reason, we choose to use the Protégé.

- **Integration** – During the process of ontology creation, it may be necessary to integrate the ontology which is been constructed with an already existing one, with the aim of using previous and well-known concepts’ definitions and relationships.

- **Evaluation** – Finally, the ontology should be evaluated by a domain expert who will validate it if it satisfies the requirements defined in the scope identification phase. This phase should also be done in parallel with the steps of the ontology creation, in an interactive process. To evaluate the ontology with the domain experts, the use of a graphic representation is extremely important.
2.2 Knowledge Acquisition

This stage starts with the planning of the Interview Structure. So, initially, the participants should be defined. The participants should be people who know about the equipment and its functionalities, the processes involved, and the domain. During the interview, these key participants must be involved in a full-time basis, and no observers should be allowed in.

For all the interview sessions we have a leader (or a group of them) who will be the mediator, someone specially trained in structured process for knowledge acquisition, to facilitate consensus-reaching and run efficient meetings. These sessions should have some facilities: i) located offsite, ideally in a hotel or conference center; ii) visual aid support; iii) computer support, iv) camera to record whiteboard contents and sound recorder to store discussions; v) post-its, paper and pens; and vi) name cards (if needed).

The first knowledge acquisition technique to be applied is the Card Sorting.

2.2.1 Card Sorting.

It is a technique for sorting and categorizing groups of knowledge objects. The basic aim is to support the expert's grouping of concepts into significant clusters. The visual metaphor for Card Sorting is that of taking a series of cards, each of which has a visual representation of a knowledge object on it, and then sorting them into piles to make distinctions between them. By doing a card sorting, the various ways in which experts 'see' a set of concepts, and the various types of distinction that they make between them can be made clear. In our proposal the mediator obtains sets of equipment that broadly cover the domain (derived from books, manuals, tutorial, etc). Then, the mediator asks the participants to mention other concepts/equipment that they know of or remember. The mediator then transfers each piece of equipment to a card. The participants then sort the cards into common groups/functions according to similarity, as in Figure 4. The participants create the sorting criteria. The groups themselves are grouped until eventually a hierarchy is formed.

2.2.2 Laddered Grid.

Each hierarchy is a family of equipment. For each classification discovered after the Card Sort use, we apply the Laddered Grid Technique. The laddered grid uses pre-defined questions to persuade an expert to expand a taxonomic hierarchy to its fullest extent [7].

This technique allows the knowledge engineer to construct laddered grids corresponding to decomposition hierarchies for a particular domain-specific relationship. The two most common types of hierarchies are taxonomic (is-a) and compositional (part-of); however, ladders can be constructed for any relationship (e.g. a functional decomposition), and mixed ladders (which feature multiple relation and element types) can also be used.

Here participants and mediator refer to a ladder presented on paper or a computer screen, and add, delete, rename or re-classify nodes as appropriate.

This phase also involves a set of predefined probe questions, such as ‘Could you tell me some sub-types of X?”, "Could you tell me how you can tell that something is X?” and "Why would you prefer X to Y?”.

In our approach, as said before, each concept is analogous to a piece of equipment. Here, we try to improve the previous categorization conducting the audience with some direct questions on:

- Functionalities of this kind of equipment;
- Properties which identify this equipment;
- The most important parts (pieces) of this kind of equipment;
- Example of equipment (equipment belongs in this kind/family of equipment);
- Related processes (processes where this equipment is normally used);

These questions are made orally and the answers are posted on a whiteboard for everyone to validate them.

Some questions are made and the answers should be written by each participant to preserve one’s individuality. These questions are about: i)Needed competences to operate the equipment; ii)Needed competences to operate the equipment; and iii)People who have expertise with this kind of equipment.

After the use of this technique, we move on to a finer equipment classification. During the interview, the mediator can use photographs, sketches, animations and drawings to illustrate some issues.
The Card Sorting and Laddered Grid are complementary techniques. When Card Sorting provides terms which are mapped in concepts (equipment) in ontology, the Laddered Grid produces terms which can be new concepts, attributes, instances and new relations.

Of course, these techniques have limitations, as shown in Table 1 and Table 2, but the use of both together improves the knowledge acquisition process.

### Table 1. Card Sorting Technique (Strengths and Limitations)

| Strengths | Gives structure to large concepts sets, and it is easy to execute [8]. Appropriate for systems with natural hierarchical organization [9]. Apart from detailed knowledge which experts bring to bear on specialized areas, experts are also likely to have a more global structuring of the domain. Concept/card sorting helps identify this meta-knowledge [10]. |
| Limitations | Requires preparatory work to create concepts. Requires knowledge engineer trained in interpretation. Requires computer. Hierarchy may be too restrictive. Permits only one view per sorting run. Some aspects may be distorted and lost [8] |

### Table 2. Laddered Grid Technique (Strengths and Limitations)

| Strengths | Highly similar to interview format |
| Limitations | Requires knowledge engineers trained in rule analysis [8] |

### 3. THE STUDY CASE

This approach was applied in a Brazilian Oil Company. The problem faced by this company is typically a problem of “knowledge loss”. This company owns several items of equipment, from those to find and extract petroleum to the manufacturing of oil products. At the refinery, several pieces of equipment are used but, in due time, a great deal of technical information about these were lost. Knowledge about handling the equipment, its types, applications, purposes and operation, was only in the minds of more experienced employees. That is, if a more experienced employee, holder of critical knowledge on important equipment is dismissed, retires or is transferred to another section, he/she takes this knowledge with him/her. That is, the company loses its knowledge, and time costs to training another person are very high.

Another problem, which we deem as having greater complexity is that the company does not have the ability to gauge what it actually knows, i.e., the competences mastered by organization, thereby bringing forth greater difficulties in discovering specialists in different kinds of equipment.

With the need of representing the knowledge on equipment, transforming the knowledge residing in employees’ minds into public knowledge, we conduct some dynamics with experts. The interviews were made to represent knowledge and construct an ontology for Dynamic Equipment; Figures 3 and 4 illustrate it.

Some issues have to be stressed in this study case:
- All participants are very experienced company employees;
- The interview sections had 2 mediators, who worked alternately;
- All participants used in the knowledge acquisition process validated the final ontology, and all of
them agreed with the completeness of it;

- The final ontology was validated, by the second time, by another expert, who did not participate of the interview stage. This validation is important because participants can be influenced by the knowledge acquisition process and, thus, interfere with the final evaluation. This expert agreed with the quality and completeness of the ontology.

Now, this ontology is used to classify learning resources and documents. Users agree that the document finding, searching for internal competences and finding a person with a specific expertise is now easier work. The final ontology permits an inexperienced worker to learn about a piece of equipment, see how it works through simulations, contacting experienced people and experts.

4. CONCLUSION AND FUTURE WORK

Design and manufacturing are important activities of the modern world and several web platforms are used to aim in interoperability of design and manufacturing processes. Equipment has fundamental importance in a design and manufacturing process and we observed that after learning, knowing and adapting to the equipment in a design process, all the activities executed by a professional flow in a faster, safer and more confident way.

Analyzing this scenario in a design and manufacturing process, we can identify several pieces of (important) equipment having been used in different processes. So, our proposal is to adopt an equipment centered vision, analyzing concepts, processes/activities, competences and resources as per equipment. For that, a common vocabulary is necessary, and this work aims at describing a methodology to create an ontology based on equipment.

Our work was applied on an actual equipment knowledge loss problem in a Brazilian Oil Company. Initially, we describe our equipment centered vision, discuss a common design and manufacturing process and the knowledge exchange in it, and show our approach and the study case conclusions.

As future work we envision the study, and possibly adoption, of other knowledge acquisition techniques in our approach, such as the Repertory Grid Technique. We hope to conduct more experiments in the design and manufacturing context.

This approach is part of the GCE project, a project about Knowledge Management centered on Equipment.

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GRAPHICAL INTERACTIVE MODELING OF WORKFLOWS IN WEB BASED REPOSITORIES

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ABSTRACT
A main obstacle during the implementation of online repositories based on content management system is the difficulty of adapting workflows in content management systems accordingly to the needs in the repository. We developed a semi-automatic method to redesign processes or to add new processes. This facilitates the implementation and maintenance of the whole system, and addresses the common mistake of adapting workflows to software instead of adapting software to workflows. We demonstrate the feasibility of our proposal by implementing prototypical usecases in our online repository.

KEYWORDS
Interactive Workflow Design, Web Based Courseware

1. INTRODUCTION
When building virtual communities for purposes like e-learning, courseware or repositories for online resources, today it is most likely that one will use content management systems (CMS) like WebCT originating from the University of British Columbia, Blackboard from Cornell University, commercial systems like Coremedia CMS from CoreMedia AG or open source software like Typo3 (www.typo3.org) or Lenya (lenya.apache.org). The advantage of using standard software packages is the richness of already included services and facilities like user management with authorization and authentication, authoring support, versioning, internationalization, categorization, scheduling, layout templates for an integrated look and feel, search facilities and others. An additional advantage of using standard software is constantly ongoing development that in general allows for having additional features in future versions. A minor drawback is that migration to newer software versions may be complicated.

Besides these rather useful features, CMS are prepared for easy adaptation of their look and feel like colors and logos and are also prepared for the adaptation of the menu style (on top or on the side, how many hierarchy steps etc). Dealing with additional self developed services, or complete design of processes, one has to interfere deeply with the CMS by adapting configuration files, programming additional code and even modifying libraries of the CMS. Therefore, the modification and adaptation of workflow addresses very different parts of the CMS, from the user interface to data storage, from code development to configuration files.

We experienced this complexity when implementing an online repository for educational use in the computer graphics domain with two special services “code based interactivity” and “server side compiling” (Görke et al., 2005). These services allow for creating so called live graphic gems with modifiable program listings and corresponding interactive applets. Abstracting from these services, we need additional workflows in our repository in order to use our services in different learning scenarios like students self study, peer reviewing, and online evaluation.

The above cited complexity may be mitigated by our approach of integrating a workflow editor and a standard library of actions and events into the underlying CMS in order to give users the possibility of graphically design their workflows followed by a semi-automatic deployment in the online repository.
2. RELATED WORK

In general, today’s document management systems – whether web based or not, whether commercial ones or open source projects – do not offer possibilities to remodel or add any additional workflows. Better document management systems offer libraries with APIs to the user or at least offer their system calls – but at a very low level.

In the academic world, workflows are known as derivatives of Petri networks (Petri, 1962). These were invented in 1962 by Carl Adam Petri at the University of Bonn. He created a graphical description of concurrent threads useful for distributed systems. Although his work was primarily invented for automation theory, it adapts well to workflow theory. In the mid-1970s, Officetalk (Ellis and Bernal, 1982) and Wharton’s SCOOP (Meyer, 1997) at Xerox Park showed the development towards automated business processing. From 1985 on, commercial workflow systems were developed and sold. An overview of these systems can be found at (zur Muehlen, 2004).

Academic research refocused on workflow processes in the 1990s. Most mentionable is the work of van der Aalst (van der Aalst et al., 2003) who demonstrated the tight relationship between Petri nets and workflow by systematically evaluating existing workflow languages and systems and giving the analogous constructs in Petri nets (van der Aalst and ter Hofstede, 2002).

The Workflow Management Coalition (WFMC), founded in August 1993, is an organization that tries to establish common standards in the domain of workflow management. Fruits of their proposals are the workflow API (WAPI) and the Workflow Process Definition Language (WPDL). This was evolved in 2002 to be compatible with the extended markup language (XML), the resulting XML dialect was called XPDL.

3. TECHNICAL BACKGROUND

Workflow management systems are software that interpret formal descriptions of workflows, store states of the activity chain and assign tasks to applications or users. Workflow management therefore implicates advantages over traditional non graphical process management: the development risk is reduced, the implementation of workflows is centralized, and the development time is reduced, facilitating furthermore the maintainability and bringing more flexibility (zur Muehlen, 2004).

Workflow management includes four different technical layers: states, context, programming logic and user interface. The state layer defines the logic and steps of the workflow. The context layer enables to read and write context variables in order to interact with the environment. Programming logic is necessary for steering external applications, for triggering actions and generating complex events (for example sending emails). The user interface layer finally defines how to get information from users like “approving someone access to a system” or the like.

Workflow schemas are defined as a guarded automaton, consisting of a set of states, a set of transitions, a set of events, a set of conditions, a set of actions, a set of variables and an initial state. Instances of workflows are composed of a workflow schema, a current state and instances of the variables in the workflow schema. Each instance is followed by a successor. This successor instance consists of the same workflow schema, but another current state and possibly newly assigned variable instances. The new current state is determined by examining transitions that have the old current state as starting state, the new current state as end state, a corresponding event, and all conditions fulfilled. Transitions also steer the assignment of values to variable instances.

In the following chapters, we discuss in detail the different parts of our online repository and the different tools necessary to achieve the above proposed workflow configuration and management system.

3.1 Content Management System

When establishing our online repository, we had to choose a suitable content management system, as we did not want to reinvent the wheel by writing a content management system from the scratch. Today’s available content management systems (www.opensourcecms.org, www.cmsmatrix.com) already offer a huge amount of included services like user management, integration with LDAP, versioning, searching, scheduling, authoring support, internationalization, categorization. As we developed own services, we had to look for
easy extendibility. Second, we want to be able to distribute our system so we chose open source software. A majority of open source content management systems deploy PHP (Typo3, Mambo, PostNuke) that very often suffers from severe security vulnerabilities. In addition, maintainability of systems written in PHP is less optimal as the technique is rather old. New concepts like XML/XSL (Yergeau, 2004; Clark, 1999) based content processing are only available in additional libraries. Lenya, an Apache project (lenya.apache.org) contrarily is a content management system based on a XML/XSL transforming framework called Cocoon (cocoon.apache.org). A modern technical basis, all necessary standard services of a modern content management system included, possibilities to integrate self developed extensions and services and even a workflow interpretation machine based on configuration files in XML characterize this CMS.

3.2 Workflow Editor

For editing workflows, almost every editor capable of generating XML files fits the task. We primarily evaluated open source workflow editors, mostly within the context of open source workflow engines. Additionally, we tried out Open Office Draw (http://www.openoffice.org/) for comparison purposes. Main criteria of the evaluation were the usability, the stability and the generated XML code. We looked at the editor of Twister, Con:cern, Enhydra JaWE, YAWL (van der Aalst et al., 2004), OSWorkflow (http://www.opensymphony.com/oswork-flow/), and Open Office Draw.

<table>
<thead>
<tr>
<th>Editor</th>
<th>Usability</th>
<th>Stability</th>
<th>Generated Code</th>
<th>Remarks</th>
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<td>Twister</td>
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<td>-</td>
<td>Additional tools necessary</td>
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<tr>
<td>Con:cern</td>
<td>+</td>
<td>0</td>
<td>-</td>
<td>Generates Java code</td>
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<tr>
<td>Enhydra JaWE</td>
<td>0/+</td>
<td>0</td>
<td>+</td>
<td>Lacks usability features (no labeling)</td>
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<tr>
<td>YAWL</td>
<td>0/+</td>
<td>+</td>
<td>+</td>
<td>Best tradeoff between the three criteria</td>
</tr>
<tr>
<td>OSWorkflow</td>
<td>+/-</td>
<td>-</td>
<td>+</td>
<td>Looses layout after save</td>
</tr>
<tr>
<td>Open Office Draw</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>Generates binary XML with included layout information</td>
</tr>
</tbody>
</table>

The results of the evaluation are listed in table 1. We denote a minus (-) for unacceptable, a zero (0) for not good, but acceptable and a plus (+) for good implementation.

Every editor has its advantages and disadvantages. Very astonishing some editors lost knowledge of the tediously modeled layout of the graphs after saving and reopening documents. Others unexpectedly terminated without letting time to the user to save his work. Open Office Draw was the best editor, if it would have generated pure XML instead of XML combined with binary data. We finally chose the YAWL editor, as it seems to be the best compromise for the tested features.

4. USECASE: PEER REVIEWING

As an exemplary usecase we implemented a peer reviewing process, a well known process for evaluation purposes and quality assurance in the scientific community. Well established in the 1950s, it is a common instrument especially useful in the domain of scientific conferences.

For a rather critical description, see (Brown, 2004). In our usecase, we adopt peer reviewing for learning groups among students.

In our case, we tackle a student’s tutorial scenario: students are given an exercise that they have to work on. Then, they have to show their results to peer groups in an anonymous way. The peers will evaluate the solutions and annotate feedback by filling out a form. These forms are sent to an editor in chief who decides whether to publish the solution or not. This peer reviewing workflow is just an example; it may be modified and extended later on.

In order to implement this process in our courseware, we have to consider some possible pitfalls:

- Workflows are attached to documents belonging to users – forms are new documents that have to created and assigned to users
- Synchronisation has to be guaranteed
- Evaluation forms have to be anonymous though we are treating documents belonging to users
The submission process is started by the creation of a document in the system. The user proposes the document, i.e., solution to the editor in chief. The editor in chief assigns newly created evaluation forms to three independent peer reviewers. The reviewers were chosen by the system: the system only has to select randomly users or groups that have suitable roles. When reviewers accept the reviewing task, they fill out the evaluation form. In case of rejection of the review, the system simply chooses a new reviewer randomly. In a future step, an evaluation rejection ratio per user may be updated in order to guarantee that all users have the same amount of work. When the evaluation form is completed, users submit it back to the editor in chief. The system presents the vote summary to the editor in chief at his next login. He finally accepts the solution for publication or rejects it.

5. CONCLUSION

Our approach strongly facilitates the adaptation of workflows in virtual communities build on content management systems. Our approach tackles the adaptability of content management systems that we felt insufficient when we promoted our service enriched online repository. We successfully offer the possibility to create new workflows demonstrated with the above cited peer reviewing. The process of workflow definition and implementation is yet not fully automated as we have shown with our example. Thereby users still have to interfere with the system – in our future work, this hopefully will not be any more necessary. Our useful approach not only addresses virtual communities but all web based systems with processes that normally lack graphical workflow management possibilities. Our approach relies on usecases and actions that necessitate programming only if the library with common cases is insufficient. Nevertheless, we also give the rich possibilities of programming to the developer in case he wants to. We assist him with doing so by generating program skeletons. The usability, possible use and maintainability of the web based system is heavily improved.

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COMMUNITIES FOR THE “LESS CONVINCED”
A MODEL FOR SME LEARNING BASED ON
COMMUNITIES OF PRACTICE

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ABSTRACT
This paper describes the process of design of a model for learning in SMEs based on the “community of practice”. Previous research led us to conclude that formal learning approaches are, in many cases inappropriate for SMEs. Learning takes place, but it is more usually of an informal, situated nature, and formal learning approaches are often rejected as unsuitable. The characteristics of this kind of learning have much in common with the learning that takes place in communities of practice, and indeed in many cases communities of practice can be identified. However the learning that takes place is largely ad hoc and as such not always as structured as it could be. At the same time however, very structured approaches to learning and training in the SME context are rarely successful, either due to the fact that the training offered is inappropriate to the company’s needs or because the way it is structured comes into conflict with other priorities and time considerations. SME learners need highly appropriate and flexible approaches that allow them to learn when they need to, and at the same time provide continuous support for this.

KEYWORDS
Communities of Practice, SME, informal learning

1. INTRODUCTION
This paper describes the process of design of a model for learning in SMEs based on the “community of practice”. Previous research led us to conclude that formal learning approaches are, in many cases inappropriate for SMEs. Learning in this context is more usually of an informal, situated nature, and formal learning approaches are often rejected as unsuitable. This kind of learning have much in common with the learning that takes place in communities of practice. However it is important to recognize and engage with a series of caveats at the outset:

1. The term community is overused. In our view it is necessary to set out our understanding of the concept and this document in its first section aims to do this. Having said this, it is important to recognize the difficulties involved in defining the term, particularly because a plethora of different definitions have appeared over time. The overlap between these concepts is often considerable, and confusing. Our principal focus is on the community of practice, both because it is a model derived from observation of workplace activity, and because it focuses explicitly on the ways in which learning is situated within participation in the community.

2. There is an important distinction to be made between the learning community, and the community of practice, and this distinction is located in the difference between the usually unplanned or informal learning that takes place in the latter and the structured nature of the former. This consideration is important since it fundamentally affects our approach to design; rather than designing a community of practice, we will
attempt to create the conditions in which something resembling a community of practice, albeit with certain idiosyncrasies derived from the nature of the SME context, emerges.

3. Kimble and Hildreth state with regard to the use of community models in business contexts; “The results of a community are unpredictable” and for this reason the concept may not be well received especially in highly competitive results-oriented contexts such as SMEs. Notwithstanding, it should be noted that, in business contexts we do encounter much of the behavior found in communities of practice. However this is an important issue and the resistances that maybe encountered as a result need to be taken into account.

4. Lastly both Kimble and Hildreth and Lueg point to the importance of co-location as a fundamental element of communities of practice and question whether it is possible to work with online communities of practice. While this objection would seem to answered by the plethora of existing online communities, and by other authors for example Preece and Maloney-Kirchmar who, quoting Amy Bruckman, identify the strength and nature of online relationships as overcoming the difficulties related to the absence online of the social presence afforded by co-location, the objection is especially valid for the SME context.

These caveats indicate that the use of a model for learning derived from the literature on communities of practice and other kinds, needs to be approached with considerable care. However, as we have noted, formal learning approaches, and the use of technology for learning (e-learning) have largely failed to provide SMEs with appropriate solutions, and much of the kind of informal learning that takes place shows such similarities with what is described in the literature relating to communities of practice that we feel it is important to research the potential of a model for learning on SMEs based on the concept of the community of practice.

This document initiates the process of creation of a provisional working model. As we have already suggested the initial considerations and general structure set out will be refined and perhaps reorganized through discussion with the SMEs who participate, and is furthermore expected to evolve with time. The article begins with a brief summary of our review of the concept of the community of practice and some characteristics of web-based communities identified by different authors as necessary conditions for the emergence of a community. These principles are summarized in table 1. For reasons of space a fuller description of each principle is not possible in this article. We then derive from these principles a series of central ideas and a general structure before going on to identify the key questions that will inform the development (this will be a user-centered participatory process) of an appropriate model for learning in the SME context.

2. THE MODEL

2.1 The Literature Review

Our examination of the concept of the community of practice focused on the work of Lave and Wenger and Wenger’s later work, in which learning is understood principally as a social activity that is part of a wider process in which individuals participate actively in communities of practice. Our research indicates that much learning in SMEs is informal in the sense that it is not planned, and community-based in that it is based fundamentally on learning through participation with others in processes that are based on activity within a context rather than learning in the abstract about that context from outside it. The concept of the community of practice illuminates these processes and points to ways in which these processes may be facilitated and supported, using a model informed by the work of Wenger and others. In table 1 the basic characteristics of the community of practice as described by Lave and Wenger are summarized, as well as the contributions of Brown and Duguid, who, working with ethnographic research done by Orr, focused on how knowledge is created within the community rather than the nature of the community itself.

The literature on communities throws up a range of principles that seem to help in the cultivation of a community of practice. We focused on three different descriptions, the first of which is the work of Wenger, McDermott and Snyder. These authors propose a series of seven principles (table 1). Daniel, McCalla and Schwier propose a different though related series of guiding principles. They distinguish between distributed communities of practice as defined by Lave and Wenger and virtual learning communities. They list these authors’ key aspects of distributed communities of practice, and then go on to define a fundamental series of elements for virtual learning communities. The other work we examined in detail is Amy Jo Kim’s list of
simple design principles ("social scaffolding") for rich online communities, all of these are also summarized in table 1.

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<td>Common identity</td>
<td>Shared purpose</td>
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<td>Mutual engagement</td>
<td>Social constructivism</td>
<td>Context</td>
<td>Common identity</td>
<td>Shared objectives</td>
<td>Individual in community</td>
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<td>Shared information and knowledge</td>
<td>Explicit learning goals</td>
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<td>Shared protocols and objectives</td>
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<td>Open design</td>
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<td>Cognitive/social presence</td>
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2.2 Central Ideas – A General Structure for the Model

After completing this literature review we drew out a series of central ideas, which will form the general structure of the model proposed. We will outline these first, and then propose ways of developing this structure in further detail.

First there are three central elements that are shared in the different descriptions of communities of practice, these are all similar in nature to Wenger’s original description and relate to identity (mutual implication) background (shared repertoire) and objectives (joint enterprise). In addition to these is the question of motivation. In many communities participants can be described as self-motivated, but in the SME context it would be rash to assume this. Wenger, McDermott and Snyder use the idea of value in this context. Participation in the community must be in some way of value to its members. It is clear that this element is key in this context where without perceived value it will be nigh impossible to promote the entry of individuals into the nascent community, let alone ensure their continuing participation.

After this come a series of recommendations related to the design and maintenance of communities which form two groups. The first of these, which we will denominate the “framework”, has to do with the configuration of the space in which the community exists, and includes aspects relating to the tools used and the spaces created and initial consensus-based norms that govern the way the community functions (though these may change). The idea of framework can however also be understood as governing the evolution over time, which we refer to as the temporal framework. This includes not only the stages of emergence, but also the sense of history of the community, the rhythms of interaction, the interaction between familiar events and rites and spontaneous activity.

The other group of recommendations can be termed “presence”. This includes all the elements relating to interaction, dialogue and the interrelation of the participants and the different roles they adopt at different times. In a sense these are elements that cannot be defined beforehand as they are emergent, and conditioned by the way in which the participants behave and interact within the community. From the point of view of this project they are key because they constitute the processes through which learning will take place through participation in the community. We have divided the idea of presence into two areas along the lines of the Community of Enquiry (Garrison and Anderson, 2005) which though more focused on formal educational contexts is of use, since the divisions though they overlap at times, are useful tools for thinking about these aspects. The theory distinguishes between social presence, cognitive presence and teaching presence. In our description the framework is equivalent to the third of these; teaching presence.

These groupings have been used to organize the range of terms and recommendations we have explored in the literature. (table 1). It is important to bear in mind that though the design and configuration of the “framework” can to some extent be defined beforehand, many aspects cannot be defined without reference to the participants themselves and their shared repertoires, identities etc. The initial model in this context is therefore the structure for a series of questions to be answered with reference to these potential participants as part of a process of participatory development. The model proposed in the next section, rather than a blueprint, is therefore a starting point for this process.

3. CONCLUSION

These heading in the left-hand column of the table constitute a starting point for development, and raise a provisional series of questions that need to be answered through the involvement of the potential community.

Basic elements: There are three basic elements involved in communities of practice, mutual engagement, shared repertoire and joint enterprise. The last key element is motivation, and the potential value of the community. The questions that need to be asked in relation to these concepts include the following:

What are the common interests of this potential “community of practice”? What shared history and knowledge may it have? How do members of this potential community view themselves? Is there a shared identity? How do the potential members of this community currently engage/interact with each other? What might be their shared objectives and/or needs? How might this model help them to achieve these shared objectives? What other sources of value might there be for participants? How can this potential value be demonstrated, both before the start and during the life of the community?
Framework: The virtual framework includes the following issues that need to be addressed; the tools provided, the design of the community and the different spaces available. Questions include:
What experience do potential participants have of online activity? To what extent are potential participants likely to need technical support in order to use the tools provided? Apart from the software tools what kind of resources would be valuable to potential participants in the community? Is there an identifiable set of norms and protocols that would be acceptable to potential members of the community?
The temporal framework includes issues such as a shared history, possible events within the community, and the rhythm of the community.
What kind of time commitment is likely to be possible for participants? How often are they likely to connect? Is there a history of similar face to face community activity among the participants? Are there events within the potential community that could be supported or enriched by online activity? What kind of regular activities might be seen as valuable elements of the community by potential participants?
Presence: Issues involved in this area involve fomenting collaboration, interaction and dialogue, as well as the sharing of information and knowledge and the development of trust.
Are there natural leaders or champions within the potential community who could act as attractors for other participants? Are there identifiable peripheral experts who could be encouraged to participate sporadically? Are there potential participants who have experience in moderation? What interrelations exist between potential participants already? Are there cultural aspects or attitudes that may affect participation? Does the current group of potential participants currently collaborate in any way? How do potential participants view their peers in the sector? What kinds of interactive activity are likely to be most valued?
This list of questions is currently undergoing refinement, and the process of involvement of the potential participants in the development process, the SMEs will generate an initial model. The process will be described in more detail in future papers.

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ABSTRACT
With this paper the authors will discuss and analyze one ongoing experience on collaborative learning in the industry field, managed by one technological center in Portugal. The analyses and discussion will be grounded on the questioning of diverse theoretical approaches to learning communities, communities of practice, value networks, collective intelligence and their fit (or not) to the case study. Are theoretical frames reviewed in practical experiences? The field experiences are consistent with the proposed theories? What makes practice work? How can we enable and strive knowledge creation and sharing? What’s the basis for collective intelligence? What’s the technology role? These are some of the questions that the authors will analyze and discuss with this paper.

KEYWORDS
Value networks, collective intelligence, value creation, innovation

1. INTRODUCTION
The concept of community has long been studied across several fields of knowledge, varying from management sciences to social sciences. Since the beginning of its use, the word’ polysemy is recognized although non consensual. In our days this plurality of meanings and terminologies has been transposed to concepts like “Communities of Practice” (CoPs), “Communities of Learning” (CoLs), “Knowledge Networks” (KN), “Value Networks” (VN), “Networks”, among many others. Although there are some ideas, such as communities are at the center of the collaborative learning processes that are common, there are others that are subject to variations.

According to Fernandes and Rocha (2006) if we look back in history we can find several examples of communities were knowledge was shared and taught, the authors ask themselves if rupestral pictures weren’t less art form and more one visual representation of the knowledge required for hunting. The learning of a new profession by mentoring is consistent with this approach. These practices align with Schon’ “reflective practice” (Schon, 1982) were learning is accompanied and done in phases.

As we can see, this is not a new or revolutionary approach to this social phenomenon, otherwise is the phenomenon that has changed appearance with the technology’ help. In our perspective, technology unfolds the communities’ potential to create and share knowledge. The technology enables communities to be of common interest or expertise and not of common location (Dvorack, 2005; Lickider & Taylor quoted by Andrade, 2005).

CoPs are defined as learning groups in which new insights can be transformed into knowledge through mutual engagement around a joint enterprise (Wenger, 1998, p. 214) or in a later review as groups of people informally bounded together by shared expertise and passion for a joint enterprise (Wenger & Snyder, 2000, p. 139). Dynamic in CoPs is potentiated by trust, collaboration, participation, communication, life span and
leadership (Wenger & Snyder, 2000). Although there are some authors ( Büchel & Raub, 2002) that argue that the approach of Wenger and Snyder to CoPs neglects the organizational support that networks can benefit along with the benefits to the organization that the member belong. So following this line Büchel and Raub (2002) propose a new concept “Value Networks” (VN) based on an empirical study, and argue that there are four types of networks: hobby networks, professional networks, best-practices networks and business opportunities networks. The first three categories are according to the classical definition of CoPs proposed by Wenger and Snyder exposed above, but the fourth “Business opportunities networks” goes beyond. These networks are reported as business driven, and entrepreneurial networks which are potentially the most innovative and attractive, from a growth and development perspective. Building VN implies, according to Büchel and Raub (2002), passing through four stages: 1) focusing, 2) creating a context, 3) routinizing the activities, and 4) leveraging the results.

These reflections lead us to the collective intelligence concept. It was coined and presented to the scientific community by Wheeler (1911) and flourished for several years in the literature on social insects (e.g. ants and bees). The classical approach was transposed to the complex systems theory in the late 80s, and it was viewed like an excellent example for the arose of high-level complexity from low-level simplicity (Kelly, 1994; Langton, 1995; Resnick, 1994; Sulis, 1997). Today this idea is very popular, it’s used in economics, artificial intelligence, psychology, etc. Collective intelligence is viewed by researchers like the synergy that takes place when a community/network’s know-how exceeds the total sum of individuals contributions (Kahan, 2004). Facing the idea of VN where one plus one isn’t equal to three and the result of the community interaction is more than the sum of the parts contribution. The generated synergy plays an important role in the creation of new knowledge and in the innovative process.

The practical implication of communities (in its wider meaning), weather supported by the technology or not, are several, varying from social and affiliation issues to technological and ethical issues.

2. POSITIONING THE COMMUNITY IN STUDY

In this paper we are analyzing the functioning of 8 networks coordinated and managed by a Technological Center in Portugal. Some of these networks date back to 1987 and still active nowadays, having in mean 26 members (total of 210 member for all the 8 networks). These networks have specific goals to achieve, and its members have well defined roles and tasks, outputs are clear to all, although the participation is non-remunerated and free. All of the networks are in important business areas and/or innovative sectors (technology, industry intervention, special projects, etc.).

These networks where designed to develop the ability to respond to core needs common to all of the members/organizations evolved. An example is the identification, conceptualization and analyses of emerging trends as the base for strategic interventions. But are equally thought of, for supporting the organization' strategic objectives. There is always an holistic perspective on the integration of the member and the organization in one macro-economic setting.

2.1 Structural analyses

In 2003 it was made one evaluation for the 8 networks, until the moment working only based on traditional techniques, such as, presential meetings, telephone, fax and e-mail. There are some tasks, for example voting one document that implied a lot of coordination work. Imagine sending the document to all the community members, receiving the voting information from all of them through fax or letter, checking it out and replying back with the result. In this setting economic issues (e.g. time, paper, phone, etc) where very expressive for a non-remunerated working group.

Due to several contextual variables and to the referred evaluation process it was implemented a new working method based on a learning management system (LMS) located in the Internet and owned by the technological center. All the documents exchange, voting processes, exchange of opinions, and some reunions are know done through the LMS. The costs were widely reduced from the coordination perspective, and the work was done in an efficient and faster way. For example, since 1987 until 2003 there where in average 36 presential meetings/year, and from 2004 until know there where 19 presential meetings/years. The members’ time gain is clear.
The access to technology enabled new working methods. The voting process was widely simplified, tasks to be done were automatically generated and send to the members, statistics on the process also. The work can know be done from anywhere with access to the Internet. The technology potentiated the community interaction and work, and since 2004 the majority of the work was virtually sustained through the LMS.

2.2 Value networks and collective intelligence

The networks we are studying face the requirements for being a CoP. Are a group of people bounded together by shared expertise. Although the members didn’t join informally (at least all of them), as Wenger and Snyder defend, they asked to be part of the network. Several principles are meet: 1) there is participation from all the members, 2) the members trust each other with confidential and privileged information, 3) there is collaboration between the members in getting the things done, 4) the members communicate in a regular basis, most of the times with the technology’ help. But there is something else. As we have expose above, Büchel and Raub argue that Wenger and Snyder’ definition neglects the organizational support that networks can benefit along with the added value to the member and to the organization. Our network as both, managerial support and the members/organizations have gains in belonging to the network. These members and organizations are knowledge and opportunity driven. They have access to privileged information and connections with people working in the area or with the same interests. One of the main reasons for joining a network is the social capital underneath.

In figure 1 we can see the position of our value networks according to Büchel and Raub model. It aligns with the “Business Opportunity Network”, it is business-driven and an entrepreneurial network. The network members are genuinely interested in creating new products (e.g. working papers, document, working documents, norms) that can lead to new or renewed business opportunities. Like happens when new knowledge is generated, these products don’t necessarily fit into pre-existing business models. Sometimes, like in all creative settings rules are broken and new ones appear, the potential for new products and ideas is unlocked.

There are several studies that point in the direction that most of the knowledge used in organizational settings is developed externally (Karrissson et al, 2004; Paruchuri, 2004). These networks strive knowledge creation and being a member means to have access to it in the first place.

Why collective intelligence? All the members used their own skills and developed new ones with the belongingness to these networks. Several tangible and intangible outputs were accomplished. And this is clearly the scenario where “1+1≠2”, the group is different from the adding of the parts, according to the “Business Opportunity Network” (Büchel & Raub, 2002) and the collective intelligence model (Sulis, 1997). Belonging to the right community is knowledge, and having access to right knowledge in the right time is power. Power to innovate, to strive creation and to face the market and environment challenges.

3. CONCLUSION

Knowledge has long been the core competency for associations, technological and training centers, universities, industry and services. The networks’ value, especially “Business Networks” is widely
recognized as one of the means for striving new knowledge. Being a community member means to give and to receive, and to contribute to the creation of new knowledge that they can call their own.

The access to technology enhanced the work-flow and made the process easier and cheaper. In these settings strategic partnerships are made (though than tacit some of the times) all the members and organizations gain, it’s a “win-win” situation for all. Each network is unique, has its identity, its culture, its rules, its norms and obviously its collective intelligence and collective memory.

But, not all the CoPs or VN are success cases. As happens worldwide, the technological center that coordinates these set of networks is learning with experience and trying to get the best out of it.

What are the key points to the success? We can point some reasons: 1) there are tangible results to be achieved (e.g. norms, working papers, working documents, norms’ translation, voting); 2) the members and organizations have gains in being part of the network (e.g. knowledge, contact list, work optimization); 3) the network is mediated by the technology striving the cooperative process; 4) there is privileged access to classified information; 5) members and organizations improve core capabilities that deliver customer value; 6) members and organizations improve the management of opportunities and threats by seeing across the whole network. It’s a strategic advantage for making investment decisions in this highly uncertain business environment. There are also many reasons for failure, such as complexity, risk, conflicting agendas, will, trust. As we know business is about building relationships that create and deliver value, increased efficiency is a precondition to success, belonging to a value network is a competitive advantage.

REFERENCES


FOR THE BLIND AND INVISIBLE:  
A GUIDING SITE OUT OF DARKNESS

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ABSTRACT
The research project, Atlantic Connections, aims to investigate the nature and process of developing an e-learning community of people who are blind. The project will evaluate the capacity of a selected web-based, voice based technology called iVocalize to provide learning opportunities, employment services, as well as opportunities for social interaction to this unique population. Critical theory provides the dominant theoretical framework informing marginalization and exclusion of the blind.

KEYWORDS
community, web-based voice-based technology, blindness

1. RESEARCH PURPOSE AND PERSPECTIVE

The overall goal of the Atlantic Connections Project is to identify factors which promote and barriers which inhibit access to and participation and success in social, learning and employment communities for people with vision loss, who traditionally have been barred from inclusion and integration. To achieve this goal this project aims to conduct needs assessments to identify unmet social, academic and employment-related needs and to develop programs and services to meet needs assessment results; to use and test the capacity of a web based voice based technology, iVocalize, developed by a visually impaired person for use by people with vision loss, as an instructional method and lastly, to develop a web based, Canada-wide, community of blind and visually impaired people.

Critical theory provides a framework for understanding the problem of marginalization of those who are blind. Critical theory is concerned with the dominant sources of political, social, economic, cultural and intellectual power and the action of the dominant holders of power to serve and to legitimize their own interests while ignoring, marginalizing or dismissing the interests of “the other” (Hogan-Royle). People with blindness in most instances lack power in all its many forms: physical power, social power, economic power. The blind lack intellectual power as a result of challenges to access and participation in educational institutions; the blind lack economic power as revealed by inordinately high unemployment rates; the blind lack social power as they report of unmet needs for social interaction and studies reveal low levels of social development are prevalent. Critical theory explains how systems function to deny, constrain or suppress the development of power of “the other” (Cherryholmes, 1988, Doyle, 1993, Royle, 1997). Giroux and McLaren (1984) explain that “cultural territoriality is constructed in a hierarchy of domination-subordination worked by a centre and margin and legitimated through the legitimizing knowledge and power of a privileged econocentric culture” (p.8). It is not surprising that the blind are among the most disempowered groups in the world as they stand at the margins and outside the borders of present cultural territory, they have become invisible to those within the borders of society. As long as modernism’s notion of social attractiveness and acceptance refers to white, male and European and not to physical disability as blindness; as long as equality will come for those at the margins only when differences are eradicated (Giroux & McLaren, 1984); then there is little hope for social, academic and economic inclusion and equality for the blind as vision loss in most instances is irreversible and permanent.
1.1 Challenges of Blindness

There is no single universally accepted definition of blindness. The term blindness can be used to describe individuals with complete loss of vision; to describe individuals who require more than glasses to function visually in the workplace and academic situations; or to describe one who must use senses other than vision to carry out activities (Needham, 1980; Tuttle, 1996). However it is universally accepted that in most instances blindness challenges, limits and most often bars inclusion in learning, social and employment communities.

Economic Exclusion: The Canadian National Institute for the Blind (CNIB) 2005 National Needs Study on employment needs of blind Canadians reveal that the unemployment rate among working age people with vision loss is as high as 75%; that most blind Canadians live in poverty and in fact many barriers to economic participation faced thirty years ago still exist today.

Social Exclusion: Low levels of social development is not uncharacteristic of the blind population and therefore the problem of social exclusion is not improbable. Studies by Van Hasselt (1993) reveal that a number of factors may be responsible for inadequate social skill development of people with vision loss. They include 1. “difficulty acquiring non-verbal interpersonal skill components such as physical gestures (a wave of the hand) and facial expressions and gestures (smiling); 2. inability to acquire social skills by modeling through visual cues (dancing skills); 3. inadequate feedback concerning interpersonal effectiveness from the environment; 4. inadequate encouragement from others to provide reinforcement contingent on adequate social performance” (Van Hasselt & Sisson, 1987, p. 242). Deficits or delays in adaptive and social behaviour are not uncommon in people who are blind.

Academic Exclusion: Low enrolment rates in post secondary colleges and universities are characteristic of both visually impaired youth and adult learners. Lukoff and Whitman (1972) concluded that “low levels of education are congruent with higher levels of non-acceptance and maladaptation of individuals concerning his/her blindness” (p. 4) as well the less education an individual attained the more likely he/she was to experience problems in accessing the workforce and participating in social activities and communities.

2. RESEARCH DESIGN

This research study uses primarily qualitative research methods; research instruments include focus group discussion sessions, participant observation, key informant interviews, and review of the literature related to needs of the blind, marginalization, web based learning technology, sense of community.

Recruitment was conducted through random sampling which involved identifying, according to specific inclusion/exclusion criteria, potential research participants from the Atlantic Provinces of Canada Blind Registry. The research sample included approximately 100 blind and visually impaired individuals distributed geographically among the four Atlantic Provinces: Newfoundland and Labrador, Nova Scotia, New Brunswick and Prince Edward Island. The sample was distributed evenly among three clusters of people who are blind: youth, working age and seniors. Recruitment materials were generated in appropriate communication format: braille, large print or tape.

Research questions were developed for each specific group. The research sample participated in two hour focus group discussion sessions in which research questions posed identified social, learning and employment needs and gaps. Data was taped, tapes were transcribed, data was inputted, coded and analysed using QRS NUDIST Ethnograph, a data storage, retrieval and analysis software. Analysis is not yet completed but preliminary findings have been generated.

2.1 Data Gathering

The primary focus of research questions is exploration of visually impaired individuals’ knowledge of, experiences in and recommendations concerning factors which promote and barriers which inhibit access to and participation and success in social, learning and economic opportunities and subsequent equity and inclusion in society.

Sample research questions posed to blind youth in focus group discussion sessions include the following:

What does blindness mean to you; what bothers you about being blind?
86. Luke (dressed as Goth) “Being blind is cool; it’s part of who I am …my identity… its me, blind Luke, When I go to the mall to meet my friends, most are Goth by the way …the guys say…hey its blind Luke!”

92. Jaime: “I don’t hide the fact that I am blind; I use MSN to chat with guys and girls everywhere and they could never know that I am blind if I didn’t tell them, but I tell them … even my MSN user name is ‘sightless’.

Many youth with vision loss claimed that they did not consider blindness a disability for them and appeared to have accepted their blindness. Studies by Adams, Pearlman and Sloan (1971) support this finding; they list acceptance as one of the three and most common responses of youth to loss of sight. Acceptance may be said to be achieved when “the blind individual could tolerate and accept the changes that loss of sight had brought and feel relatively at ease with his/her self image, adapting behaviour to meet these changes, formulating a lifestyle which was defined as being relatively anxiety free as far as it relates to the disability” (p. 72). Fitzgerald’s survey (1970) of the newly blind supports this; his findings revealed that shock, denial, anger and anxiety are present and are essentially healthy responses to loss of sight especially in the early stage; however following this stage it is important to realize that youth may feel stronger motivated to participate in life because of a prevailing sense that a lot of life is ahead of them and life is too long to live in isolation and exclusion.

In contrast older people who lose their sight appear to accept loss of sight as just another physical faculty that, with advancing age, is failing. However many elderly report that they have high levels of anxiety relating to their disability as they realize that their quality of life and life satisfaction is diminishing and they are fearful of what the future may hold for them.

98. Ethel (a blind senior): “My world is gradually shrinking; I used to be able to do gardening for a hobby and to go for walks but since I lost my sight I can no longer go outdoors; I live in a condominium and I cannot see well enough to cross the busy intersection to get to the park. I usually stay indoors all day long; my world is getting smaller and smaller”.

Working age blind individuals also participated in focus group discussion sessions. This subset included six groups of participants, approximately ten individuals in each group, between the ages 25-65. Sample questions included the following: What are the factors of your profession/career that make it an especially good career choice for a person with vision loss; what are the barriers that your career would pose for a person with vision loss? What advice would you give to a youth with vision loss wishing to choose a career; to apply for a job; to participate in an interview; to handle a career transition successfully? Could you describe your experience of disclosure: that is, disclosing to a potential employer that you are blind? What were the reactions of the job selection committee to your disclosure? What recommendations would you make concerning the issue of disclosure, when and how should a person disclose is/her blindness?

Most participants in the working age focus groups had graduated from post secondary educational institutions. The participants reported that when they were seeking employment, rather than focusing on negative barriers they were facing, they instead chose to explore, develop and implement strategies for overcoming challenges to participation in the workforce. The cognitive skills of goal setting, problem solving and decision making acquired through the process of education had informed participants’ strategy- making abilities. Studies by Ash (1995) support the claim that a good education most often determines higher employment and economic status. Ash contends that “a higher education level benefits overall adjustment to vision loss in part due to the fact that better educated individuals are less likely to be affected by the direct consequences of visual impairment particularly in terms of employment, financial income and status” (p. 37).

Analysis of data gathered in all 12 focus group sessions identified unmet social, learning and employment needs of these three groups and informed the process of development of social experiences, educational courses and employment services to be delivered using iVocalize instructional technology.

3. ASSISTIVE TECHNOLOGY

The development and use of appropriate web based technology is an especially critical need for persons with vision loss eager to avail of learning and employment opportunities. Web based, voice based technology can liberate blind users from visual and physical barriers to information and communication. The assistive technology iVocalize provides alternative, auditory rather than visual access and provides a bridge to overstep barriers associated with physical orientation and mobility experiences by people with vision loss.
Day (1995) opines that in addition “web based technology enables provision of a wide range of life opportunities for those with vision loss and subsequently dramatically improves the quality of life of these individuals” (p. 4). In this research study, people with vision loss will be taught to use the selected web based, voice based technology iVocalize and will be provided with access to three voice- based virtual rooms: a Peer Mentoring Common Room, a Moderators/Instructors Classroom for their training and private use and a general Administrator/Conference Room for conferencing usage.

The voice based technology will be used to deliver educational opportunities, social interaction experiences and employment services; the capacity of iVocalize as an instructional technology to deliver programs and services for people with vision loss, will be evaluated.

4. A COMMUNITY OF BLIND LEARNERS

Specific interests, common goals or visions shared by people are considered major elements of the concept ‘community’ A sense of community bridges barriers as geographic dispersity, race and gender, economic differences, and dissimilar life experiences (Drucker, 1993; Roper, 2001; Shaffer & Anundsen, 1999). A sense of community is developed wherever a group of individuals hold in common certain set of values or experiences. The blind share the common experience of daily lived blindness; the blind share the common values of equality and self-actualization; the blind share the common vision and pursuit of acceptance and inclusion in social, academic and economic communities.

Although web based technology has the capability to provide connectivity among individuals, access alone is not sufficient for ‘development of’ community as learners may have access to learning but have no engagement or social involvement with each other: both cognitive and social needs must be met if a sense of community is to develop. Inclusion in a community is defined as “not only access but, as well engagement at the physical, social and cognitive level with one’s peers that are at an appropriate level and worthwhile and that are a response to the needs and rights of a diversity of learners” (Moore, 1992, p.106). According to Barton (1998) “Inclusion is a learning process under the influence of political will and the agendas of different interest groups, inclusion is thus about responding to diversity, it is about listening to unfamiliar voices, being open and empowering all members however and when traditionally only the powerful have had voices and been heard, inclusion is not an easy task (p. 85).

The challenge of creating a sense of community among individuals with vision loss seems daunting. Traditionally the blind have not fit political and social symmetry; traditionally the blind have been voiceless in and invisible to mainstream society. In addition blind individuals have been more accustomed to living and working in isolation rather than as members of a community. In most instances a blind person is the only person at school who is blind; one of only a few living in a neighbourhood or town who is blind; the only one in the workplace who is blind. The challenge of developing motivation to engage and to integrate in those individuals whose experience has been traditionally of insularity, exclusion and marginalization is a difficult challenge. Yet the overall and critically important goal of this research project is to develop a sense of community, a learning community of people with vision loss. This goal is indeed worthwhile. Astin (1993) opines that “involvement in a learning community, that is involvement in one’s own learning and with one’s faculty and peers are positively associated with both self and moral development, with academic performance and with retention ….this has substantial positive correlations with self reported growth in interpersonal skills, overall academic development, analytical and problem solving skills and critical thinking skills” (p.40).

5. HOPED-FOR RESULTS AND RECOMMENDATIONS

By the completion of this project two hundred individuals with vision loss will learn to use the web based voice based technology; ten new informal educational and employment related courses will be delivered using iVocalize; a web based community peer mentoring program for 100 blind will be established; recommendations concerning web based technology for use by blind people will be identified; a web based learning community of people with vision loss will be established in the Atlantic provinces with the intention for roll-out across Canada.
The success of this research project depends heavily on finding solutions and recommendations concerning the following questions: As Palloff and Pratt (1999) have associated specific outcomes as the sense of commitment and obligation with the presence of an online community, this project seeks to learn which factors promote the development of commitment and obligation essential for development of community? Where and under what conditions do principles of community survive and thrive? What are strategies for building a sense of community; a community of learners, a web based community of blind learners? How can web based technology contribute to development of a community of persons who are blind, interacting and learning together and what must its capabilities include? In what ways can web-based technology be adapted and used to develop the social arrangements necessary to establish learning communities which will help people with vision loss reach their full potential?

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BUILDING VIRTUAL (LEARNING) COMMUNITIES TO SUPPORT PEOPLE WITH SPECIAL NEEDS UPON ALPE PLATFORM

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ABSTRACT
Virtual communities have been identified as one of the most valuable applications in the Internet. One of their main features is that they do not limit participants to particular locations. However, so far they usually do not consider accessibility issues for those who have special needs. In fact, managing virtual communities that take also into account accessibility requirements is not just a new way and added value for students with special needs to get in touch with other people, but it may be just the only way to do so. In this paper we present an accessible collaborative platform and learning management system that allows building accessible virtual communities so that students (with and without special needs) can organize themselves in communities of interest and promote dynamics in learning. A virtual community built upon this platform for members of the Spanish National University for Distance Education (UNED) interested in accessibility issues (directly or indirectly) is described in the paper.

KEYWORDS
Web-based communities, Virtual Communities, Accessibility, Students with special needs, Access for all, Design for all, Collaborative platforms, Disabilities.

1. ACCESS FOR ALL
People with any sort of disabilities are usually excluded from virtual communities when collaborative platforms are not designed according to the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) Guidelines. Accessibility means here providing an inclusive, accessible environment for actively participate in the community that might otherwise be closed to people with physical or cognitive disabilities. The Web Content Accessibility Guidelines (WCAG) explain how to make web content accessible to people with different disabilities. It has 14 guidelines that are general principles of accessible design. Each guideline has one or more checkpoints that explain how the guideline applies in a specific area. To cope with these issues the techniques for web content accessibility are the following: 1) Provide equivalent alternatives to auditory and visual content, 2) Don't rely on colour alone, 3) Use markup and style sheets and do so properly, 4) Clarify natural language usage, 5) Create tables that transform gracefully, 6) Ensure that pages featuring new technologies transform gracefully, 7) Ensure user control of time-sensitive content changes, 8) Ensure direct accessibility of embedded user interfaces, 9) Design for device-independence, 10) Use interim solutions, 11) Use W3C technologies and guidelines, 12) Provide context and orientation information, 13) Provide clear navigation mechanisms, and 14) Ensure that documents are clear and simple. These techniques address two objectives, (i) to define the requirements to allow different strategies for web access and (ii) to facilitate the integration of technical aids (any product, equipment or technical system) to compensate, reduce or neutralize the disability. The following table relates these two different approaches that can be used to facilitate users with special needs their participation in virtual communities, by avoiding the traditional restrictions from the collaborative platforms. This table is far way to be complete, but should help to clarify the whole situation.
Table 1. Disabilities, web access strategies and technical aids

<table>
<thead>
<tr>
<th>Disabilities</th>
<th>Web access strategies</th>
<th>Technical aids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blind or partially sighted</td>
<td>Keyboard browsing, metadated links, descriptions for client plug-ins, context information</td>
<td>Screen readers, text readers, voice browsers, Braille lines</td>
</tr>
<tr>
<td>Low vision</td>
<td>Elements resizing (personalized CSS), refreshing time and movements controlling</td>
<td>Screen magnifier, big screens</td>
</tr>
<tr>
<td>Colour blindness</td>
<td>Colour changes (personalized CSS)</td>
<td>High-definition screen</td>
</tr>
<tr>
<td>Deaf or hard of hearing</td>
<td>Total deafness</td>
<td>Visual error signs, audio transcription</td>
</tr>
<tr>
<td>Mobility restricted</td>
<td>Restricted</td>
<td>Interface interoperability</td>
</tr>
<tr>
<td>Cognitive impairments</td>
<td>Psychological</td>
<td>Clear browsing, wide graphics usage, no animations, synchronised video, refreshing time and movements, controlling, context information</td>
</tr>
<tr>
<td></td>
<td>Neurological</td>
<td></td>
</tr>
</tbody>
</table>

2. ALPE PLATFORM

ALPE (Accessible eLearning Platform for Europe) is an accessible, open source, standards based collaborative platform and learning management system developed at the Spanish National University from Distance Education (UNED). It can be used both as an eLearning platform that delivers barrier free web education content where virtual learning communities are created to support the distance courses offered at UNED (e.g. graduate, post graduate, life long learning, on-going education, children courses, …) and to manage virtual communities of diverse nature (e.g., student associations, research projects, collaboration communities for departments and schools, student communities for study, etc.) for different types of users (students, administrative people, tutors and faculty staff). In this paper, we focus on the virtual communities’ side.

ALPE is based on an existing learning management system called aLF where some components developed at aLF anet European Project are integrated. Moreover, assistive technologies can be integrated in ALPE to track users’ needs in order to provide personalised services. The next figure describes in more detail the different open source components that made up ALPE platform.

2.1 aLF

aLF (Active Learning Framework) has been developed by the Innova Department\(^1\) to support the requirements for the collaborative work of virtual communities at UNED since 2000. aLF is a multiplatform and open source set of tools for constructing web-based educational applications, based on dotLRN, a sophisticated enterprise-class software for learning and collaboration. aLF provides a customisation layer on top of dotLRN which has been built with the requirements of accessibility needs in mind.

\(^1\) http://www.innova.uned.es
From the user’s point of view, aLF provides a large variety of tools organised around three clearly differentiated workspaces: personal area, communities and courses. To date the statistics, aLF experiences include more than 500 different virtual communities (associated centres, departments, R&D groups, associations, student communities, teacher communities, etc.) and courses (undergraduate and postgraduate subjects, bachelor subjects, masters, PhD courses, ongoing education, open courses at national and international level, etc.), over 170,000 potential users (i.e., students and all the personnel), where around 3500 are students with disabilities (who represent about 2% of the total number of students), more than 2000,000 working sessions, over 600 tutors and 300 teachers trained to teach online, and more than 40000 real users of virtual learning communities (faculty, administrative people and students).

dotLRN is built on OpenACS, an open source enterprise framework for building scalable, community oriented web applications\(^2\). It features a number of collaborative applications (e.g. calendars, forums, file sharing) that add up to the ones that the OpenACS framework provides, as well as it integrates educational standards (SCORM, IMS) to allow delivering reusable, pedagogically supported courses. Some of this functionality is similar to the one found in other learning management systems such as WebCT and Blackboard, sometimes with additional features made possible by the common data model (e.g. a centralised alert system). The great advantage here is that dotLRN is structurally flexible and accessible and supports and accessible delivery of tools and contents based on technological and educational standards. Regarding accessibility issues, an exhaustive analysis was done by Kalnins-Cole and Peters (2005). Finally, a key differential feature of dotLRN is to support collaboration on virtual communities, not just on courses.

2.2 Adaptation Engine

One key feature of ALPE platform is that it is prepared to include the adaptive features developed in aLFanet European Project (IST-2001-33288) (Santos, Boticario and Barrera, 2005). In particular, it takes the core from the aLFanet Adaptation Module. This module is built on a multi-agent architecture developed from JADE (Java Agents DEvelopment framework) where different agents are used to perform adaptation tasks. There are Recommendation Agents (who produces the adaptations given to the user), Model Agents (that store the knowledge of the system) and Modelling Agents (who learn, by applying machine learning techniques and inference mechanisms, the unknown attributes of the models of the system). The modelling subsystem integrates WEKA algorithms (Witten and Frank, 2005), which is a data mining with open source machine learning software in Java.

The Adaptation Engine is being customized now for the needs of ALPE platform. The adaptations to the final user will put a big emphasis on properly modifying the user interface according to the particular disability of each user. For instance, in case of visual impaired users, the size of the components of the screen should change, different colour pairs should be used, the information should appear only on certain parts of the screen, different and customised keyboard shortcuts should be available. In respect to hearing impaired users, the adaptation should address selecting the appropriate range of frequencies where the user has audition, or translating sound alerts to visual messages, etc. In any case, the adaptations will take into account the web access strategies identified in Table 1.

2.3 Assistive technologies

Regarding the assistive devices, ALPE can integrate different types, with special emphasis on those developed under open source license. This work is also under progress. The goal is to integrate the technical aids mention in Table 1.

3. COMMUNITY OF USERS WITH SPECIFIC ACCESSIBILITY NEEDS

Altogether, 3379 students with different types of disabilities were reported by the Disability Support Unit (DSU) to be enrolled at UNED in the year 2005, who represent, about 2% of the total number of students. UNED is, at present, the Spanish university with the greatest number of students with disabilities (UNED is

\(^2\) http://openacs.org/
also the Spanish university with the greatest number of students). These students have a wide range of disabilities and their demands on necessities for the study also vary widely. To support the action lines of this unit, a virtual community for UNED members (personnel from the DSU, students with special needs, administrative staff, professors and researchers) with specific interests (personal, professional or both) on accessibility issues (i.e. the aDeNu research group from the Artificial Intelligence Department of the Computer Science School), has been built within the collaborative environment of ALPE (i.e. aLF).

The front page of this community can be seen in figure 2. Several relevant sections are available: General information, Forums, News and Surveys. In the upper bar of the screenshot there are other sections, such as Calendar, Documents, Membership, Sub-groups, Web-page, FAQs, ... to access the rest of the available services which cover alternative facilities to support the collaborative work of community members with accessibility requirements. In particular, members of this community have established several forums to cover issues of their interest: latest news, users’ associations, scholarships and awards, congresses, courses, sports, employment issues, research, legislation, leisure/culture and miscellaneous.

Moreover, in order for this framework to be effective, the management of the community is easily provided and the resources to be assigned to each sub-group are also configurable according to the different interests. Moreover, the organization of communities is a flexible and dynamic structure that those in charge of it administration can model according to the different groups’ use.

On the other hand, it has to be remembered that the main advantages of a virtual community like this are a) persistence, b) shared information, c) interactivity and d) participation. The first advantage refers to the possibility of gaining access to the same contents any time and anywhere. The second refers to the capacity of adding comments and sharing activities with the other participants who help clarify the subject’s concepts. The third one consists of being able to interact with the contents responding to questions or resolving problems. Finally, the most obvious advantage is the possibility of actively participating with numerous communication channels with a group of people who have common needs and interests. The four of them are fully achieved in this community thanks to the functionality provided by the collaborative platform.

Last but not least, it is relevant to recall that there are general issues that users must meet to guarantee successful interaction in these kinds of virtual communities (Etzioni, 2000): a) reputation, b) trust and c) intimacy. And, taking into account our own experience in supporting virtual communities at UNED for 5 years so far, there are three additional requirements: d) users must have common objectives, activities or interests, e) users must be involved in the activities and f) there should be a behaviour and communication protocol. The real challenge consists of making the members of the virtual community aware that they are the main protagonists of the process and that what they get out of this framework depends primarily on them.

4. CONCLUSIONS

ALPE collaborative platform and learning management system allows building accessible virtual communities where users with and without special needs can share common interests, ideas, and feelings, being aware of each other's presence on the web. Moreover, it allows building virtual learning communities
to promote dynamics in learning by accessing educational and standardized services and includes mechanisms to adapt the response to the students' needs. However, these adaptations do not only focus on promoting active participation in the collaborative services as Gaudioso and Boticario's (2003), but they also try to adapt the platform interface (for any kind of virtual community) to the special needs users may have. In this way, ALPE platform focuses on providing Access For All, in line with EU Policies for e-Inclusion in the European Information Society (European Commission, 2005). It applies WCAG 1.0 specifications (2.0 will be considered as soon as it is approved) to cover the 4 different groups of disabilities (blind or partially sighted, deaf or hard of hearing, mobility restricted, and cognitive impairments), providing web access strategies and the integration of technical aids (see Table 1).

As an example, the "users with specific accessibility needs" virtual community available to members of the Spanish National University for Distance Education with and without special needs interested in the accessibility field for personal or professional interest, and which has been implemented on the collaborative part of ALPE (i.e., aLF), has been described. The issues to be covered in a virtual community like this one are twofold. Firstly, there are those related to available functionalities. In this respect, community features are the following: (i) it is supported by fully accessible services (ii) a wide variety of interesting out-of-the-box capabilities are provided (e.g., forums, surveys, FAQs, news, event manager...), (iii) the management of the community is easily provided and the resources to be assigned to each sub-group are also configurable according to the different interests. Secondly, as far as behaviour issues are concerned, there are also some relevant aspects to be met: (i) attendance of any issue related to disabilities, impairments, and equity of opportunities, providing counselling and assistance services when needed, (ii) the organization of the community is a flexible and dynamic structure that those in charge model according to the different groups’ use, (iii) reputation, trust and intimacy are guaranteed and supported (i.e., in terms of platform services). Furthermore, the real challenge consists of making the members of the virtual community aware that they are the main protagonists of the process and that what they get out of this framework depends primarily on them. Finally, in more concrete situations such as the educational scenario, new paradigms like assisted lifelong learning will allow the increasing number of students who face social, physical and cognitive barriers for valuable opportunities to improve themselves.

5. FUTURE WORKS

An e-ten project (eTEN-2005/1-029328) to be started at the latest in Spring 2006 will assess market feasibility of ALPE platform, testing the customization of the services offered to the needs of disabled (visual and deaf students) and adult learners of Spain, UK, Greece and Cyprus with materials on basic skills.

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ONTOLOGY INTEGRATION: A NEW APPROACH BASED
ON COLLABORATIVE NEGOTIATION

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ABSTRACT
The amount of available information on the Internet has dramatically grown, but the possibility of finding and managing relevant information is still limited. One main reason for this is that the web was initially designed for direct human use and not computational agents. So, documents do not provide machine readable semantic annotations. The application of ontologies could be important for improving the search process since they provide additional semantic information. It means that we need ontologies that can be adapted to user or groups needs. In order to achieve this, ontologies have to be flexible, open ended and capable of dealing with multiple definitions. But there is a concern about definitions and relationships in an ontology. This issue especially disturbs a multi-domain project, which has a multidisciplinary team and must consist of people with specific and different knowledge, from diverse domains, to execute special activities. In this kind of project teams, having an unique vocabulary and a common understanding about terms is essential to the success of the project and integration of systems. Negotiation arises from this context as a process for the construction of consensus. The goal of this work is to present a model of negotiation to obtain the consensus of meanings, based on models of business negotiation, and consequently, deal with conflicts and the multiplicity of understandings of a concept, making this negotiation a way for creating value for all agents involved.

KEYWORDS
CSCW, Collaborative Meaning Negotiation, Ontology Integration, Knowledge Management, Emergent semantic.

1. INTRODUCTION

In our global economic and information readiness, information overload is a fact, not a theory, and there is evidence that most people lack the skills or tools to keep up in the Knowledge Age. Nowadays, all major economic players have decentralized organizational structures, with multiple units acting in parallel and with significant autonomy. Currently, computational tools and humans have to handle a variety of information sources, with data in several formats, patterns and different quality degrees. Grasping relevant information wherever it may be and exchanging information with all potential partners has become an essential challenge for enterprise survival. The reason that makes semantics so important is that information now has to be ‘sharable’ and disseminated in a faster way, in a distributed environment, where people or software do not necessarily share a common understanding.

Another issue that highlights the importance of an understanding consensus is the continuous growth of multi-disciplinary teams. While multi-disciplinary teams are common in our modern world, it is more problematical to find a common vocabulary, an agreement over meaning, which will aim at information and knowledge exchange, besides a common understanding of tasks, activities and works.

Emergent semantic aims to establish semantic interoperability from a consensus, in relation to interpretations that are common in a particular context. Considering the evolving character of information, whose semantics are enriched by interpretation, handling, and use in a particular context, the interoperability is conditioned by the way the concordance of interpretations of meaning is set. Negotiation arises from this context as a process that is appropriate for the construction of consensus. However, as interpretations are not necessarily shared at first, semantic interoperability becomes dependent of the frequency, quality, and efficiency with which such negotiations are conducted in order to achieve agreement. In the negotiations that
encompass meanings and interpretations, each participating agent can be regarded as an independent decision-maker that carries one’s own individual perception and judgment regarding the issues under consideration.

Given that in negotiation all the parties involved have to contribute for the agreement not to be reached in an unilateral fashion, it can be seen as inter-dependent decision process. Taking into account that each negotiator possesses different knowledge, experiences and focus, the conciliation of objectives or meanings contributes to the complexity of this kind of negotiation. Thus, there is the need for establishing a management of the process of consensus formation, guaranteeing the incremental and evolving aspects of these agreements.

With this assertion in mind, the goal of this work is to present a model of negotiation to obtain the consensus of meanings, that is, semantic consensus, which represents a structured way to deal with the possible conflicts, and with the multiplicity of ideas, making this negotiation a productive process, and a way of creating value for all agents involved by the creation of an ontology. For this purpose, our model will be described in section 2. Apart from the model, we show some correlated works in this area in section 3. Opportunities and challenges, and the conclusion and future works related to negotiation applied to consensus meaning are outlined in section 4.

2. MEANING NEGOTIATION

Semantic interoperability is seen as an emergent phenomenon constructed incrementally, and its state at any given point in time depends on the frequency, the quality and the efficiency with which negotiations can be conducted to reach agreements on common interpretations within the context of a given task 0. As the set of mutual beliefs shapes the “agreement” or “consensus” between the interacting agents, humans or not, we believe that the most convenient and appropriate type of negotiation, when we envision the meaning of consensus in a multidisciplinary team, to be the collaborative kind. The reason is the need to know, to learn and to understand the special and relevant knowledge of people from different domains of knowledge which will be the base of a job well done and probably, the responsibility in competitive value. However, as per 0, meaningful exchanges can only occur on the basis of mutually accepted propositions.

So, our model is divided in 3 stages, which are: pre-negotiation, conduct of negotiation and post-settlement. This model can be seen in Figure 1.

2.1. Pre-Negotiation

Pre-negotiation refers to the discussions that precede formal negotiations. In our model for meaning negotiation, these phases are divided as follows:

2.1.1. To choose the personal or domain ontology.

In this stage, the user should choose an ontology to represent the knowledge of his/her domain. Each of these ontologies (one by domain) will be the base for the process of ontology integration.

2.1.2. To specify the importance and malleability degrees of terms and concepts.

For the ontology which chosen in the previous step, the user has to define the degree of importance for each concept and relationship. The degree of importance is an integer value, between 1 to 5 (1 - the lowest ‘it is not so important’ value, 5 - the highest ‘it is very important’ value) and represents the importance, and the relevance of a concept in the ontology, or the importance of a relationship between two concepts in the same ontology. The definition of the degree of importance is optional, and the concept and relationships for which the user does not define a degree of importance are automatically assigned with value 1.

Analogously, the user has to characterize the malleability degree. It means the range in which the user accepts to modify a concept definition or a relationship between two concepts. The malleability degree is an integer value between 1 to 5 (1- the lowest ‘it can be changed without any problem’ value, 5 - the highest ‘it is impossible to change’ value). The definition of the malleability degree is optional, and the concept and relationships for which the user does not define the malleability degree are automatically assigned with value
1. The combination of these degrees will be used in step 2.2., as shown in Figure 2, which means the status of concepts and its relationships in an ontology.

2.1.3. BATNA Construction.

BATNA means "best alternative to a negotiated agreement". BATNAs are critical to negotiation because the negotiator cannot make a wise decision on whether to accept a negotiated agreement unless he/she knows what his/her alternatives are. The BATNA is the only standard which can protect the negotiator from accepting terms that are too unfavourable and from rejecting terms it would be in his/her interest to accept. It means that if the proposed agreement is better than the negotiator’s BATNA, then he/she should accept it. If the agreement is not better than his/her BATNA, then he/she should reopen negotiations. If he/she cannot improve the agreement, then he/she should at least consider withdrawing from the negotiations and pursuing his/her alternative (though the costs of doing that must be considered as well).

Having a good BATNA increases negotiating power. Therefore, it is important to improve the BATNA whenever possible. The BATNA should be filled out with all the desired possibilities to an ontology construction: all the concepts that can be negotiated, which the user waits with this negotiation process, all the alternatives, and so on.

2.1.4. To publish the personal or domain ontology.

After the user defines the importance and malleability degrees and constructs his/her BATNA, it is time to publish his/her ontology to a public place, where negotiators can find and access all ontologies. After the user has seen other ontologies, he/she can refine his/her BATNA. For the ontology definition (steps 2.1.1, 2.1.2, 2.1.4) the user employs the COE editor 0.

2.2. Conduct of Negotiation

The actual conduct of the negotiation is where the counterparts exchange a series of messages and offers, creating a suitable atmosphere for the negotiation, presenting their side of the case, and bargaining until they
reach an agreement. The parties may conduct negotiations with the assistance of one or more neutral third parties, using a person or a team as mediator. The conduct of negotiation is divided in two phases, as follows:

2.2.1. Attempt at Automatic Integration.

In this stage, the environment tries to automatically integrate the ontologies, supporting this action with the degrees of importance and malleability, and the syntax and semantic analysis. The syntax and semantic analysis are based on the proposal of Conceptual Schema Integration, described in 0.

The result of automatic integration (if it was computationally possible) is posted to the negotiators so that they evaluate the result. If all of them agree with the result, then, the next step is 3.3 (Post-Settlement). If someone disagrees, then, all the members are invited to participate at the negotiation table.

2.2.2. Negotiation Table.

Negotiations are arguments. Argumentation, not a derogatory term, is a practice of achieving a common sense through parties that take contrary positions. Here, the members can debate, exposing their positions, arguments and counter-arguments for a concept definition and its relationships in an ontology. It is not only helpful in discovering compacts, but the essence of constructive social interaction. To aim at this negotiation phase, users can consult their first ontology, the BATNA, the ontologies of the other members and the ontology resulting from step 3.2.1. This negotiation is made in a synchronous electronic environment and all the messages are categorized using the IBIS methodology (Issue Based Information Systems), as in Figure 3. The discourse develops around single issues, in our case a concept definition or relationship between concepts, which somebody raises assuming that their treatment would be relevant for the ontology integration. The participants take different positions, defend their positions, oppose others, and weigh one aspect against another, through arguments.

All messages have relations. Every argument is assigned at least to one position, every position at least to one issue, and every issue to at least one topic. Arguments "support" or "oppose" a position; positions "respond" to issues. Other relations can exist between all elements of IBIS. For instance, an argument can relate to another argument, and also to one which belongs to another position of another issue. Or a counter-argument can relate to a position of another issue, and different positions can be related (as a "derivative" relation), too. The relations form a network and this network is stored after the negotiation ends.

![Image of IBIS methodology](image.png)

Figure 3. Message categorization using the IBIS methodology

3.3. Post-Settlement

The post-settlement is the period after an agreement has already been reached, or if not, the negotiation is cancelled or a renegotiating process can be analyzed. In our case, if the meaning agreement was reached, then the next steps are done.

3.3.1. Context storage.

All information which helps to represent the context - as BATNAS, previous domain ontologies, importance and malleability degrees, the attempts at ontology integration and the log of the negotiation table (with the messages IBIS categorization), and the final ontology - are storage.

3.3.2. Ontology dissemination.

The integrated and final ontology is disseminated to the team.
3. RELATED WORK

There are several works dealing with related issues, such as information integration, schemas and ontology matchmaking, negotiation in agents’ communication and context elicitation. An extended analysis of Emergent Semantic Systems is made in 0 and computational mechanisms can be found in this reference. In 0 we found a consensus approach for deriving semantic knowledge on the Web. The significance of information sharing and distribution of cultural knowledge has encouraged some researchers to exploit consensus, measured by inter-subject agreement, as an indicator of knowledge. The method of Consensus Analysis was first presented in several seminal papers 000. In addition to introducing the formal foundation for Consensus Analysis, the initial papers cited above also provided examples of its application to modeling knowledge of general information among US college students, and the classification of illness concepts among urban Guatemalans. Other more recent applications of Consensus Analysis have focused on measuring cultural diversity within organizations 0 and different degrees of expertise in organizations and communities of practice creation 0.

Our work is different. It is an attempt to use already-known techniques of negotiation, usually employed in the business scenario, and to try and bring these concepts to ontology integration. Using this idea, our work is unique.

4. CONCLUSION AND FUTURE WORKS

The lack of any efficient semantic agreement mechanisms makes semantic integrity in heterogeneous environments very difficult for the participating parties. This problem is stressed in multi-disciplinary projects, where groups from different domains have to work with and understand each other.

Initial approaches rely on some pre-defined corpus of terms serving as an initial context for defining new concepts or make use of gossiping and local translation mappings to incrementally foster interoperability in the large, but this is not enough. In this work we are based on a negotiation model to conduct a semantic agreement in a process of ontology integration. We did not find an equivalent work in literature, that is, this attempt at mapping how business negotiations are made into semantic agreements is exclusive.

As future work, we envision the use of data mining techniques to find patterns of i) meaning X domains; ii) agreement reaching X person profile; and iii) importance of terms X domains.

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THE TALAS PROJECT: FROM MOBILITY TO CONNECTIVITY AND BACK AGAIN

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**ABSTRACT**

The mobile-learning can be consider the new frontier of the e-learning ensuring connectivity and promoting mobility. The best learning solution can be reached designing and developing an integrated learning methodology merging e-learning and a m-learning solutions. The main feature of the new e-learning and m-learning technologies, able to promote a structured and complex training scenario, is the “connectivity” fostering not only personalized and flexible training path, but also collaborative and cooperative learning processes within a network of “people on the move”. Mobile technologies support learning experiences which are collaborative, ubiquitous, accessible and integrated to the world, going beyond the boundaries of a classroom and creating a virtual community.

**KEYWORDS**
e-learning, m-learning, connectivity, mobility, community.

1. **INTRODUCTION**

The TALAS project – Tourism mAnagement e-LeArning Solutions, a Pilot Project co-financed by the Leonardo da Vinci Programme, intends to develop and integrate a learning methodology merging e-learning and a m-learning solutions. The TALAS Project, running from October 2004 to September 2006, aims at realizing a “Tourism Management” Pilot course with a focus on hospitality topics to be delivered through an e-learning platform and a m-learning portal. The innovative training system will be experimented by a European target group, working in the tourism field, sharing the need to move everyday and to be updated day by day. The training scenario promoted by the TALAS Project is able to provide informal learning process, fostering personalized and flexible training path, with an added value in terms of collaborative and cooperative learning. The main feature of the new e-learning and m-learning technologies is in fact the “connectivity”:

- e-learning and m-learning are networked (technical aspect);
- e-learning and m-learning promote the birth of new networks and the strengthening of the already existing networks (social outcome).

In this context the informal learning, exploiting all the potential of the new technologies, is able to promote kind of collaborative and cooperative learning within a network of “people on the move”. Mobile technologies support learning experiences which are collaborative, ubiquitous, accessible, and integrated to the world, going beyond the boundaries of a classroom or a physical learning environment.
2. FROM MOBILITY TO CONNECTIVITY AND BACK AGAIN

It has been unanimously recognized that new information and communication technologies have broken the barriers of space and time. People physically remote can interact writing texts and messages, seeing one another thanks to the web cam, sharing applications, exchanging documents both in a synchronous and asynchronous way. The forms of interaction and communication promoted by these new technologies are not an end in themselves, they are useful to promote training sessions at distance, allowing teachers and students from different countries to teach and learn, to share knowledge and to spread expertise. The physical mobility has been replaced by a “virtual mobility” which in several circumstances offers many benefits:

- to get just-in-time information;
- to get contextual information;
- to save money spent for traveling;
- to save time spent for moving.

The TALAS project is going to demonstrate that it is possible to preserve physical mobility without giving up the connectivity. Even if virtual mobility is useful to reduce waste (in terms of money and time) and to get just-in-time information, there are a lot of people who need to move for different reasons. If we take into account that specific jobs imply moving, we have to ask technologies to ensure mobility without limiting connectivity. The TALAS project intends to exploit all the features of the new technologies allowing users “to be on line” every time and everywhere. The “Tourism Management” pilot course realized by the TALAS pilot project, delivered through the e-platform and the m-portal, results from the integration of the e-course and the m-course.

2.1 The TALAS e-learning course

The TALAS e-course, available through the e-learning platform, is set up by two different training scenarios: a training section promotes personalized and flexible learning paths, and an interactive section focuses on collaborative learning and ubiquitous learning.

The didactic environment hosts didactic pills specifically designed to be used via platform and able to foster flexible and hyper-textual paths thanks to the realization of the following Learning Objects:

- audio-lesson, a lesson which synchronizes a slide show together with an audio file;
- animated cartoon showing virtual characters in different contexts;
- lectures note, an in-depth text dealing with the topics of the lesson;
- evaluation and assessment tests and quizzes.

The audio-lesson represents the focal point of the training path (Figure 1. TALAS e-course interface). The user who will access the audio-lesson of the “Tourism Management Course”, thanks to a user-friendly screen that displays commands (start, stop, forward, back), will be able to manage the lesson in a customized way.

Figure 1. TALAS e-course interface

The slideshow synchronized to the audio-lesson allows to synthesize the topics through key-words and by using images, pictures, diagrams and tables. An advantage of using slides, consists in the possibility of guiding the user’s attention.

The most important and most innovative features of the TALAS e-course are the following:

1. the modularity of the contents that allows the user to access to a specific level of the contents;
2. the indexing of the subjects that promotes a “hyper-textual learning”.

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Hyper textual learning improves cognitive processing because it resembles the natural way of thinking of the human mind, since there exists a substantial analogy between the typical network of links of an hypertext and the working of the human mind, meant as a neural network. Hyper textual learning leads users in their dynamic exploration, presenting them a non linear knowledge made up of interweaving and connections among links, and allowing them to customize the training processes, to enrich and improve the meta-cognitive strategies and to promote active, constructive and interactive training path.

The interactive and collaborative section promotes both synchronous and asynchronous communication among the remote users and the e-tutors ensuring tracking and transparency through instruments as forum, chat, video chat, weblog, wiki, moderated by the teachers and the tutors. These new so called “social softwares” become the strengths of the interactive process; specifically, the blogs promote the discussion among participants and allow to express emotions and feelings fostering motivation and participation among the users, the wiki represents the building of a shared knowledge.

The interactive section is moderated by tutors which assist the participants during the exploration of the different environments of the “Tourism Management Course”, giving a constant evaluation of their didactic progress. He designs training scenarios and suggests different interactive tools to activate collaborative learning sessions and to promote interaction among the different actors of the training process. Furthermore, the tutoring session permits the rapid exchange and sharing of documents and didactic material contributing to reduce the drop out risk due to the remote users isolation.

The TALAS e-learning platform intends to show that the network from a mere mean of communication becomes a virtual space promoting the share of learning and fostering the collaboration.

2.2 The TALAS m-learning course

M-learning represents the new frontier of distance training because it allows to transmit multimedia contents through the latest generation of mobile devices and to merge effectively two technologies -mobile and Internet - having already in common the slogan: “anytime, anywhere, anyhow”. The TALAS m-course will be available through PDAs using the most up-to-dated version of the Windows Mobile Operative System and the UMTS connection, provided with a large screen in order to ensure the usability and accessibility of the mobile didactic pills provided with the TALAS m-portal (Figure 2. TALAS m-course interface).

Figure 2. TALAS m-course interface

The TALAS pilot project experiments the UMTS connection (acronym of Universal Mobile Telecommunications System) considered as a 3G (third generation) communication for wireless devices. UMTS could now appear quite innovative and not available to many people, but is in fact rapidly wide spreading and is becoming of common use, permitting to deliver multimedia didactic pills, especially supporting videos and promoting collaborative synchronous interaction among the remote users.

The m-portal will host a training section and a communication section.

The training section hosts different learning objects integrated in a unique and homogeneous environment:
- animated cartoons;
- audio-lessons;
- video files.

Students will discuss on topics dealt with in the interactive section thanks to chat, video chat, forums and blogs moderated and animated by the tutors and the teachers.
3. COMMUNICATION AND COMMUNITY

The word “Communication” and the word “Community” have the same Latin etymology *Communis*, which means common, sharing and community. This helps to understand the one-to-one and bi-directional link between “Communication” and “Community”. This reflection can be contextualized in the framework of the TALAS project: in fact the TALAS e-platform and the m-portal, providing users with different communication tools, allow them to interact and strengthen relationships every time and everywhere. In this way the TALAS users learn together, share the knowledge, the expertise and the know-how, have something in common, in other words they become a community.

The TALAS course curricula in the same direction promotes a cooperation between students for reaching a common result thus stimulating an interaction similar to Barnard’s theory of the stone, where he demonstrates how is it possible to improve the sense of the involvement in a group through the sharing of a common objective. The approach to the tourism and hospitality topics goes from the specific and localized case histories, targeting and addressing the different training needs, to the historical and social framework, offering a common and shared background. From this point of view hospitality becomes a factor to valorize the endogenous and local characteristics, appreciating differences and improving a wider sense of transnationality and cooperation. The TALAS community is set up by people belonging to different European countries, to different socio-cultural and political backgrounds as well. These people do not necessarily share the same needs, the same daily rhythms, but they belong to the TALAS community. They communicate while moving, they share knowledge and expertise, they live a common experience of learning.

3.1 Why an integrated system

The didactic pills delivered through the TALAS e-course and m-course become “objects” to be commented and discussed, promoting an active learning where the knowledge is built thanks to the contribution of each user. The awareness of the importance of collaboration and cooperation for an effective learning justifies the choice to develop and experiment an integrated learning system made up by the e-platform and the m-portal: the “double system” exploits the benefits of both e-learning and m-learning.

Following the increase of the internauts throughout the world, the e-learning solutions have grown up as well. The most recognized benefits of e-learning exploited by the TALAS e-learning platform are:
- on-demand availability;
- just-in-time access;
- higher retention of content through personalized learning;
- improved collaboration and interactivity among students;
- promotion of different learning and meta-cognitive styles.

The mobile learning is spreading more and more. Its strengthens in the training processes it is testified by a survey conducted by the FernUniversität which shows the interest of German, Swiss and Austrian companies for m-learning solutions. The main benefits identified in the survey are: time and place-independent learning, individual speed of learning and learning with familiar instruments.

In order to ensure the birth of a web community and over all the durability of it, the e-platform and the m-portal exploit their features to compensate any possible lacks. One of the most discussed weaknesses of the e-learning is the need to be in front of a connected personal computers. The personal computers need to be connected and this could constitute a limit for people moving. The mobile devices solve up the problem of portability, they are in fact small and light. The survey conducted by the FernUniversität does not only identify the benefits of m-learning; it also highlight the need of a higher self-discipline of the user, the promotion of impersonal learning and the necessity of high level of technological know-how.

The result is that mobile technologies are useful in a lot of situations but a complete training path become more effective if it combines e-learning and m-learning solutions, in fact the two different systems support each other in order to allow the user to be easily connected whenever he wants.
4. CONCLUSION

The learning system promoted by the TALAS project ensures the birth of a learning community because it supports synchronous and asynchronous communication allowing people “on the move” to participate in a common learning experience.

The project, began in October 2004, is now going to begin the Experimentation Phase which will present a validation action, involving the partners of the project, and a experimentation session involving the European users selected. The TALAS experimentation Phase, has just the right objective to individualize any possible critical states, to analyze them and to propose solutions.

The TALAS learning system, promoting the birth and strengthening of new communities could be used by all people “on the move” which do not intend to give up the physical mobility but which want to be always “on line”. The model experimented by people working in the tourism field could be transferred and used by any other specific categories of mobile workers, who needs:

- Efficiency, due to the possibility to personalize the training path;
- Flexibility, due to the fact that the course can be delivered “anytime and anywhere”;
- Wide accessibility and prompt usability;
- Autonomy and respect for personal commitments;
- Access to real time information in order to make appropriate decisions.

Last but not least, e-learning and m-learning become a must for all those belonging to the so-called “wired generation”, the generation of teenagers and young people spending a lot of their time browsing and communicating through Internet, which will need to be connected while moving more and more.

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THE EFFECTS OF INTERNET USE ON CHILDREN'S PSYCHOLOGICAL WELL-BEING AND SOCIAL COMMUNICATION

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ABSTRACT
In this study, we conducted a two-wave panel study with 421 Japanese elementary school children in order to examine the effects of Internet use on their psychological well-being and social communication. Variables for psychological well-being and social communication that may be affected by Internet use were depression, loneliness, aggression, and Internet addiction. The data obtained in this panel study was then analyzed by structural equation modeling (SEM). The results indicated causal relationships in which children who used the Internet frequently showed increased depression, aggression, and Internet addiction. The finding of this study was to suggest the possibility of harmful effects of Internet use on psychological well-being and social communication of children, and the methods for reducing such harmful effects must be studied in the future.

KEYWORDS
Internet use, depression, loneliness, aggression, Internet addiction, panel study

1. INTRODUCTION

With the global-scale advancement of information society, the opportunity to use the Internet in daily living has been rapidly increasing. Does such daily Internet use have any effect on individuals' psychological well-being or social communication?

Many of the early studies point out the harmful effects of Internet use. For instance, the pioneering study by Kraut et al. (1998) suggested that Internet use resulted in reduced involvement in social networks and increased depression or loneliness. Also, computer mediated communication (CMC) studies reported that aggressive communication such as flaming were more likely to occur in CMC than in face-to-face communication (e.g., Siegal, 1986). Furthermore, Internet addiction, characterized by excessive dependence on online communication, was also acknowledged as a problem (Morahan-Martin & Schumacher, 2000).

Some, however, have pointed out that the harmful effects of Internet use on psychological well-being or social communication would reduce as individuals got used to using the Internet (e.g., Kraut, et al, 2002). Furthermore, in recent years, there have been an increasing number of studies that emphasized the beneficial effects of Internet use (e.g., Mckenna & Bargh, 2000).

A majority of these previous studies, however, were conducted with adults as participants. Unlike adults, children's cognitive abilities and social skills are still under development, and therefore, they may not be able to properly handle online communication in which they do not see each other's face but rather carry on text-base conversation. This may in turn result in strengthening of the harmful effects of Internet use.

For this reason, in this study, we examined the effects of Internet use on elementary school children's psychological well-being and social communication. Note that we used depression, loneliness, aggression, and Internet addiction as variables that may be affected by Internet use.
2. METHOD

2.1 Overview of the panel study

We conducted a two-wave panel study in order to examine the causal relationships between Internet use in daily living, and psychological-well being and social communication. A panel study refers to a method of study in which the same questionnaire is administered multiple times with certain time intervals to the same group of participants. The obtained data is called longitudinal data, and by analyzing it using the structural equation model, the causal relationships between variables can be examined (Finkel, 1995). To analyze the causal relationships between the variables, we used the cross-lagged effect model in this study (Figure 1). This is a commonly used model when analyzing data obtained in a panel study. If Path a (dotted line) in Figure 1 shows a significant positive effect, then there is a causal relationship in which the increased amount of Internet use results in deterioration of psychological well-being or social communication. If, however, Path a shows a significant negative effect, then there is a causal relationship in which the increased amount of Internet use results in improved psychological well-being or social communication.

2.2 Participants

We conducted a two-wave panel study with 5th and 6th graders (11- and 12-year-olds) from seven public elementary schools in Tokyo, Japan. The first survey (Time 1) was conducted in November 2002, and the second survey (Time 2) was conducted in February 2003. Data from 421 children (222 males, 197 females, and 2 of unknown gender), who participated in both surveys, was then analyzed.

2.3 Measurements

2.3.1 Amount of Internet use

The amount of Internet use was measured for each Internet tool. For (a) e-mail (e-mail message transmission / reception), (b) browsing Web-sites, bulletin board systems (BBS), or reading e-mail magazines, (c) posting messages on BBS or mailing lists, (d) creating Web-pages, (e) chatting, and (f) playing online games, participants answered the amount of use per week by using a 7-point scale.

2.3.2 Depression

In order to measure depressive mood, we developed two items: "I feel sad" and "I want to cry." Also, in order to measure decrease in interest or pleasure, we developed two items: "Nothing excites me" and "I do not feel like doing anything." The participants used a 4-point scale to answer each of items.

2.3.3 Loneliness

5 items (e.g., I have few friends who understand my thoughts or feelings) were cited from the sub-scale of loneliness in friendships in the "Multidimensional Scale of Loneliness in Different Human Relations"
developed by Hirosawa & Tanaka (1984), and their expressions were adjusted for use with children. The participants used a 4-point scale to answer each of items.

2.3.4 Aggression

From each of the 3 sub-scales of the "Japanese version of the Buss-Perry Aggression Questionnaire" developed by Ando et al. (1999), 4 items were cited and their expressions were adjusted for use with children. The sub-scales used were the following: (a) anger (e.g., I cannot help being overcome by anger); (b) hostility (e.g., I believe there are many people who do not like me); and (c) verbal aggression (e.g., I say my opinions very clearly when I cannot agree with my friend's opinions). The participants used a 4-point scale to answer each of items.

2.3.5 Internet addiction

In order to measure excessive dependence on online communication, we developed the following two items: "I feel it is easier to play with someone on the Internet than playing with someone outdoors or at home" and "I feel it is easier to communicate with someone over the Internet than to communicate with someone face-to-face." The participants used a 4-point scale to answer each of items.

3. RESULTS

3.1 Analysis models

We used the cross-lagged effect models to analyze the causal relationships between variables (Figure 1). We compared the $\chi^2$ values between the restricted model (Model 1), which made the covariance zero between errors obtained in Time 2, and the unrestricted model (Model 2) without such restrictions. If the difference between the $\chi^2$ values was significant, Model 2 was used. If the difference was not significant, then Model 1 was used. Also, we used GFI, CFI, and RMSEA to examine goodness of fit of the selected models. For the models selected for this study, GFI = .99 to 1.00, CFI = .99 to 1.00, and RMSEA = .00 to .07.

3.2 Causal relationships between Internet use and depression, loneliness, aggression, and Internet addiction

As for depression, use of e-mail, posting massages on BBS, chatting, and playing online games indicated significant or marginally significant positive effects on depression (Table 1). On the other hand, none of the methods of Internet use showed significant effect on decrease in interest or pleasure.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Depression</th>
<th>Aggression</th>
<th>Internet addiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mail</td>
<td>.14**</td>
<td>.13**</td>
<td>.08</td>
</tr>
<tr>
<td>Browsing Web-sites or BBS</td>
<td></td>
<td>.10**</td>
<td>.09*</td>
</tr>
<tr>
<td>Posting messages on BBS</td>
<td>.08*</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Creating Web-pages</td>
<td></td>
<td></td>
<td>-.10*</td>
</tr>
<tr>
<td>Chatting</td>
<td>.13**</td>
<td></td>
<td>.07*</td>
</tr>
<tr>
<td>Playing online games</td>
<td>.07*</td>
<td></td>
<td>-.10*</td>
</tr>
</tbody>
</table>

*Note. Values shown in this table are significant causal coefficients (standardized coefficients). **$p<.01$, *$p<.05$, $p<.10$.}
As for loneliness, creating Web-pages indicated a marginally significant negative effect. As for aggression, use of e-mail, browsing Web-sites, and posting massages on BBS, indicated significant or marginally significant positive effects on aggression. As for Internet addiction, all the methods of Internet use except for chatting showed significant or marginally significant positive effects on Internet addiction.

4. DISCUSSION

This study indicated that Internet use by children in daily living may cause depressive mood, aggression, or Internet addiction.

To examine the significant effects that we obtained in this study, a large number of opportunities to make interactive communication on the Internet had undesirable effects on children's depressive mood. Also, as with the case of depressive mood, Internet use involving interactions with others had an undesirable effect on aggression. In online communication, where visible clues were not easily communicated, understanding others' intentions correctly would be more difficult than face-to-face communication. For this reason, children who do not have enough cognitive abilities or social skills may suffer an increase in depressive mood, anger, or hostile towards others as they experience more online communication.

Differing from the case of depressive mood, aggression increased not only by interactive online communication but also by passive actions such as browsing Web-sites or BBS. In accordance with the cognitive neoassociation theory, watching of aggressive scenes on TV activates individuals' aggressive mood or cognition, promoting aggressive behaviour as a result (Berkowitz, 1984). For this reason, if Web-sites hold aggressive contents, it is possible that passively browsing such aggressive contents may increase individuals' aggression.

As for Internet addiction, Internet use indicated undesirable effects on Internet addiction regardless of the tools used. We also conducted additional analyses to examine the effects of depression, loneliness, aggression, and Internet addiction on Internet use (Figure 1, Path b), and the results often indicated that Internet addiction would cause Internet use. These results may suggest generation of a vicious circle in which children who are addicted to the Internet, use the Internet for everything regardless of the tools, and as a result, they may increase Internet addiction. Such a situation is unique to Internet addiction, showing how difficult it is to overcome the addiction.

As seen above, Internet use may affect children's psychological well-being or social communications in various ways. In the future, moderate variables to reduce such negative effects must be examined.

REFERENCES


AUTOMATIC EMOTICONS GENERATION METHOD FOR WEB COMMUNITY

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ABSTRACT
Communication by Web pages and email with cellular phones have a weak point which hard to tell to be utterance speed and the pitch of sounds with communication by words, because it communicate by letter information. Emoticons are overused to make up for this weak point. This paper describes techniques to predict an emotion of a Japanese sentence and give an emoticon to end of a sentence automatically. This technique is achieved by learning information of emotions with emoticons used and analyzing the text of email with cellular phone by collecting and analyzing our corpus of email with cellular phones. We also examined consistency evaluation with real email sentences input by cellular phones and emoticons automatically generated by this technique. We could get correct answer rate of 87.7%.

KEYWORDS
Prediction of emotions, Morpheme analysis, Emoticon

1. INTRODUCTION
There are many document writing tools such as bulletin board, chat and blog in Web community. It is difficult that they express emotions because of letters only. Therefore it is common to express emotions by emoticons. Recently, the cellular phones connected to the Internet become the daily tools and most familiar input tool in the Internet.

Emoticons are overused to make up for this weak point. In this paper, we analyze emotions information of an emoticon used in sentences by the results of collecting and classifying inputs by cellular phones. Next, we describe a technique to predict the emotions of email text in cellular phones and give an emoticon to end of a sentence automatically.

2. RELATED WORKS
Various classification methods of emotions based on this study were suggested so far[1]. Woodworth said he could classify emotions to six basic emotions, and Schlossberg expanded these six emotions and suggested a three-dimensional model of emotions. Plutchik also made a criterion of basic emotions clear and defined eight emotions. This definition suggests the opposite meaning of emotions and a three-dimensional strength model based on a corpus, so it is more fine model than others.

A lot of automatic distinction methods of an emotion in the various media with computers have been studied. Kanoh applied information of emotions to expressions in robots[2], and Matsumoto suggested emotions recognition technique by images and sounds[3]. Keila also examined emotions understanding method of emails as technique for customers problem discovery[4]. In addition, Nakamura suggested the technique with neural network for emotions distinction of emoticons in dialogues[5].

In these works, they didn’t examine about automatic emoticons grants technique of emails for the smooth communication.
3. CLASSIFICATION EMOTIONS

At first, it is important to define a classification of human emotions itself that decides what kind of emotions an emoticon expresses. Many classification methods of emotions were suggested so far. We use a classification method based on eight basic emotions of Plutchik.R which can express various emotions by the following reasons[1].

(1) It expresses the strength of emotions.
(2) It expresses the opposite meaning of emotions.
(3) It defines actions with emotions and relation of actions and emotions.
(4) It defines the mixture of basic emotions and can explain various emotions.

Table 1 shows the relation of feelings with Plutchik method and words of emotions. We express emotions of emoticons by these words of emotions and additional ones described in next clause.

Table 1. Emotions classification of Plutchik

<table>
<thead>
<tr>
<th>Basic emotions</th>
<th>(Strong) ← Strength → (Weak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance</td>
<td>Love, Goodwill, Trust, Generosity, Acceptance</td>
</tr>
<tr>
<td>Fear</td>
<td>Shiver, Scare, Fear, Concern, Carefulness</td>
</tr>
<tr>
<td>Surprise</td>
<td>Astonishment, Surprise, Perplexity, Unrest, Doubt</td>
</tr>
<tr>
<td>Sadness</td>
<td>Grief, Worry, Sorrow, Discouragement, Sadness</td>
</tr>
<tr>
<td>Disgust</td>
<td>Hatred, Hate, Antipathy, Disgust</td>
</tr>
<tr>
<td>Anger</td>
<td>Anger, Rage, Fury, Indignation, Hostility</td>
</tr>
<tr>
<td>Anticipation</td>
<td>Anticipation, Expectation, Caution, Curiosity, Attention</td>
</tr>
<tr>
<td>Joy</td>
<td>Pride, Joy, Satisfaction, Pleasure, Peace</td>
</tr>
</tbody>
</table>

4. DEFINITION OF EMOTICONS THAT SHOW EMOTIONS

We define emoticons corresponding to the words of emotions that were showed before. The emoticons to use were picked up representative emoticons equivalent to each emotion words by one or more questionnaire from 172 emoticons defined in Microsoft IME 2003.

When we simply relate IME to Plutchik’s words of emotions, it is concerned about falling off emoticons and words of emotions with high frequency using. Therefore, we pull out and add words of emotions which are used in emails of cellular phones and doesn’t appear in Plutchik’s words of emotions from our collection of email data.

We also add words which are in Plutchik’s words of emotions and short in IME. We show additional words of emotions in Table 2.

We picked up pairs of emoticons and words of emotions as above. Table 3 shows part of these. We store these in our system as “Emoticon dictionary”.

Table 2. The additional words of emotions

<table>
<thead>
<tr>
<th>Irritating</th>
<th>Normal farewell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridiculous</td>
<td>Sad farewell</td>
</tr>
<tr>
<td>Apology</td>
<td>Request</td>
</tr>
<tr>
<td>Sleepy</td>
<td>Fear</td>
</tr>
<tr>
<td>Tired</td>
<td>Love</td>
</tr>
<tr>
<td>Greeting</td>
<td>Acceptance</td>
</tr>
</tbody>
</table>

Table 3. The part of Emoticon dictionary

<table>
<thead>
<tr>
<th>Emoticon</th>
<th>Words of emotions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(^_^)/</td>
<td>Greeting</td>
</tr>
<tr>
<td>(&gt;_&lt;)</td>
<td>Disgust</td>
</tr>
<tr>
<td>^^^</td>
<td>Joy</td>
</tr>
<tr>
<td>(T_T)</td>
<td>Sadness</td>
</tr>
<tr>
<td>(· · ?)</td>
<td>Doubt</td>
</tr>
<tr>
<td>(+o+)</td>
<td>Perplexity</td>
</tr>
<tr>
<td>m(__)m</td>
<td>Apology, Request</td>
</tr>
<tr>
<td>&lt;=( <code> ^</code>)&gt;</td>
<td>Pride</td>
</tr>
</tbody>
</table>
5. MORPHEME ANALYSIS FOR EMOTIONS DISTINCTION

We use morpheme analysis in this technique to distinguish what kind of emotions emails of cellular phones have. By using morpheme analysis, we can expect that this technique can handle it more precisely than the method of searching all strings. We use ChaSen\(^{2}\) for morpheme analysis.

We chose the parts of speech to express emotions from morphemes defined in ChaSen. We call this "Emotions parts of speech", Table 4 shows a list of these.

<table>
<thead>
<tr>
<th>Emotions parts of speech</th>
<th>Examples of words</th>
<th>Number of words in the dictionary of ChaSen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noun, Changed connection of “Sa”</td>
<td>愛着 (Attachment), ひと安心 (Settled)</td>
<td>12,041</td>
</tr>
<tr>
<td>Noun, Stem of adjective verb</td>
<td>安易 (Easygoing), だめ (No good)</td>
<td>3,313</td>
</tr>
<tr>
<td>Noun, Stem of adjective for “Nai”</td>
<td>申し訳 (Excuse), 仕方 (No choice)</td>
<td>42</td>
</tr>
<tr>
<td>Adjective, Adjective・Step “i”</td>
<td>貧しい (Sad), 楽しい (Fun)</td>
<td>654</td>
</tr>
<tr>
<td>Adjective, Unchanged type</td>
<td>ふくい (Cool), きもちいい (Comfortable)</td>
<td>8</td>
</tr>
</tbody>
</table>

The number of words in total 16,058

Next, we extracted words for each emotion part of speech from 2,218 Japanese sentences input by cellular phones which we actually collected. We decided what kind of emotions these words expressed by questionnaires and built "Emotion dictionary" such as Table 5.

<table>
<thead>
<tr>
<th>A part of speech</th>
<th>Emotion words</th>
<th>Emotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noun, Changed connection of “Sa”</td>
<td>お願い (Request)</td>
<td>Request</td>
</tr>
<tr>
<td></td>
<td>お祝い (Celebration)</td>
<td>Pleasure</td>
</tr>
<tr>
<td>Noun, Stem of adjective verb</td>
<td>不安 (Worry)</td>
<td>Perplexity</td>
</tr>
<tr>
<td></td>
<td>不利 (Disadvantageous)</td>
<td>Sadness</td>
</tr>
<tr>
<td>Noun, Stem of adjective for “Nai”</td>
<td>仕方 (No choice)</td>
<td>Sadness</td>
</tr>
<tr>
<td></td>
<td>申し訳 (Excuse)</td>
<td>Apology</td>
</tr>
<tr>
<td>Adjective, Step “i”</td>
<td>よろしく (Best regards)</td>
<td>Greeting</td>
</tr>
<tr>
<td></td>
<td>あいくるしい (Lovely)</td>
<td>Love</td>
</tr>
<tr>
<td>Adjective, Unchanged type</td>
<td>かっこいい (Cool)</td>
<td>Pride</td>
</tr>
</tbody>
</table>

6. EMOTICON AUTOMATIC GRANT TECHNIQUE

This chapter describes the technique to give an emoticon to express emotions for a sentence in an email of cellular phones by using Emoticon dictionary and Emotion dictionary showed in last chapter. This technique is carried out by the following procedures.

1. Input one sentence.
2. Get the emotion part of speech at the end of the sentence by morpheme analysis.
   (Because it is often that cellular phone email sentences have an emoticon in the last of a sentence, we also grant an emoticon to the end of a sentence.)
3. Get an emotion word from Emotion dictionary using an emotion part of speech and real words as keys.
4. Get an emoticon for that emotion word from Emoticon dictionary.
5. When emotions part of speech that we get is "Noun - Stem of adjective for Nai", check whether there are "auxiliary verb - special Nai" just after that.
   If it gets one, it defines an emoticon that shows the opposite meaning of emotions at (4). (It can find opposite emotions by emotion classification method of Plutchik.)
Output an emoticon which is converted from the punctuation mark at end of an input sentence.

7. EVALUATION EXPERIMENT

We compared the real emoticons with emoticons acquired by this technique for 65 sentences with emoticons input by cellular phones. When the emoticon did not completely accord, we assumed it was correct answer if correct semantically. Table 6 shows our results.

Table 6. Evaluation results

<table>
<thead>
<tr>
<th></th>
<th>Number of sentences</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>57</td>
<td>87.7%</td>
</tr>
<tr>
<td>Wrong</td>
<td>8</td>
<td>12.3%</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

As a result of evaluation, the correct answer ratio was 87.7% and our method is almost effective enough. It was 12% wrong answer ratio in our evaluation. We describe some reasons of them below.

1. It cannot understand a conjunctive particle.

   It is ambiguous meaning such as “けどね” with information only for one sentence, and difficult to distinct emotions if it has emoticons even human being. For example, “楽しかったけどね(^-^)”. (“I was happy, but…” in English.)

2. Morphemes out of the range

   For example, case of the sentence “もし心配なら猫の本とか見て調べてみて下さい V(^-^)V”, it chose an emoticon for “心配”, but the correct choice is one for “調べてみて下さい” (Its morpheme is Verb – five steps, “Ra” line special). We are able to handle this problem by extension of morphemes to intend for.

8. CONCLUSION

In this paper, we defines the emotions classification with emoticons and proposed the technique to grant an emoticon which express emotions of it at end of email sentence by input from cellular phones.

We were able to confirm the correct answer rate of 87.7% as a result of evaluation experiment and the effectiveness of this method. We plan to study to understand of emotions by context for ambiguous expressions in future.

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COMPATIBILITY OF THE PRINCIPLES OF COMPUTER-BASED AND CLASSICAL TEACHINGS

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ABSTRACT
Computer-based teaching tools give new opportunities in learning including distance learning and lifelong education. Despite of the great investment to eLearning not always expected results were achieved. Analysis of the classical (classroom’s) form of teaching shows that it is a multi-elements’ self-controlling system with a set of “quick” and “slow” feedbacks between teacher and learners. These feedbacks give the ability for system to be adaptive both from teacher’ and learners’ sides. Digression from classical teaching scheme (that often is seen in different implementations of eLearning tools) usually does not allow such feedbacks to work properly. As a result teaching system could not adopt to current conditions as well as to optimize its work within the long time slot. There are two mutually complemented principles to improve the quality of eLearning – to develop software tools simulated teacher’s thinking or to “fill” the system by elements imitating classroom’s lessons. At the current stage of computer science second approach looks more appropriate. The set of requirements for tools supporting eTeaching, methods of creating teaching materials as well as requirements to the authors of teaching materials are considered and formulated.

KEYWORDS
quick feedback, slow feedback, eLearning, classical teaching, eTeaching

1. INTRODUCTION
Together with the wide usage of computers started development and implementation of new tendency in teaching – computer-based learning (now more known as eLearning). Computer-based teaching tools gave new opportunities for learning, including distance learning and lifelong education. Despite of the great investment to eLearning not always expected results were achieved [Leontjev, Novicky]. The objective of the article is to provide the analysis of existing forms of teaching and to give recommendations to the development of computer-based teaching tools.
2. CLASSICAL TEACHING

Classical forms of teaching have been evolved during centuries and the following two basic teaching forms are developed:
- using text-book;
- face-to-face lessons in class-rooms.

2.1. Properties of classical teaching

Textbook is the repository of knowledge. Learner works with textbook usually individually therefore manage this process by him/herself. Lesson in class-room envisage learning of the group of learners under control of a teacher. Both mentioned forms were progressing over centuries influencing to psychological-emotional comfort of learners during the lessons. Both forms complement each others, but despite of a long coexistence they do not have the tendency to join. It is because the first teaching process is basically individual, but the essential part of second one is the behavior of a group of learners.

Classical teaching methods usually are considered as the achievements of pedagogy and are analyzing particularly from that point of view. In contradistinction to mention above we are looking to the process of teaching as an interaction of systems with highly complex structure.

Presentation made by teacher is only one of influences that particular learner has got during the lesson. For effective teaching not less important than previous one are also another influences that come from lecturer and from the auditorium:
- intensity of presentation - the lecturer has determine the proper intensity exactly during the lesson;
- behaviors of another learners and their actions (disturbance, questions etc.);
- interest of the learner and others on topic considered;
- discussion on the topic.

During the lesson (as well as during the whole learning process) learners influence to teaching staff. It could be in both direct and indirect form, and such influences come both from particular learners and from the group of learners at whole.

Teaching staff during the lesson is adopting to influences form particular learners and from auditorium at whole. It is “quick” feedback. The influences have the form of:
- feedback from the whole auditorium (interest, attention, manners as well);
- feedback from particular listener, whose background differs from average background of auditorium (interest, attention, manners as well);
- questions during the lecture and after it;
- discussion (if teacher allows it).

During the whole process of learning work “slow” feedbacks that have an effect on activities related to inspection of familiarization of teaching materials: consultations, test works, workshops, tests, exams.

Because often teaching is carrying out by persons who are experts in particular knowledge area, mentioned above feedbacks are not taken into account preparing particular course. Mentioned above feedbacks are bearing in mind only on the basis of lecturer’s pedagogical background and experience.

2.2 Conclusions about classical teaching

1. Classical teaching process is adaptive both from teacher and learners sides. Therefore it is effective and emotionally comfortable both for lecturer and listeners.

2. The model of classical teaching process is a self-controlling system. This model includes the range of mutual influences which provide adaptation of system’s elements to the current conditions and optimisation of the system’s work within the long time slot.

3. In classical teaching could be recognized “quick” and “slow” feedbacks. First one provides mutual adaptation of participants, second one give the ability for teaching staff to optimize the process.

4. Digression from classical teaching scheme usually does not allow mentioned above feedbacks to work properly. As a result teaching system cannot adopt to the current conditions as well as to optimize its work within long time slot. It, in turns, brings discomfort both to learners and teacher and essentially decreases the quality of teaching process.
3. COMPUTER-BASED TEACHING

Computer-based teaching is a result of attempts to apply new technical tools for information storing and its further representing to the learners. Computer, as the data repository, completely could replace the textbook, but the learner who prefer classical mechanisms of knowledge adoption, not always is emotionally and psychologically ready to replace the book with the computer. Further researches were addressed to assignment of the properties of a teacher to the computer – to prepare the information in specific manner (usage of keywords for quick searching, collection of information about the most frequently asked questions and the most frequently made mistakes etc). Such approach brought discomfort to the learner. Studying by book the learner manage the process by him/herself, but in computer-based teaching the process of individual by essence learning is controlled by the computer [Leontjev, Rastrigin].

3.1 Properties of computer-based teaching

Computer-based teaching systems very often were developed by experts in particular knowledge areas, but without deep knowledge in pedagogy and teaching. The main focus in such systems usually was devoted to the content of reviewed subject (e.g. to precision of essential details), but less efforts was made to organization of teaching process and its appropriateness to learners.

In computer-based teaching each learner works individually (solely) and therefore do not exist such entity as the group of learners that is an integral and historically recognized part of the teaching process. The absence of the group creates discomfort to teacher during preparation of teaching materials in computer-based form because it is unable reactively adopt to the particular current conditions during the teaching process like in classrooms.

Computer-based teaching usually do not envisage quick reaction and adaptation to the actions of listeners, but envisage only more less fixed scenario that to a certain extent could be customize (e.g. by asking additional questions in the case of mistakes or by giving additional portion of information, explaining particular terms etc.). Attempts to replace physical learner with overall generalized model of a learner and therefore to simulate quick feedbacks usually do not give the desired results because the development of precise learner model is more complicated task than the teaching process by itself [Grundspenkis].

Computer-based teaching system even if it fully accomplishes nowadays achievements of artificial intelligence cannot provide genuine adoptive discussion with the learner about particular issue using different forms and levels of layouts.

Thereby computer-based teaching from organizational point of view cannot fully provide properties of classroom’s lessons because existing technological tools cannot provide genuine adoptive discussion with the learner, cannot provide quick feedbacks and could provide (only to a certain extend) slow feedbacks. By the lack of mentioned feedbacks the following problems of computer-based teaching are illuminated:
- it is difficult to authors to provide necessary degree of details elaborating the teaching materials;
- it is difficult to authors of teaching materials to provide necessary speed of the presentation;
- learner cannot enter into the spirit of a lesson because there is not physical auditorium around him/her (e.g. there are not interested listeners whose keep the discussion with a lector);
- learner cannot ask the question to lecturer when it is necessary and therefore cannot familiarize him/herself with the further teaching material.

In the case of eLearning and distance learning usually learners by themselves choose the time for learning. The ability freely to select the time for learning usually is considered as an advantage of computer-based teaching. However in reality it brings problems as well:
- learner could not study for a long time hoping that just before the exam (test) it will be possibly quickly to get up the whole teaching material;
- learner can study at inappropriate time, e.g. at a late evening when he/she is very tired and therefore ineffective.

3.2 Conclusions about computer-based teaching

1. Computer-based teaching now is just evolved and it has a lot of weaknesses that will be overpowered in the future, but will not be overcome in the immediate future because computer-based teaching does not have...
formal semantic equivalent of brainwork of teacher and therefore it has not an effective algorithm of teaching.

2. To resolve the problems of computer-based teaching it is necessary to apply achievements of the other knowledge areas – artificial intelligence, theory of algorithms, theory of systems etc.

3. Despite of mentioned above problems it is necessary today to develop teaching tools for the Web because it is necessary to teach learners who for a variety of reasons cannot attend classroom’s lessons. For instance, young people with special needs, teachers from rural schools, officers of particular services etc.

4. REQUIREMENTS FOR ORGANIZING OF ADOPTIVE E-LEARNING

There are two mutually complemented principles of improving the quality of eLearning:

- development of computer-based teaching using elements of artificial intelligence and drawing therefore computer-based teaching closer to nowadays intellectual work of a teacher;
- drawing methods of computer-based teaching closer to methods of classical teaching. It could be achieved by simulating of classical teaching creating therefore for learners the spirit of classroom.

According to our considerations the process of eLearning has to be base on the following principles:

- it is necessary to provide during the teaching the feedback “listener-lecturer” (“learner-teacher”);
- it is necessary to imitate for the listener the spirit of real classroom and to imitate the presence of a group of listeners;
- eLearning material has to be prepared in such manner that its familiarization will be as possible close to classroom’s lessons;
- eLessons must be carried out according to particular time schedule and learners must to report on familiarization of teaching materials.

For implementation of the eLearning process with mentioned above properties there are necessary:

1. To envisage tools that allow to learner to discuss with teacher [Mabrito] or with his/her colleague about interested subject (ask questions, show picture with marked on it some particular frame, simultaneous oral explanation etc). Hereto all these have to be provide via Web.

2. Teaching materials have to be prepared by teachers with deep experience in auditorium’ work. Hereto:

   - to provide an appropriate speed of presentation by recording of the teaching materials either directly in auditorium or in parallel with classroom’s lesson;
   - to apply as simple visuals as possible (drawn by hand pictures, diagrams etc.);
   - to envisage in eLessons discussion with participants; it gives to others learners impression of real auditorium;
   - to envisage fixed time of lessons on which and immediately after which listeners could ask a question and quickly receive response on it.

3. At the beginning of teaching course to envisage classroom session (with physical presence of participants) to strengthen the spirit of auditorium in further remote sessions. In the case of long timeframe such intramural sessions have to be envisaging during the fulfillment of the course as well.

4. To envisage practical exercises those have to be carried out by the group of learners together. Work has to be done without physical contacts, but by using mentioned above tools for discussions.

5. For each teaching cycle to develop teaching materials from scratch or to redesign it essentially. It is necessary to draw eLearning closer to classical teaching for the teaching staff also.

5. REQUIREMENTS FOR ENVIRONMENTS FOR E-LEARNING

There are different general-purpose tools providing disposition of teaching materials in the Web with further access of learners to those materials [Grundspenkis].

If the target group does not consist of the experts in information technology (for instance the young people with special needs), then using of advanced general-purpose tools is problematic for learners. It is due to their not sufficient IT background, often due to inappropriate knowledge of English as well.

Second essential issue (at least in Latvian Republic) is limited capacity of Internet in districts as well as limited capacity of learner’s computers.
Third essential factor is initiating of work. Often advanced collaboration tools consist of server’s and client’s parts of software, but remote learners have not necessary knowledge and skills to install client software on their computers.

The last factor is the cost of collaboration tools for learners. Implementation of advanced tool could be too expensive, hereto provided advantages will be used only partially.

From mentioned above follows that environment for collaborations between remote learners and the teaching staff should conform to the following requirements:

1. First lesson has to be in classroom. For purely prepared learners such events could be more than one.
2. It is necessary to prepare special tools those make possible for learners to check ability of their computers to work with particular collaboration tool. For instance, operation of sound card, ability to see PDF-files and other essential aspects required for work with environment.
3. Collaboration tool must provide feedbacks between learners and teacher as well as between learners.
4. Collaboration tool must operate within limited capacity of Internet in districts.
5. Collaboration tool must not require special knowledge and skills including good knowledge of English.
6. Collaboration tool must not envisage installation of client software by learners.
7. It is desired that the collaboration environment will be costless for learners.
8. If eTeaching process will be widely deployed and will span distributed learners’ cluster, that it is necessary to have network of supporting points where learners could take consultations about usage of collaboration tool as well as about studied subjects.

According to mentioned above principles Riga Technical University has fulfilled post-graduate training of teachers in Informatics of rural secondary schools [Sitikovs] and with the support of European Structural Fund develop the environment for education of the young people with special needs at their place of living [Lavendels].

6. CONCLUSIONS

eLearning is one of the effective teaching forms. Its implementation helps to resolve communication problems as well.

Classical classroom’s teaching is complex multi-elements’ self-controlling system with mutual interactions between separate elements as well as between particular elements and the set of elements at all.

Existing tools for eLearning cannot provide qualitative teaching process as their (tools) organization differs from classical teaching. Such tools do not fully implement mutual influences of elements therefore bring the discomfort both to learners and to teachers.

Special efforts are necessary to assign properties of classical classroom’s lessons to eTeaching tools.

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SOCIAL ISSUES IN ON-LINE COMMUNITY CONTENT SHARING

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ABSTRACT
The paper deals with the social issues involved in the creation and development of on-line communities of peers. This research is part of the project A4MC², which is concerned with the possibilities for technology to support and encourage communication and interaction among different users. In this case, users belong to several communities of peers within which they exchange content of various natures. Along with some inevitable technological problems related, for instance, to the use and the automatic generation of metadata, some fundamental user-related issues also come into play. These latter ones include questions about the kind of experience users expect by this sort of communication and the consequent characteristics of the interface to be developed depending on the underlying platform, but also more theoretical ones related for instance to the different kinds of social relationships that this form of communication allows participants to undertake: where are the boundaries between the self and the others? How much are people willing to reveal their contacts over their current location? Which meaning does the notion of privacy take in this context? Here, the full concept of sociability is interested.

This paper represents a first step in the definition of a design model for mobile technology to support sociality on-line.

KEYWORDS
Modeling social relationships, social issues in on-line communities.

1. INTRODUCTION
Ubiquitous technologies are pervading everybody’s life and tend to shape and affect it. In recent years, we have indeed assisted to the gradual shift from work-related activities to personal ones in the use of information systems: more and more people are for instance using SMS to communicate or find it easier and simpler to send an email rather that to phone. It has therefore become unavoidable to start to question the extent of the effect of the use of (ubiquitous, mobile) technology for personal activities on users.

As Howard and al. argue (2005), whereas a lot of research has been devoted in the last years to the study and improvement of systems that manage what they call “instrumental” activities, less has been done for personal ones. Instrumental activities comprise both “surveillance, coordination, scheduling, and information management” (Howard and al., 2005), and are, according to them, goal-oriented activities that can be easily conceptualised and modeled in terms of a global goal to be attained and a series of intermediate tasks to get to it. At the other extreme of this hypothetical line they place personal activities in the domestic space, that is, anything that concerns the individual directly without having neither any particular goal in mind nor a predefined or pre-formalised way to achieve it. They refer to them as to “phatic” interactions (Howard and al., 2005; see further). But whereas they actually intend to address all activities that take place around the home both as a physical and a socio-emotional environment, we intend to refer with this term to any interaction that involves some degree of confidence and intimacy and that transcends any work-related relationships.

Several problems arise when dealing with phatic interactions by means of ubiquitous technologies, both technical and more user-centred ones. From the technical side, the problem is to devise a way for technology to help establish and maintain the development of such relationships, so as to support some form of community building.
From the user perspective, however, many more issues come into play and range from the reason why an individual may be interested in keeping his/her contacts via a ubiquitous technology to how the underlying application may support this; from the kind of activities a user may ask this system to enhance to the sort of information s/he may be willing to disclose to his/her social contacts; from the way these activities may be modeled and designed in a mobile environment to the methodologies and the parameters to apply to evaluate the usability of the final product.

Relations in on-line communities can be of different kinds: there are communities of people with the same interest who meet on-line to exchange information and other material on it by means of one or another electronic medium. But there are alongside also communities of people who only share a phatic relationship and communities of people who have just a work-related interaction, like people on an intranet mailing list or members of an e-commerce community. Clearly, the nature of the community has a direct impact on its creation and further development. And it helps shaping the system or software it is supported by. However, in many cases, a lack of technical support hinders this mutual reinforcement.

The project A4MC is a research project dealing with these issues. But whereas the project actually concentrates upon the possibilities for technology to support and encourage community content creation in the large, by focusing on mobile users, advanced metadata, community support, moderation of content, social issues, usability and legal limitations, the present paper only focuses on that aspect of it dealing with the establishment and maintenance of social relations through mobile technology, before one could even speak of sharing content among community members. Indeed, establishing and maintaining certain social relations is the prerequisite to any other form of communication. In this sense, the most prominent kind of exchange users will engage themselves in is phatic exchanges, i.e., exchanges purely meant “to establish and maintain the possibility of social interactions” (Vetere et al., 2005).

In the end, along with a series of technological problems related, for instance, to the use and the automatic generation of metadata, some fundamental user-related issues also come into play. These latter ones include questions about the kind of experience users expect by this sort of communication and the consequent characteristics of the interface to be developed depending on the underlying platform, but also more theoretical ones related to the instruments to use to both define and evaluate the interface and the different kinds of social relationships that this form of communication allows participants to undertake: where are the boundaries between the self and the others? How much are people willing to reveal their contacts over their current location? Which meaning does the notion of privacy take in this context? Here, the full concept of sociability is interested.

In what follows, the paper will therefore set the theoretical background at the basis of this research and discuss some of the preliminary issues that have emerged in relation with this user-related problematic. To achieve this, the paper is structured as follows: first, we introduce the notion of sociability, we illustrate its centrality into community building and we explain its relevance in the current project by discussing the concept of phatic communication; then, we present the design decision originating from the persona hypothesis initially formulated about users’ definition, selection and profiling; afterwards, we discuss how to represent these social interactions; at last, we draw some conclusion and indicate the future directions to represent and model sociability with ubiquitous technologies this research topic may take.

2. SOCIABILITY

If a system has to encourage and support the establishment of social relations, a clear understanding of sociability and, in particular, of on-line sociability and of its link with the issue of on-line community building is required.

Several definitions of sociability and different frameworks for understanding sociability have been developed (see, for instance, in Preece and Maloney-Krichmar (2003) for an overview). Among them, the Participatory Community-Centered Development (PCCD) proposed by Preece (2000) offers the widest perspective on the community building process. It foresees four stages in community development:

1 They are: (i) understanding community’s social needs; (ii) developing a conceptual model of it; (iii) refining sociability and usability; (iv) supporting the community’s growth and helping it expand (Preece and Maloney-Krichmar, 2003). These four stages go hand in hand with a technological process which consists in the selection of a software or system that can support all this.

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identifies three elements to support on-line sociability, namely “the community’s purpose, its people and the policies that help to guide on-line behaviour” (Preece and Maloney-Krichmar, 2003).

It is with this framework in mind that we have first identified the possible communities that might be involved in the use of mobile technologies as devised by the A4MC³ project (see next section). This community identification does not limit itself to a general community profiling, but it specifically focuses on the social needs of its members in order to be able to derive the sort of communication that they may wish to pursue (see Section 3). The critical point, here, is twofold, namely it is:

1. to find the right balance between individual needs and preferences and community requirements. Several questions arise in this respect: how can the individual’s needs emerge and be acknowledged by the community? Where does the boundary lie between one’s own requests and the community’s ones? These are all questions that are present also in real life communities, but that ubiquitous devices make more urgent and stringent.

2. to find an additional balance between the individual and its context. Since we are considering building and maintaining social relations by means of mobile devices, a further possible question may concern the environment the user find him/herself in while interacting with others. Questions that may arise here pertain the extent to which it is relevant that the resulting system takes this environment into account and, of course, the ultimate form this adaptation should take. To this end, the notion of social indexicality developed by Kjeldskov and Paay (2005) seems to be a very interesting concept to be further analysed. It refers to the idea of indexing information on the user interface on the basis of “the user’s current social group and their history of shared experience” (Kjeldskov and Paay, 2005). In this way, information is adapted to users depending on “the time, place, and the people involved in a situated social interaction” (Kjeldskov and Paay, 2005). In what follows, we will see how this notion could be applied to the specific objectives of the A4MC³ project.

First, we need to see what the characteristics of an on-line community are.

2.1 On-line communities

According to Wang et al. (2002), “the virtual community exists in the mind of participants” (Wang et al., 2002). However, whereas some communities originate on-line and do actually remain circumscribed to this space (we call them “just virtual”), others are the extension of some communities already existing in the real world (we call them “meta-virtual”) or yet others even develop (with some or all of their members) a real, physical existence that progresses in parallel with the virtual, on-line one (we call them “semi-virtual”). In this sense, communities clearly do not only exist virtually or in the participants’ head. In particular:

- just-virtual communities originate on-line and mainly remain such. In this case, the fact that some of its members may decide to meet in the real world is seen more as the exception that confirms the rule: it happens but not so much. Moreover, the outcome of transferring an on-line relationship in real life is not always successful. For the special case of chatters involved in a romantic, on-line relationship, for instance, statistics reveal that when the two people finally meet, in most cases the relationship is jeopardized and is then petered out (both in reality and on-line)
- meta-virtual communities originate in the real world but later further extend on-line
- finally, semi-virtual communities originate on-line but, at a certain moment, also develop in the real world with a consistent number of their members (what a major difference is compared to virtual communities going off-line, as in the special example mentioned above), giving rise to a parallel real-world community. This is for instance the case of some expats communities. “Italians”2, for example, an on-line community of Italian expatriates, initially started as a virtual place where Italians abroad could meet and talk about their experiences as emigrants. Soon, real-life events started to be organised regularly where all community members could meet and get to know each other personally. Clearly, the side effect of these official gatherings is that people start to develop one-to-one or, also, more dedicated relationships with a restricted group of participants that they carry on both on-line and in the real world.

Gusfield (1975) proposes another classification which further distinguishes between two meta community types: geographic communities and relational communities (Gusfield, 1975). While geographic communities are physical communities in that they are bound to a specific place, relational communities are location-
Although Gusfield does not mention this explicitly, because of their placeless nature, relational communities can also exist on-line.

In the project A4MC³, and in this paper in particular, the focus lies on this second sort of meta communities, on their establishing and maintenance, that is on communities whose members share a phatic relation. In these communities, what matters is the tie among the people involved that is somehow reinforced by the participation in a community life. Moreover, the activities carried on by its members within it are less prescriptive and formalized: people do also share information and knowledge of some kind, but they are mainly involved in the strengthening of their social bond (Vetere et al., 2005). These relational communities often become meta-virtual communities: people start using technology to amplify the possibility of staying connected (both literally and metaphorically). When the technology in question is ubiquitous and mobile, understanding the social dynamics implied by this setting and the ways technology can support and encourage them become urgent.

Every time a person is active in building a relation, s/he is involved in a phatic exchange. The term “phatic” originates from the speech act theory and denotes any expression whose only function is to perform a social task. Whatever form it may take, it indicates the urge to keep “existing communications channels open and usable” (Vetere et al., 2005). A phatic exchange involves a personal relationship of some degree, but this does not necessarily imply the execution of an activity (like shopping or going to the cinema) as in the case of the rendezvous experience described by Colbert (2005).

The issue that arises when thinking of phatic exchanges is to imagine a ubiquitous technology-based environment where such exchanges are supported and even enhanced. In the context of the project A4MC³, this includes answering the following questions:
1. understanding which form such phatic exchanges take in this setting;
2. defining how they can be matched onto existing technologies.

The correlation phatic communication-technology is indeed by far not a straightforward one, since a phatic exchange is vaguer and less formalisable than instrumental activities. Moreover, in phatic exchanges a balance has to be found between individual needs and community requirements because both are affected by the environment (i.e., the context) interaction takes place in.

### 3. IDENTIFYING THE USER

We started our investigation by the formulation of the persona hypothesis. This is a hypothesis made by the designer before observations start about the possible users, both actual and potential, who may be using the system under development (Cooper and Reimann, 2003). It is on this basis that the designer will eventually select users for observation.

In the project A4MC³, the persona hypothesis states that everyone can become provider of one’s own content, i.e., by sharing ideas, stories and experiences with people with the same interests belonging to a community through the use of ubiquitous technologies. Initially, a distinction was therefore introduced among four different communities on the basis of their user typology and related goals. They are:

- **advertisers**, i.e., who may want to advertise a product in a user-adapted way, by providing personalised ads. They can be both local, individual advertisers (like the local baker) or professional ones (like a restaurant chain, for instance);
- **professional content providers**, like journalists, who may want to integrate the story text they are working on with comments or hands-on reports from people who have been living the event they write about;
- **moderators**, i.e., media companies that behave as intermediators among advertisers, news agencies and the public to be targeted. But also an individual who, on a voluntary basis, may be responsible for a blog, like a city blog, where s/he may be publishing stories, reports and comments by other inhabitants about the city they live in;
- **end users**, like tourists, shoppers, citizens, young people, workers. This user group is rather wide and every sub-category within it presents different, although sometimes overlapping, goals.

On the basis of the three pillars of sociability foreseen by the PCCD framework (Preece, 2000), a first selection and sorting was made among the four categories mentioned above so as to be able to design a
ubiquitous system that can support sociability in at least one of the well-defined online communities from those listed before. They were prioritized in the following way:
1. end users;
2. city reporters, as example of professional content providers and of moderators. They will be responsible for providing content for and for moderating a city blog, i.e., the blog of the city where the project coordination is based;
3. advertisers.

Within the project A4MC, the focus lies on the first two classes of users, i.e., end users and moderators. They constitute both a community and a mere user typology. And from a community point of view, their membership is transversal, in the sense that both end users and moderators belong to the same community of city bloggers and may as well belong to other, more specific communities dedicated to a different topic.

In what follows, we will further elaborate on the profile of end users and on a model for online social relations suitable for them. More specifically, we will focus on end users as members of a relational, meta-virtual community which is characterized by a phatic exchange (see above).

### 3.1 The end user profile

Depending on their goals, end users can ultimately be further divided into four sub-categories with several, at times overlapping, goals. Both sub-categories and goals are ordered on the basis of their relative importance, i.e., from top to bottom as the primary focus of the analysis decreases, and from left to right as the users’ goals become less relevant or prominent for them. They are:

- **Inhabitants of the city where the project coordination is located:** they may be communicating (with family members, neighbours, friends, colleagues); looking for e-government services; consulting the city cultural agenda; looking for information about the city (like shops and restaurants opening hours, running hours of busses, etc.).
- **Shoppers:** they may be looking for information about shops and restaurants; looking for information about the city (like opening hours, running hours of busses, etc.); communicating (mainly with friends); consulting the city cultural agenda.
- **Tourists:** they may be consulting the city cultural agenda; looking for information about shops and restaurants; looking for information about the city (like running hours of busses, etc.); communicating (mainly with friends).
- **Workers (like commuters or business people just passing through the city):** they may be looking for information about the city (like opening hours, running hours of busses, etc.); communicating (with friends or colleagues).

Table 1 gives an overview of the different goals per user category.

<table>
<thead>
<tr>
<th>USERS</th>
<th>Goals</th>
<th>Contacts</th>
<th>City info</th>
<th>e-government</th>
<th>Culture</th>
<th>Shopping &amp; Eating out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Shoppers</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tourists</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Workers</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Citizens ultimately represent the primary focus of this research analysis. Their most predominant activity, as illustrated above, is communicating with their social contacts, that range from very intimate (i.e., family) to less close (i.e., colleagues). In this sense, they are involved in phatic interactions (see Subsection 2.1).

The (ubiquitous) system they will need to use to this end will have to support at least two activities:

1. communication (and phatic exchange)
2. content sharing mainly in the form of information about places and events in the city itself. In this sense, this system will have many of the features of a mobile guide.

In this classification, the typology of “life’s habitual places” modeled by McCullough (2001) and reported in (Paay and Kjeldskov, 2005) is actually not followed because the focus here does not lie that much on the
physical place but more on the type of sociality that is realized and which is sometimes transversal to given places. The situated interactions reported in Table 1 are indeed not so much affected by the physical place where they take place but more by the social context in which they are performed. In order to circumscribe the user and task analysis, however, a choice among the possible places for everyday activities will have to be made. For citizens, the most suitable candidate seems to be the city itself. Understanding how they communicate with their contacts, the exogenous and endogenous rules they follow to this end, “the physical and social affordances” (Paay and Kjeldskov, 2005) they are subject to within this well-defined environment can help identify the features a ubiquitous system needs to have to support that same interaction on-line and, even more, to eventually adapt to both the single user and the specific situation at hand in the case of multiple intersections between different social and physical situations. To achieve this, a method to model phatic interactions and to represent them on-line has to be found.

3.2 Modelling the user: the social context

In order to model social relations on-line (according to the end user profile identified above), a formative study has been set up. The experimental protocol foresees up to 15 citizens, heterogeneously selected in terms of gender, age, familiarity with technology and professional background.

The formative study was conducted using different design methods, both in-vitro and in-situ ones. This study consisted of two phases:
1. at first, a structured interview was used to understand these end users’ phatic exchanges
2. later, users were asked to observe themselves, by reporting on their own behaviors and thoughts by means of the Experience Sampling Method (Barrett and Feldman Barrett, 2000).

The structured questionnaires aimed at discovering, for each end user:
1. the identity of his/her most frequent social contacts
2. the degree or quality of the relation with the social contacts previously identified
3. the kind of contact and/or social activity that is entertained with these social relations
4. the way of carrying this contact or social activity out (e.g., by phoning, by sending an SMS, by visiting the person in question, by going somewhere. This is necessary to highlight the requirements the final system will have to have and to identify the sort of interactions and activities it will have to make possible)
5. the kind of information each user is willing to disclose to each and everyone of his/her social contacts, like for instance location disclosure as in (Consolvo et al., 2005). This is a direct reflection of the kind of social relation that occurs between the two.

In a second and last phase, users had to report of their own social activities during one week in the form of a diary. Here, experience sampling techniques are exploited (Barrett and Feldman Barrett, 2000). Users are asked not only to record the actual execution of social activities, but also the thoughts, the feelings, and any emotional elements ascribed to them. This is important to assign a psychological value and relevance to such exchanges.

Data processing is in progress. Combining the pre-experiment answers to the structured interview with users’ personal report on their daily activity will allow us to model each end user’s social context. His/her physical context is not taken into account. The physical context where sociality takes place is only informative and peripheral: it does not impinge upon the final execution of sociability, it does not influence or drive it. The (implicit or explicit) social rules that are followed by the subjects in interacting with their contacts are location-unbound: users are not bound to any place, their only place being the city where they live, inside or outside a physically closed environment (like a cinema or their homes).

4. CONCLUSION

The paper has briefly introduced the scope and objectives of the project A4MC. This project deals with on-line community building for content creation and sharing. The approach that is followed to appropriately represent sociability in ubiquitous technologies is a top-down approach where, from the possible on-line

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Footnote: “At work, at home, on the town and on the road” as reported in (Paay and Kjeldskov, 2005).
communities originally identified (see Table 1), only one, i.e., the end users/citizens community, is modeled in order to design a system that can support sociability for them. More specifically, the focus lies on end users as members of a relational, meta-virtual community which is characterised by a phatic exchange. The phatic exchanges users are involved in are assumed to be location-unbound: the physical location where they take place is not considered to have an effect on them, to influence them, whether positively or negatively, to determine or jeopardize the (implicit or explicit, formal or informal) set of social rules that are enacted while carrying them out.

At this stage, the mainly theoretical and fundamental problems that had been initially identified (i.e., the questions about the kind of experience users expect to live by this sort of communication, the kind of information they are willing to disclose to their social relations, the kind of activities they require technology to support and the sort of interaction they ask the system to make possible) still need to be appropriately answered. A possible solution that is currently under investigation requires the development of an adaptation model performing some form of information filtering (Calvi and De Bra, 1997) and that implements the notion of social indexicality developed by Kjeldskov and Paay (2005).

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ABSTRACT
OurGrid is a web-based community whose members can use each others’ spare computing power. When an OurGrid member is not using his own computer, it can be used by any other member. This paper describes the community aspects of OurGrid. These have been crucial for its success.

KEYWORDS
Communities, Grid, Peer-to-peer.

1. INTRODUCTION
This paper is concerned with OurGrid, a web-based community whose members can use each others’ spare computing power. When an OurGrid member is not using his own computer, it can be used by any other member. OurGrid has been described in several previous publications (listed at http://www.ourgrid.org/twiki-public/pub/OG/OurPublications - in particular, for an OurGrid primer see [Cirne et al, 2005]). However, this paper is the first to focus on OurGrid’s web-based community aspects. OurGrid’s exploitation of the fact that it is a web-based community has been crucial to its success.

This paper may be of interest to members of web-based communities who would like to know about community practices that have contributed to OurGrid’s success, and so might also be useful for their own communities. It also may be of interest if you would like to increase the computer power that you can use, in exchange for making your spare computing resources available to others.

1.1 Previous approaches to sharing computing power
For decades, distributed computing has allowed computing power to be shared within an organization. A user of a networked computer can send applications to be carried out by other computers within the same organization. More recently a more ambitious architectural vision has arisen, that of grid computing [Foster et al., 2001; Berman et al, 2003] in which computing power can be shared transparently between different organizations.

There has been considerable effort into realizing grid computing, and several grids are now in operation (for instance, CERN’s LHC Grid [CERN, 2005], TeraGrid [Beckman, 2005], ChinaGrid [Jin, 2004], the UK e-Science Grid [Hey and Trefethen, 2004]). However, the middleware stack that these grids rely on is large and complicated, and as a result is regarded with suspicion by security experts. Joining any of these grids is a complex operation, and it requires human negotiation, so its complexities cannot all be delegated to a computer.

Once it is technically possible for your computer to be used by someone who belongs to a different organization, the question arises as to why you would want to let them do that. An answer which has had widespread appeal is that they would pay you for the use of your computer, in a secure, automated fashion, using a grid economy [Buyya et al, 2000; Buyya, 2002]. Although work on grid economies is progressing, none of the grids mentioned above have yet developed full grid economies, and the elements required to support a future grid economy have sometimes proved problematic. In particular, the e-banking and
cryptography infrastructure required can provide a single point of failure. In one grid the certificate revocation server went down twice in six months, and each time the entire grid stopped working.

An alternative approach to sharing computing power between different organizations is that of volunteer computing [Sarmenta, 2001; Anderson and Fedak, 2005]. There have been quite a few examples of volunteer computing, but the most famous is probably SETI@home [Anderson et al, 2002]. Volunteer computing uses the idle time of volunteers’ computers. Computer users typically have some periods of time during which they need to use their computer, and some periods of time during which they have no applications to run and leave their computer idle.

Suppose a project team wants to carry a large computation which is embarrassingly-parallel, that is, it consists of a number of tasks that can be performed in parallel without any communication between the different tasks. Embarrassingly-parallel applications exist in many fields, including data mining, simulations, parameter sweeps, computer imaging, film animation, pharmaceutical development, computational biology, and meteorology. To use volunteer computing, the team makes some special screen-saver code available for volunteer members of the public to download. When a volunteer’s computer is not being used by the volunteer, and so would otherwise be idle, the screen-saver code uses the volunteer’s computer to perform some of the tasks, and sends the results back to the project team.

The screensaver code is lightweight, joining the system as a new volunteer is easy, and volunteer computing scales well up to millions of volunteers. Volunteers lose nothing by volunteering, since their computers would otherwise be idle. However, they also do not gain anything by volunteering (except a good feeling from having contributed, for example, to improving malaria control in Africa [AFRICA@home, 2006]). Only projects which can persuade large numbers of people to volunteer can harvest much voluntary computing power, and hence in practice volunteer computing can only be used for applications with wide public interest. It is impractical for an individual user to use volunteer computing to increase the computer power available for his routine computer use.

1.2 OurGrid

OurGrid is a web-based community for sharing computing power. It has been in production since December 2004. It began as a research project in the Federal University of Campina Grande, and later gained some financial support from HP Brazil. In January 2006 it comprised 303 computers on 13 sites. For a snapshot of its current size and status, visit http://status.ourgrid.org.

As in volunteer computing, members join OurGrid by downloading a lightweight client which runs tasks on their computer when it would otherwise be idle. However, instead of there being a single project team who specify the application that the tasks will belong to, the tasks may be part of an application submitted by any OurGrid member. That is, the organizational model for OurGrid is a community, in which all members can both contribute and benefit, as opposed to a service (where some only perform the service and others only receive it, as in volunteer computing) or a market (in which benefits are bought and sold, as in a grid economy).

The OurGrid code incorporates an innovative resource allocation algorithm which ensures that the more spare computing power that a member donates to other OurGrid members, the more he can expect to receive from them. Thus there is an incentive for an OurGrid member to let other members to use his computer, which is that in return he can use their computers (when they would otherwise be idle) to perform any embarrassingly-parallel application that he pleases, for free. In contrast to volunteer computing, the application does not need to be of wide public interest.

The client code runs the tasks in a sandbox based on Cambridge University’s Xen virtual machine [Barham et al, 2003], which isolates the tasks from the rest of the computer and has no network access. This helps to prevent poorly-coded or malicious tasks from causing security problems. OurGrid is designed to work smoothly for up to 10,000 computers. In comparison to grids such as the LHC grid it is simple to join, and joining does not require a human negotiation. Its code is lightweight, and it does not require secure e-banking or a network-wide cryptographic infrastructure.

OurGrid’s architecture for the sharing of computing power is that of a peer-to-peer community [Oram, 2001]. That is, it is completely decentralized, and hence so has no single point of failure. Evaluation results ([Cirne et al, 2005], Figure 5) indicate that almost all the time there are computers being donated over OurGrid. This means that almost all the time there are both some OurGrid members whose computers would
otherwise be idle, and some other OurGrid members who have a current demand for computing power that
their local resources cannot satisfy.

In the rest of the paper I will first outline the role of web-based tools and communication in OurGrid, and
the effects of the build-up of social capital. I will then describe an application for which the community
aspects of OurGrid are especially relevant. I will end by indicating how readers may benefit from, or
contribute to, OurGrid themselves.

2. OURGRID SEEN AS A WEB-BASED COMMUNITY

A crucial aspect of OurGrid’s code is that it was developed by and for a web-based community. Web-based
communities allow distributed collaboration, opportunities for testing ideas, and easy feedback from
members on system functionality. All of these have been essential in the development of the code. OurGrid’s
code is open source, allowing any member (or, indeed any non-member) to contribute to its development.
Different functionalities were developed by different members of the community, in different locations,
working together over the Internet. For instance, OurGrid’s resource allocation algorithm [Andrade et al,
2004] was developed by a collaborative team distributed between Brazil and the UK. OurGrid’s own
technology has been used to run simulations and tests of new technical ideas for OurGrid, trying them out in
a safe way on members’ computers. Several changes in technical direction for OurGrid came from
suggestions by community members or arose from their experiences with using the OurGrid code.

The OurGrid development team has found wikis particularly useful for coordinating distributed tasks. For
example, there is a wiki of contact information for the development team. Whenever a team member makes
contact with an organization that expresses interest in OurGrid, the team member can add this contact to the
wiki and provide updates on the progress of that relationship. That way, any other team member who comes
into contact with the organization can simply and quickly find out the state of the organization’s
involvement. There is also a users’ wiki, which is used to introduce members to each other, and to allow
members to contribute useful information, hints, and pieces of code.

The OurGrid web site (http://www.ourgird.org) is also used to spotlight interesting applications and
development activities, thus rewarding high-quality application or development work with publicity; to
record current research activities; and to make available all OurGrid’s documentation and related papers.
Moreover, web technology is essential for the ease of joining OurGrid, because the method of joining
OurGrid is to download the OurGrid client from the Web.

The OurGrid community has been fostered through face-to-face communication as well as web
communication. Regular face-to-face meetings have been organized for OurGrid community members. This
has been productive, both technically and socially.

The social capital developed within OurGrid provides an extra disincentive for malicious uses, in addition
to technological security protections such as the sandbox mentioned earlier. It provides an incentive for
members to make useful contributions. Perhaps most importantly, it has had the effect of increasing and
enhancing the interaction between OurGrid members. Several OurGrid member organizations are now
collaborating with each other in deeper ways than simply using each others’ spare computing power.

3. AN OURGRID APPLICATION: WATER MANAGEMENT

OurGrid members have used the OurGrid technology to run many different applications, including molecular
dynamics [Veronez et al, 2003], simulations, computer imaging, and data mining [Silva et al, 2004]. An
example of a project for which the community aspects of OurGrid are particularly relevant is the SegHidro
collaborative project [Araújo, 2005; Araújo et al, 2005], whose aim is to support water management in
North-East Brazil, an area where repeated droughts and poor planning have made a huge number of people
suffer unnecessarily. Within SegHidro, several government organizations are using the computation power
that they can gain from OurGrid to improve weather forecasting for this area. Many water reservoir managers
are using these more accurate forecasts, plus computation and simulation power from OurGrid, to improve
the risk management of their resources. Other organizations are using computing power from OurGrid, and
information from the previous two types of SegHidro project members, for the management of alluvial aquifers - underground water sources that were previously used in an unsystematic fashion.

For this application, volunteer computing could certainly be used. However, the use of OurGrid means that the SegHidro project can exploit the communication channels and social capital available within OurGrid. Clearly, the more closely that the different organizations work together, the more effective they can be, and the better the potential impact on water availability for inhabitants of this area. By sharing each others’ spare computing power over OurGrid they are already cooperating with each other, and the aim is that their joint membership of OurGrid will assist them to cooperate in other ways as well, both over the web and face-to-face.

4. WHAT NEXT?

If you have a Linux computer connected to the Internet, you too can join OurGrid. Download the client from http://www.ourgrid.org and follow the quick-start guide. The web site also gives contact information if you would like assistance, or if you would like to contribute suggestions or help to the project. OurGrid is open source, and is free to join (as in free speech and also as in free beer).

At the moment only embarrassingly-parallel applications can run on OurGrid. Restricting OurGrid’s use to this type of application makes it easier to ensure that the system is efficient and secure. However, the OurGrid team is investigating how to extend OurGrid’s code to also support workflow applications. There are also plans to extend OurGrid’s resource allocation algorithm to provide an incentive for the sharing of data between members in addition to the sharing of computing power.

5. CONCLUSION

This paper has described some ways in which OurGrid exploits the fact that it is a web-based community. This fact has been crucial in its design, development, testing, adoption, growth, and in improving its usefulness to its members.

In contrast to other approaches to sharing computing power between different organizations, on the one hand OurGrid provides an incentive for members to share their computers, and can be used by individuals to increase the computing power available to them for running applications which are not of general public interest: and on the other hand it is lightweight, easy to join, and does not have a single point of failure.

Although OurGrid is designed to work smoothly with 10,000 computers, it currently has many fewer. Communities of 10,000 users require different social and technical infrastructures from communities of 300 users, so changes to the way the community is organized will be necessary as OurGrid grows. Another current limitation of OurGrid is that it can only be used for embarrassingly-parallel applications. However embarrassingly-parallel applications are useful in many fields, and there are plans to extend the range of applications further.

ACKNOWLEDGEMENT

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CONSTRUCTION OF INTERNATIONAL COMMUNITIES IN PORTUGUESE

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ABSTRACT
We present a proposal for research, development and construction of international communities in Portuguese, using digital platforms. The idea was born following an international conference on distance teaching and learning, in which a meeting on “E-learning and Portuguese-language culture” was promoted. The established contacts gave place to a new project to stimulate learning communities via Internet (so far the countries involved are Portugal, Brazil and Mozambique but, in a near future other Portuguese-speaking communities will be able to participate). The theoretical framework is provided by Vigotsky’s ideas on learning contexts.

KEYWORDS
Portuguese-language culture, learning communities, Vigostky, Portuguese language, Web cooperation

1. INTRODUCTION
The invention and explosive adoption of the Internet all over the world is causing a great change in society, thereby influence and renewing education. The major change is probably the new meaning of what may or may not be local, of what may be or may not be a community. The Internet enables some collective praxis to take place at a distance. Learning communities with participants from different locations are already quite common in Brazil and Portugal. E-courses are becoming more and more popular and have already granted certification to many students. The possibilities of educational work with the Internet are incredibly large and remain to be explored. We have witnessed and participated in English or French learning communities with a variety of international participants (TACT, 2005). We have seen, for example, Canadian, North American and Australian universities joined in learning communities mediated by the English language. These practices point out to the capacity of putting together physically separated communities with common cultures and social practices. Starting the fire of Discoveries and for at least three centuries, Portugal, Brazil, Mozambique, Angola, East Timor, Cape Verde, São Tomé e Príncipe, Guiné Bissau, etc. shared their history. This assured a lot of cultural identities, starting with the common language, as well as some living practices, which still hold today (CPLP, 2005).

We find therefore useful the development of international learning communities in Portuguese.

2. LEARNING COMMUNITIES IN THE NET
Learning communities are best understood at the light of the socio-constructivist concepts developed by Liev Vigotsky (Vigotsky, 1978). We can understand those communities as meetings of subjects engaged on the construction of a common praxis. The diverse participants share a physical, social and cultural environment
in which they aim to achieve their goals. Their processes and practices in everyday life lead to the continuous reflection about what one does and, at the same time, about what others do, producing constant learning. In synthesis with Vigotsky proposals this situation may be called “learning approximation zone”.

In this perspective we can associate to the learning communities a series of characteristics as indicated in table 1:

<table>
<thead>
<tr>
<th>Table 1. Fundamental concepts for the pedagogical approach (Matta, 2001).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interstructuration of knowledge</strong></td>
</tr>
<tr>
<td><strong>Project pedagogy and resolution of problems</strong></td>
</tr>
<tr>
<td><strong>Authenticity of questions</strong></td>
</tr>
<tr>
<td><strong>Authenticity of the teacher</strong></td>
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<tr>
<td><strong>Metacognition</strong></td>
</tr>
<tr>
<td><strong>Formal operational thought</strong></td>
</tr>
<tr>
<td><strong>Mediation</strong></td>
</tr>
<tr>
<td><strong>Approximation zone</strong></td>
</tr>
</tbody>
</table>
Interaction

It is the function of all teaching systems with an active approach. The action over problems should focus on the relationship between the known object and the subject.

Most important, however, is the association of these characteristics of learning communities to the Internet. This association may develop communal solutions in the Web which may to be treated didactically and pedagogically under the Vigotsky’s theories (Harism, 1990, 1995; Jonassen, 1996; Scardamalia & Bereiter 1991; Sharan & Sharan, 1992 and Wenger et al., 2002).

3. PORTUGUESE-SPEAKING COMMUNITY

Being involved in today’s globalized world, Portuguese-speaking countries and communities live different political, cultural and socio-economic realities but all remain related by their common historical, anthropological and linguistic past. History and culture sharing may be a competitive advantage.

We see Portugal in the European Union, participating with other European countries in the struggle for bearable growth, for the expansion of their markets and for the employment creation. Guiné Bissau, Angola and Mozambique, in Africa, present serious health problems and need urgently, on the other side, social and economic development, without the possibility of support from their neighbouring countries, normally having the same problems. Cape Verde, São Tomé and East Timor island countries, live the problem of isolation, both having a small population. Apart from being immerse in old problems related to social under development, is now making an effort to enlarge its ability to participate in world markets, assuming the role of a global trader. In all cases, community of Portuguese-speaking countries may reinforce the national strategies.

![Figure 1. The “Portuguese-speaking world” (nationmaster.com, 2005)](image)
Education is one of the fertile fields of development of this partnership, mainly since the appearance of the Internet and e-learning (Matta, 2005). The challenge is to build models of formation at a distance able of taking advantage of a common language, or cultural and, at the same time, surpass legal and political obstacles, such that the certificates and trainings offered by common initiatives may be valid in all partner countries.

It was since the 11th International Congress of Distance Learning by Brazilian Association of Distance Education (ABED), held in Salvador, Brazil, from 7th to 11th of September 2004, that the idea of building an international learning community in Portuguese started to take shape. The event hosted the 1st Meeting of Distance Education of Portuguese-Speaking Countries that held together participants from Angola, Brazil, Mozambique, Portugal and East Timor. Issues that mattered to each country were presented in order to make known the advances achieved at a national level (ABED, 2005). There we made a first sketch of an international community of learning in Portuguese, joining participants from Brazil, Mozambique and Portugal, but with …. potential.

4. DEVELOPMENT OF A LEARNING PROCEDURE FOR THE PILOT COMMUNITY

The referred international meeting signalized the need for developing e-learning in all Portuguese-speaking countries. Although each country is in a different stage of development in the sector, it became clear that a learning community that works on teacher training and on the development of e-learning would be useful for each of the partners.

The first practical challenge for the construction of the international community in question came up from the necessity of developing the first courses that objectively could serve as pilot for the later development of more advanced proposals.

We learn from the experience of the University of the State of Bahia and by the Foundation Visconde de Cairu, in Bahia - Brazil, especially from their work with learning communities (Matta, 2003) and to the availability of digital resources for the teaching of sciences (Paiva, Fiolhais e Costa, 2004) and of e-learning practices in the Universities of Coimbra and Porto, in Portugal (Paiva et al., 2004).

5. CONCLUSION

The Internet and mainly e-learning can be positively used to achieve a better world. The construction of international communities and their courses are clear examples of e-learning so that countries and communities can overcome regional restrictions.

We started a pilot project on e-learning with the Portuguese-Speaking countries (partnership between Brazil, Mozambique, Angola and Portugal)

Our project is an embryo for later developments and continuous work for many years.

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“EMAILCE9” A WEB COMMUNITY IN A PORTUGUESE CLASS WITH A FRENCH AND A CANADIAN SCHOOL

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ABSTRACT

This article describes an ongoing investigation project whose foundation is the establishment of a virtual community emergent from a presential group (we began with a class of students, their teachers and parents). The project was launched at a Portuguese school during the 2004/05 school year and during the present school year it will include new challenges and intends to extend a community of one 9th form class to one or two other classes of a similar age and school form but from French and English speaking countries. The possibilities are students from Canada and France. The great aims of the project are generally centred on increasing and improving communication, on the exchange of experiences, on the confrontation of ideas and particularly on the cognitive aspects that are specific to the written skills in foreign languages. We describe the dynamics we want to establish among our community as well as the platform used.

KEYWORDS

e-mail; share; learning; learning communities.

1. CONTEXTUALIZATION

Where did we start from? We started from some statistics carried out in the last few years in Portugal about the use of information and communication technologies (ICT) by teachers and non-higher education students. We also started from a school that apparently shuts itself down from the moment students cross its gates to leave and where links between teachers, students and guardians are feeble and only exist face to face. We also started from evidence that that little pedagogical advantage is taken from ICT.

In fact, the problem seemed to be more in wills and mentalities than in the number of computers available; let’s see: on a national level, in 2002, 88% of teachers had computers and 91% used them regularly. But only 44% used e-mail (Paiva, 2002); as for the students on a national level (Paiva, 2003a) we observed that in 2003, 64% of students’ families had computers and 36% had Internet access. Only 3% of
students communicated by e-mail with teachers, whereas almost all used e-mail or chatrooms to communicate with friends and/or schoolmates but only for personal reasons. Unpublished data from 2004 from a sample of 780 students in the 8th form, from the metropolitan area of Coimbra; showed that 87% of students had computer at home, 57% Internet and 7% communicated with teachers by e-mail.

Thus during the 2004/2005 school year the Project Emailce (Email in the school community) began in the School EB 2, 3 Dra. Alice Gouveia, as a challenge to connect students, teachers and parents of the 9th form class, beyond school activities, to create a space “without contents” where each one could look for and meet others, share doubts, knowledge and discoveries. Socio-constructivist paradigms such as Vygotsky’s (1986) and learning concepts such as Wenger’s (1998) underlie this project.

We will not dwell on a more profound explanation of “Emailce”, as that characterization can be found in former written texts where the project is described in greater detail (Paiva et al., 2003c, 2004a, 2004b, 2005a and 2005b).

We must stress the fact that the project was thought out from the inevitable theoretical revision/reflection upon, not only the multiple understandings that several authors attributed to the term ‘community’, but also the concept of ‘virtual community’ and finally its purpose and also their potential for being learning environments. We refer, among others, to (Rheingold, 1993), (Schrage, 1991), (Silvio, 2004), (Valtersson, 1999), (Aretio, 2002), (Alvarez, 2004) and (Andreu, 2003).

We also assumed that learning communities constitute a multifactor environment and learning facilitator by interiorizing feelings of belonging, self-acceptance and acceptance of others.

2. THE “EMAILCE9” PROJECT

The ‘Emailce9’ project is an alternative of the ‘Emailce’, developed last school year. This new project, which began last September, develops in a 9th form class and involves students, class tutor, other teachers and guardians. The main goal of the new phase of this project is to widen this class community to one or two classes from a French and/or Canadian school, in order to accomplish two other main goals centred essentially on the cognitive aspects inherent to written skills of foreign languages, and the affective aspects generated through the exchange of experiences, knowledge and the confrontation of ideas. At this point in the project, we are concluding the contact with the two schools abroad.

In this project we intend to mobilize a school community on the Web, having as a starting point the presental community, and to assess to what extent the following goals are attainable:
- to make communication more systematic
- to create bonds
- to bring school into daily life
- to improve the teaching of Portuguese, English and French
- to establish bridges to other cultures.

2.1 Class Characterization

The class where the project is being developed has 24 students, 17 boys and 7 girls between the ages of 14 and 17. Twenty-two students have a computer at home and 22 have Internet; the others may access the Internet at school during their free time. The project was presented to the whole class and received approval. As it is not a compulsory activity it will be difficult to make students participate against their will. Students’ parents thought it was very interesting to be at school without being obliged to be there physically. From our experience parents’ participation, as with presental approaches, are very infrequent and more related to cognitive questions rather than education as a whole.

2.2 The ‘DeskNow’ platform

According to Wenger, virtual learning communities are characterized by a sense of belonging, by an individual identity, by mutual involvement, sharing, cooperation/participation and the path of learning.
Therefore, platforms should have characteristics that will allow for the attributes of a virtual learning community to be performed. Bearing this in mind, we chose the DeskNow Mail and Collaboration server platform (Desknow, 2005) as a support to “Emailce9” (as with ‘Emailce’).

The Desknow platform includes e-mail accounts for each user, forum, repository (of documents or information), possibility of sharing or hiding files, group calendar and contact lists (private and of the community).

This platform also allows fulfils some important requirements for establishing a web based community:
- it is closed to external users (only users with a password can access it);
- it is protected against unwanted email, spam;
- Unacceptable behaviour has been defined with students and the platform administrator retains the possibility of deleting anything inappropriate.

![Figure 1. A platform page of the “Emailce9” project](image)

### 2.3 Communication/Interaction/changes through the e-mail platform

The possibilities of “being with” offered by the platform, are those in any educational relation (asking questions, communicating reasons for absence and “chatting”), especially those established among members of this community. The email is the way to enhance them and/or recreate them.

We will now sum up the possibilities of communication and interaction that the email platform offers the different actors of the 9th form class community (students, teachers and parents/guardians), as well as educational aspects arising from the exchange with students of other nationalities.

The contact through this platform allows for, among other things:

1. closer relationships between each person involved;
2. the chance to remove some hierarchical school barriers;
3. stronger contact with the information and communication technologies;
4. time and distance to be shortened;
5. the improvement in learning performance;
6. contact with other realities and experiences;
7. the possibility of training written skills in foreign languages….
3. FINAL NOTES

For our community evaluation must be continuous, as it is the only possible way for the community to grow and evolve towards their members’ interests and needs. That is why the project will undergo adjustments whenever necessary.

There will, however, also be more formal moments of assessment. We will carry out interviews to gather information on how each member feels the community has influenced, or not, their way of being at school. We will be particularly interested in evaluating the situations of students and teachers and/or guardians that are absent from this platform even after making all efforts to overcome this situation.

From the previous experience we have the idea that students easily join this project in opposition to adult teachers and/or guardians, who show some resistance. For all of them we think the touchstone is simply attitude towards change, shaded in different reasons and assumed with several different justifications.

We are aware that our community exists not because of the set of technological applications enabled by the platform but because of the contribution each person makes to its construction. The community exists to and for people. The virtual community is, of course, essentially, a foundation for humanity. It is therefore the vitality of human the dimension surrounding the concept of community that interests us: this dimension is as complex and subjective as it is fascinating!

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THE IMPACT OF USER-FRIENDLY WEB PUBLISHING TOOLS ON THE DEVELOPMENT OF COMMUNITIES WITH MULTIMEDIA AND MULTICULTURAL INTERESTS

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ABSTRACT
In the 21st century one of the biggest trends will be the large amount of immigration all over the world, which will bring its own problems. User-friendly web publishing tools will change the development of communities that have multimedia and multicultural interests. These will become the most important communication tools, representing the first step on the road to integration, multimedia expression and remote communication in the new global communities. Different nationalities, ethnicities and genders will not exist as problems.

This paper describes and analyses some of the tools for web design and publishing that were originally made for end users, such as Blog, Wiki and CMS, as well as the “Skype ecological system”. This paper also investigates their technical parameters, usability, and their consequences in terms of sociological, national and gender issues. The paper also makes predictions about the progress of these tools, as well as their likely impact on the development of virtual communities, predictions based on an analogy with user-friendly web browsing.

KEYWORDS
User-friendly, communities, communication, multicultural, social, development

1. INTRODUCTION
From the era of the first e-mail it was obvious that humankind is craving for new communication media. With the beginning of the WWW in 1991, communication options were multiplied. Today, with improved software, the number of hardware solutions and multimedia options is almost unlimited. The WWW has become the most democratic medium so far in human history - there are numerous, user-friendly web publishing software packages that are easy to work with for every user; their prices are decreasing; data storage areas increase in size daily; processor speeds double every 6 months; people are organizing themselves and selling products via the Web; the number users of VOIP telephony is rising every day. Multimedia is now all around our planet. The world has changed.

The increase in migration throughout the world is another characteristic of modern society. Since our planet is highly polarized between poor and wealthy societies, the twentieth century encouraged a dramatic increase in migration, allowing people to achieve better living conditions, better lives. Unfortunately the integration of immigrants in their new societies is far from easy.

Meanwhile 84% of Web users have contacted or participated in Web communities and the growth in the membership and usage of these communities is expected to continue. This increased interest in Web communities reflects both the usage of new technologies and a serious need for the fulfillment of social goals. This extensive usage points the way towards qualitative and quantitative solutions that satisfy this need. Whereas the WWW offers user-friendly Web publishing tools suitable for communities in which gender, race and nationality do not play any role, the emergence of new communities of other types, communities that also have a need to deal with information and the problems of employment, health, education etc., should also be strongly supported and motivated by society in the field of multimedia.
2. IMMIGRATION TRENDS AND ITS OWN PROBLEMS

Immigration is a significant trend of the late twentieth century and the beginning of the present century. Seeking better conditions of life, many immigrants have tried to find new homes in more secure societies, especially in the most developed countries in the European Union. Even though they are highly developed, most of these countries have not yet found a completely successful model of integration.

The most obvious problems currently experienced in all the EU member states include a decrease in fertility as well as an increase in the life expectancy of the elderly. In order to offset this increasing demographic burden and to reduce the dependence of these countries to favorable limits, the EU member states must find ways to allow for the net immigration of the 47 million persons of working age who are expected to arrive between now and 2020; ways that also counter an increase in the level of xenophobic aggressions that has been seen during the past few years and which is attributed to increased immigration.

The consequences of these problems include: [a] socio-economic data relating to the employment, education, health and housing of immigrants demonstrate that a fair and proportional inclusion of migrants and ethnic minorities in vital spheres of life has not yet been achieved; [b] migrants and ethnic minorities suffer from low employment rates, a concentration in specific segments of the labor market, low wages, poor working conditions and under-representation in senior positions in the workplace; [c] migrants and ethnic minorities generally experience worse health, have higher death rates and are more likely to be exposed to health risks than the bulk of the EU population; [d] migrants and ethnic minorities suffer discrimination, resulting in their developing strong feelings of dissatisfaction and disappointment.

3. WEB COMMUNITIES – TERMS AND DEFINITIONS

3.1. Terms

There is as yet no unique term for a group of individuals who interact with each other by using new technologies. Suggested terms from the literature include: online, Internet, virtual and Web communities. Given that these Web communities could, within a short time, evolve into mobile communities (since the usage of mobile phones is cheaper, ubiquitous and always available, demonstrated partly by the extent to which SMS communication has exceeded all expectations), perhaps “online” is the only term appropriate for such a broad spectrum of usage. However, at the present time new media communities are still best described as Web communities.

3.2. Definitions

Just as there are many terms to describe such groups of individuals, there are also many definitions of such groups, including: the aggregation of individuals or business partners who interact around shared interests, where the interaction is at least partially supported and/or mediated by technology and guided by some protocols or norms; a group of people who interact in a virtual environment; a collection of web pages created by individuals or associations with a common interest in a topic; and flexible organizations that actively seek approaches to their self-improvement etc.

In this paper Web (and other new media) communities are defined as groups of individuals who mutually interact by using new technologies.

4. CMS, BLOG, WIKI

4.1. User-friendly web publishing tools

User-friendly web publishing tools are tools that are made for any end user, even absolute beginners in terms of technical education and experience, in order to provide simple and fast Web publishing. The emergence of
these tools has brought, as a social process, the democratization, filtering, decentralization, and user control of the Web, and has enabled the easy modeling of knowledge.

The Web features that are most appreciated by users in Web communities are: Web browser interfaces, simple and fast Web publishing that does not require any advanced technical knowledge of the tools and the media itself; simple means of communication among members; simple use of multimedia files; speed of interaction; and real-time communication. The recent proliferation of blogs and other content management systems (CMS) has eliminated the need for webmasters to act as mediators between the writer and the reader, turning the Web into a read-and-write medium, just as Tim Berners-Lee, the inventor of the Web, originally imagined it. CMS, Blog and Wiki are the best examples and the most commonly used software for Web publishing.

Content Management Systems CMS are mostly employed where there is a strong professional motivation, examples of which are: a company presentation, client communications, e-commerce, portals, forums, campaigns etc. CMS are more complicated form of database Web publishing tools and have not been created for use by absolute beginners, but they could provide a Web solution for computer professionals. Web solutions that are very useful for companies could range from open source tools such as Mambo www.mambo.com to enterprise solutions such as the Content Management Suite www.stellent.com.

Blogs are free of charge content management systems designed for any end user (even the absolute beginner) who wishes to publish on the Web. Blogs are weblogs, interactive web pages in which the blog owner, or author, regularly posts content. The most popular Blogs are: www.blogger.com, www.wordpress.org, www.mindjournal.com, www.mindsay.com, and www.20six.co.uk. Blogs are mostly used for publishing journals, Web communities, personal Web sites, and in education.

Wiki is used for specific hypertext documents. It is software used by a group of people to create a collection of documents. WikiWikiWeb provides collective text authorization through the use of markup language. The simplicity of making and maintaining files is the principal attribute that defines Wiki technology. The most interesting example of Wiki is Wikipedia http://en.wikipedia.org/wiki/Main_Page, a multilingual Web-based free-content encyclopedia. Wikipedia is written collaboratively by volunteers, allowing most of its articles to be changed by anyone with access to a web browser. (It will probably prove necessary in the future to moderate access to such documents, in order to avoid abuses of this freedom.)

4.2. Increasing trends

The emergence of user-friendly web publishing tools has changed the WWW. There is no accurate count of the number of blogs on the Web today because the number changes so dynamically. The literature suggests that there are currently between 8 million and 50 million blogs, but many of them disappear after a while. The number of new blogs that appear daily is double that of a year ago, and the Blogosphere is doubling in size every 5 months.

Wikipedia has more than 3 million articles, and as of January 2006 it has more than 836,000 registered users. Today Wikipedia is frequently cited in the mass media and academia as a source or as an example of free distribution, constant editing, and diverse coverage, not to mention its multilingual dimensions. There are over 200 language editions of Wikipedia, around 100 of which are regularly updated.

Skype Ecosystem, the most popular VOIP provider, was launched in 2003, allowing free or inexpensive communication between users over the Internet. Today Skype is the third largest brand in the world. January 23rd 2006 was the first day when more than 5 million Skype users were simultaneously online.

Another interesting example comes from the games world. O game, a simple web browser strategic game, was launched in 2003 and today has more than ½ million players all over the world.

4.3. Social, national, gender issues

In all of the abovementioned communities the significance of gender, race and sexuality is much reduced relative to the “real” world. In most Web communities there are no social, national and gender issues, since membership is not based on any of these criteria. Members are usually asked for their nickname, e-mail address and a password. Even in cases where the login procedure expects information as to gender, nationality etc., members frequently give false answers. The Web provides the opportunity for direct
communication but a user’s real identity can always be open to doubt. Clearly, in Web communities it is possible to transcend many offline barriers and borders. (Table 1.)

Table 1. Percent of Internet users who have contacted various communities and their interests

<table>
<thead>
<tr>
<th>Type of Web communities</th>
<th>% Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade/Professional</td>
<td>50%</td>
</tr>
<tr>
<td>Hobby</td>
<td>50%</td>
</tr>
<tr>
<td>Fans/Sports</td>
<td>31%</td>
</tr>
<tr>
<td>Fans/Entertainment</td>
<td>29%</td>
</tr>
<tr>
<td>Local groups</td>
<td>29%</td>
</tr>
<tr>
<td>Health related</td>
<td>28%</td>
</tr>
<tr>
<td>Share beliefs</td>
<td>28%</td>
</tr>
<tr>
<td>Political</td>
<td>22%</td>
</tr>
<tr>
<td>Religious</td>
<td>21%</td>
</tr>
<tr>
<td>Sports team</td>
<td>20%</td>
</tr>
<tr>
<td>Ethnic/cultural</td>
<td>15%</td>
</tr>
</tbody>
</table>

5. SOLVING PROBLEMS

Supporting, motivating and subsidizing new Web communities, both member-initiated and organization-sponsored, could be the first step on the road to the successful integration of immigrants. The member states of the EU should invest in Web communities that:
- give relevant administrative information about the new society in which they live
- give online legal and health advice and help
- are established for educational purposes (language learning, technical education, etc.)
- create databases that allow most of the unemployed individuals within the community to make competitive offers of their services on the market
- promote multimedia expression and multicultural exchange, remote projects, and the development of global online projects

By using new media opportunities, Web communities and their continual growth within modern society could strongly decrease the traditional problems faced by those communities. Some researchers have even empirically showed that participation in Web communities can increase participation in face-to-face communities. So there are many arguments for, and evidence of, positive social effects of Web community participation. The very word “community” implies positive effects: a feeling of membership, influence, integration and the fulfillment of needs, and sharing of emotions that result from the consequences of similar problems. These implications apply especially to immigrants - those who are discriminated against, those who currently live with strong feelings of dissatisfaction and disappointment, those who are remote from their culture.

6. DEVELOPMENT PREDICTIONS

The development of user-friendly tools will advance in parallel with the development of Web communities. The more communities that emerge with their own specific needs, the faster software solutions will come. In addition, rapid improvements to hardware will provide even wider options. In the very near future we will be witnesses to a proliferation of new Web communities. These will include Web based laboratories - employment solutions in which both sides are in a better position, with the employer saving in traditional office expenses and the employee not needing to spend perhaps 3 hours traveling each day, since people will no longer live and work in the same place geographically. Other types of Web community will include: research centers, multimedia based educational centers, multimedia advice centers, multimedia based exhibitions, cultural exchanges and virtual global events etc.

Ideally, designers will create interactive works that enable the user to develop an ad-hoc exploration, with features such as dynamically created juxtapositions, faceted and multiple views of the material, active serendipity tools, and smart content that reconfigures itself in meaningful and useful ways. The user will be
able to exploit these features in order to construct a personal outcome with a unique significance, unique because he created it himself. Future users should employ systems that have very high-resolution displays, tangible interfaces, embedded presence, and flexible, smart interaction.

Together with the proliferation of various types of communication, interaction and online organization, human language and needs will evolve, as will solutions to these needs, perhaps bringing humankind to a successful realization of systems for the evolution of community knowledge.

7. CONCLUSION

Sober and aware, modern society must take advantage of trends in new media technology, trends that obviously can overcome some traditional and some newborn problems. But it takes time to gather knowledge and develop theories. Some of the topics in this field that require greater attention are: finding the exact number of emerged Web communities, both the number within any specific category and the total number, measuring trends and life expectancy, how to support the sociability and usability of Web communities, the discovery of the principal social rules within a community, norms in community organization, and measures of success of various types of community. After achieving these results, more accurate predictions can be made as well as decisions as to the future direction of, and investment in, the development of Web communities.

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AN APPROACH TO GLOBAL NETIQUETTE RESEARCH

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ABSTRACT
The user base of the Internet is today more diverse than ever. People with different cultural backgrounds may have very different views on some crucial Internet-related matters, such as the regulation of the Internet, the responsibility of an individual in the Internet, copyright issues, issues of anonymity, and so forth. Differing opinions on these matters have already roused heated debates. Although there are a number of local codes of conduct for proper behavior on the Internet, and although countries have set laws and regulations concerning the net, there are almost no studies on the set of rules that would be commonly agreed on by all users of the Internet, in all their cultural diversity. In this paper we propose a study that will be based on established qualitative, anthropological methods, and that aims at finding a commonly agreed core set of rules for appropriate use of the Internet.

KEYWORDS
Netiquette; Global Netiquette; Multicultural Web Communities; Cultural Dialogue

1. INTRODUCTION
The ongoing development and diffusion of computing technology is increasingly diversifying the ICT user base. Whereas Internet users 15 years ago were a relatively homogeneous group that consisted of mainly well-educated Western people (Western, as defined by Huntington, 1993), it is not so today. The Internet of today can hardly be described as a global village – it is more like a collection of loosely linked communities that differ, for instance, in language, interests, incomes, and occupations. During the last fifteen years, miniaturization, integration, price reductions, and increased interoperability have taken information and communication technologies from desktop to pocket, from cable-bound to wireless, from proximal to ubiquitous, and from common to private. The amount of technology has increased, its forms have diversified, and information and communication technology has gradually become an integral and commonplace part of people's lives. In addition to the intra-cultural diversification of the Internet user base, there is significant inter-cultural diversification, too. The globalization of computer networks is just about to pass the point after which Western people no longer constitute a simple majority of the user base of the Internet and the World Wide Web. Furthermore, even Internet users who share English as their mother tongue, come from a number of different countries with probably diverse cultural backgrounds.

To get along in an unfamiliar society or culture, people are often told, “When in Rome, do as the Romans do.” But what should one do when Rome is scattered all around the world (Shea, 2004)? Whose rules should one follow when the inhabitants of Rome include a Finnish priest, a Korean student, a farmer from Texas, and a Kenyan human rights activist? What should be done when some people can speak the working language as their mother tongue while for others the working language it is their third language? As “official
netiquette” was created by Western early users and made to correspond to what the early users considered good manners, then “official netiquette” may not correspond with what is considered to be good manners in non-Western regions of the world.

Newcomers to the Internet are expected to behave according to the “local customs” of the net (Shea, 2004). However, there are already a plethora of local netiquettes, and new users have often trouble detecting the rules of a particular forum (Lampe, 2005). Certainly, participants of every forum can set their own netiquette that all participants are expected to adhere to, but in most web fora the netiquette is not explicitly stated. When an increasing number of web fora are multicultural, much of the potential of culturally diverse interaction may be lost due to clashes arising from problems in multicultural dialog. Similarly, legal and moral issues such as regulation, security, copyrights, ownership, free flow of information, and anonymity become increasingly contested due to the cultural and spatial distance of the users. The rigidness of the “official netiquette” (see Shea, 2004) on one hand, and the multiplicity of local expectations of ICT on the other hand, have lead us to ask, “Is it possible to find a core set of rules that would be agreed by all the users of the Internet, in all their cultural diversity?” In this paper we discuss the problem of having a single netiquette in a multicultural and pluralistic network, and describe a line of research that we propose to carry out that may help lead to the understanding and, ultimately, to the development of global netiquette.

2. STUDIES OF NETIQUETTE

Somewhere around the 1970s early users of the Internet laid the basis for a set of conventions and rules for doing things on the Internet. These rules are nowadays commonly called netiquette. The term netiquette is used in a number of meanings, so a definition is necessary. In this paper we use the term netiquette to mean a body of conventions and manners for using the Internet as a tool for communication or data exchange, practiced or advocated by a group of people. In this sense, netiquette includes laws, regulations, as well as good manners and practices.

In this broad definition, users include current and future stakeholders of ICT, such as individuals, governmental agencies, institutions, companies, organizations, and so forth. The uses of the Internet in this definition include uses such as surfing web pages and creating them, searching, advertising, offering web or ftp services, participating in web fora, reading and writing to newsgroups and mailing lists, chatting, sharing files, trading, and so on. Already the existing conventions of using the Internet differ among countries because of differences in culture, habits, law, society, language, or régime.

There is a significant amount of literature on and discussion about netiquette, but amazingly little has been written about the cultural dimensions of netiquette. There are many studies that concern netiquette as culture, but the question of different attitudes towards netiquette between cultures has been left largely untouched. In the field of computer science there are studies in computer-human etiquette, computer politeness, computer gestures, educational technology etiquette, and so forth, but in computer scientists’ discourse, netiquette has been largely disregarded.

Although netiquette is not a widely studied topic, Preece (2004) notes that there is a diversity of net users, in terms of their culture, age, enthusiasm, income, and so forth. She also notes that different technologies require different forms of etiquette; for example, the etiquette of text messaging is different from the etiquette of email. Furthermore, the netiquettes between web communities differ (Shea, 2004). There is a project called “Global TeachNet News”1 that promotes students around the world to refine and promote a more humane culture on working and learning together, stimulated by “student ambassadors”.

It is also argued that even the basic functions of new technologies may be culturally determined. For instance, Lee (2000) found that in South Korean companies, email is quite often seen as an inappropriate way of communicating with one’s superiors. In South Korea, email is not considered as respectful as other forms of communication. We acknowledge that new technologies may challenge previously accepted norms – netiquettes are not rigid (Preece, 2004) and they should not be understood as such. Yet, the flexibility of netiquettes should not be used as an argument for introducing culturally inappropriate conventions.

There are polls about issues concerning netiquette (see, e.g., Preece, 2004), but those polls typically do not collect background variables, such as country of origin, age, gender, education, or even Internet usage patterns, and they are grounded in “official netiquette.” Although conducting a poll that answers a question such as “Which netiquette issues aggravate you the most?” in a number of countries might reveal differences

1http://www.rpcv.org/pages/GTNnews/19960607.cfm
in attitudes towards netiquette, the poll would be biased by default. Namely, giving a preordained list of netiquette issues sets a fixed framework for the study. We believe that the question of a culturally fair, global netiquette is an increasingly important one, and that studies of it need to begin with more cultural sensitivity than the studies hitherto.

3. RESEARCHING CULTURE

Hofstede (1997) and Trompenaars (1997) propose a number of cultural dimensions, which are sets of value statements that typify differences between cultures. If one considers these dimensions as being correlated with how people feel about the Internet or how people behave on the Internet, a number of possible differences in netiquettes between cultures can be predicted. For instance, differences in power distance (Hofstede, 1997) may reflect different opinions on how the Internet should be regulated, on authority on the Internet, or on restricting the usage of the Internet. Differences in the level of individualism in cultures (Hofstede, 1997) may reflect different opinions on copyright issues, strong encryption, and anonymity on the Internet. Differences in the level of masculinity (Hofstede, 1997) may reflect different opinions on competitiveness and task-orientation versus collaboration and aesthetic issues (Marcus & Gould, 2000).

However, studies in cross-cultural psychology (which include cross-cultural comparisons as well as ecological studies such as those by Trompenaars and Hofstede) are hindered by various methodological problems. In general, researchers of cross-cultural psychology view culture as an independent variable and as a characteristic of an individual, similar to age, gender, or occupation (Ross, 2004). This view presumes that culture can be easily separated from other factors such as education, environment, or income level. In addition, equating a culture with a country is common in cross-cultural studies (Matsumoto & Juang, 2004). Many consider cross-cultural research, erroneously, to be causal-comparative research in which participants from different countries are compared.

In the case of Hofstede's study, for example, it is assumed that there is only one (national) culture in every country. Furthermore, in Hofstede's study it is assumed that the informants (employees of IBM) form comparable samples across different countries and that the results can be generalized to whole nations (instead of only IBM employees in a certain country). When the results of Hofstede's study are applied, for instance, in the cross-cultural design of websites, yet another daring assumption is made – that the cultural dimensions of Hofstede (or of Trompenaars, or of others making similar conclusions) are indeed predictors of the preferences of the users of the Internet in different countries. Studies such as Hofstede's and Trompenaars' are very abstract and cannot easily be applied to different contexts as such.

Cole (1998) has argued that rigorous compliance with the methods of cross-cultural psychology is not sufficient for the study of culture. As there are no culture-free research tools, and the tasks in the experiments are always dependent on the context and the subjects, Cole suggests that researchers should look for other ways to study culture. Cole recommends basing the research on the everyday activities of participants. The researcher creates an activity frame in which both the subjects and the researchers can participate in, and then during the course of the study the initial activity frame evolves. In this way, the study will include a temporal (historical) dimension. Instead of relying on ecological studies such as Hofstede's or Trompenaars', our study will utilize an established qualitative, anthropological methodology, introduced by Cole (1998).

Our research approach is a participatory one – instead of creating a framework for a study and conducting the study with participants from a variety of cultures, we start from an empty table: The participants of the study create the classification criteria and taxonomies of the study. That is, web users discuss the netiquette and continuously vote their own lists of the most important aspects of netiquette. From the netiquettes of different cultures, we try to find commonalities, and based on these commonalities form an understanding of interculturally agreed rules, regulations, and manners for the use of the Internet.

In accordance with Cole's (1988) suggestions for culturally sensitive research, the activity frame of our research is naturally the Internet, where the users' activities take place. The research is done in a number of dedicated discussion fora that enable flexible voting activities (www.globalnetiquette.org). Once the researchers have implemented the discussion fora in a number of languages, the fora are opened for everyone interested in the topics. In the fora, the users can discuss netiquette topics and regularly vote for a list of the most important issues. Although the concept of national cultures is a debated issue, in the beginning of the study we will limit the research to a number of easily bounded groups – thus far we have initiated research collaboration with Finnish, Korean, and Afrikaans-speaking researchers.
Following Cole's (1988) suggestions, we are interested both in the content of the discussion but also in the form of the discussion in the fora, as the form of the discussion may reveal unspoken values, rules, or habits. In addition to the most common topics, it is important to give attention to topics that arise rarely in the discussion, to topics that are silenced to death, and to topics in which there are agreements and disagreements among and between the cultural groups. Because the participants of the research are in constant interaction with each other, we believe that we can also get an accurate view of the controversial topics within cultural groups.

In order to avoid unnecessary bias in research, a nonreactive and minimally obtrusive approach can be taken (Bernard, 1995). To follow good research ethics, the participants are made aware that the results of their participation may be used later in research. Anonymity enables participants to express controversial views without fear of retribution. In a web-based research continuous monitoring (Bernard, 1995) is possible – all the actions of the participants can be recorded. We are also able to observe how the discussions proceed (or get stuck, or die out) over time. In the contrary, surveys and interviews are mere “snapshots”, and cannot record temporal (historical) variation.

One problem with this kind of a study is that even though it may answer the question “what happened?” it may leave “why it happened?” in question. The records of the web site can be accessed as many times as necessary, and the discussions in the fora can be analyzed; however, without an interview the motivations behind the postings and polls may not be fully understood. The participants of the study are active Internet users, which biases the constitution of the groups towards some segments of society. The fact that the participants are more familiar with the Internet than average people can be seen either as a positive or a negative aspect. On one hand, the participants are familiar with the uses and potential of the net and probably hold less presuppositions that are false about the Internet than non-users. On the other hand, possible enthusiasm about the net may result in a netiquette where the net is seen in a more positive light than what the perception of the general population is. In the end, we believe that at least in the beginning of the study, it makes more sense to ask about netiquette from those individuals who actually use the Internet.

4. CONCLUSION

Though the Internet covers an enormous variety of cultures and task domains, the idea of global netiquette is needed in order to establish a common ground so that stakeholders can have pervasive rules that transcend cultural varieties across countries and regions. Our study does not start from the official netiquette, but we take an anthropological approach and let participants in each group construct their rules, regulations, and manners from scratch. Our foremost aim is to find the commonalities and differences among cultural groups in order to create a set of rules that different stakeholders can, in principle, abide by – a global netiquette.

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ONLINE FORUMS AS LEARNING RESOURCES: SOME CASE STUDIES FROM MIRANDANET.

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ABSTRACT
This paper describes a number of small-scale studies that focus on the ways in which e-learning can be integrated in a range of settings for teachers and their pupils. They examine a range of projects: those based in classrooms; home-school environments; after-school activities; school-based continuous professional development (CPD); subject-based CPD in national contexts and post-graduate accreditation. The work of primary and secondary school pupils and adult learners is considered.

KEYWORDS
Online discussion forums continuous professional development.

1. INTRODUCTION
Since its inception MirandaNet has developed online forums as both learning resources and a medium for learning. MirandaNet Fellows have conducted evidence-based research projects evaluating the ways in which online environments can contribute to, and enrich, a range of learning situations (Stuckey, 2004). Many of these have been written up as case studies and can be downloaded from the MirandaNet site (www.mirandanet.ac.uk).

The work in the United Kingdom was undertaken as a response to the problem faced by many educationalists – that of implementing effective e-learning strategies. Virtual, and managed, learning environments had been introduced in the UK since 200, but many teachers struggled to integrate them into their own activities (Cuthell, 2004). These environments were often seen as top-down content management systems with built-in assessment and recording tools: not necessarily the affordances that would support a constructivist approach to learning. The schemes described here are, in essence, small scale, even though each may be part of a much larger project.

These case studies cover five main areas – although they are not equally weighted – and there are obvious overlaps, and findings and conclusions can be applied across a wide range of learning contexts. The largest set of studies looks at the ways in which classroom teaching and environments can be enhanced through online work. A number of these look at Think.com and Grid Club (available free of charge to educational institutions from Oracle) and the ways in which they can be used as a focus for both classroom and out-of-school activities.

The issue of home-school links builds on some of these studies. Ways in which young learners can use such environments for their own learning communities is explored. Other case studies look at the ways in which online forums and environments can be used to support staff in their continuous professional development (CPD). Some of these look at uses within an institution, others, within a specific curriculum context, and another, at the ways in which evidence can be gathered and analysed to contribute to our understanding of concept formation in children.

The final case study uses observational evidence to reflect on the ways in which e-learning contributes to the overall pedagogical and developmental process.
2. ENHANCING CLASSROOM TEACHING AND ENVIRONMENTS

A number of these studies utilised Think.com, a web-based environment available from the Oracle Corporation that is free to schools. Think.com underpins Grid Club, a freely available resource for Primary pupils.

Fanning (2004) used this environment in his school during one school term of about twelve weeks and evaluated the impact on both the pupils and his own teaching. He found that the use of think.com in the classroom changed teaching methods. During the time span of the project teachers used the system to distribute teaching materials via class web pages; they collected and returned homework by email; they set up online assessment tasks for students. A move towards a constructivist method, where teaching becomes more learner centered and the teacher assumes the role of facilitator, required appropriate training for teachers, a change in classroom/school organisation and new methods of assessment. His full case study can be downloaded here:

Fanning, J. (2004) : Can the use of think.com transform classroom teaching?

Turvey (2003) also used a Think.com environment for his study, based in a one and a half form entry primary school with Year 5/6 children. The aim of this project was to investigate the perceived advantages and disadvantages of an online community within the primary school setting. He examined the use of discussion forums to facilitate the construction of knowledge in a range of contexts, bringing together individuals with common ground to share and exchange information. Much has been established regarding the stages of progression within online collaborations through socialisation to knowledge construction and development (Salmon, G: 2002). Turvey was keen to determine whether these models of e-learning could be successfully emulated within the context of the primary school, and whether they herald the introduction of a potentially new teaching and learning style. Download the study:

Turvey, K. (2003): Online communities within the Primary School Context

Riley (2004) used the online discussion forums available in World Ecitizens (www.worldecitizens.net) available from MirandaNet. His case study focused on e-learning as a tool for extending and enriching pupils’ learning through the dialogical learning that online forums support, and the concomitant key life-skills that are developed. In embedding e-learning into the curriculum the existing practices of communities of enquiry provided guidelines for implementation. By using online discussion environments pupils were given opportunities to develop the exploratory talk required to promote collaborative knowledge construction through dialogical learning. Evaluation and assessment of learning required the use of innovative techniques of concept mapping and content analysis of discussions based on phenomenography theory.

The case study established that critical learning and key skills development took place to a significant degree. Analysis of attitudes and intentions towards e-learning established that pupils were highly motivated and found e-learning to be a valid and valuable learning tool. The use of the Internet as a resource as well as a forum and publication interface aligns with Stephen Heppell’s model of e-learning as a library, forum and publishing house.


Robinson (2003) study looked at the ways in which Think.com could extend and enrich student learning outside the timetabled structures of a large secondary school. The core group of students that became part of this study were all year nine students, aged 13 to 14 years old. As a major emphasis was the role of the Gifted and Talented student, the students he chose to concentrate on were primarily from the Gifted and Talented register in year nine, based on teacher assessment, test scores and identification of specific learning skills. The register identified two levels of gifted students, 'A' students, seen as gifted and talented in more than one subject area, and 'B' students, seen as having a talent in an individual subject area. There was a conscious effort to obtain a gender balance within the core group.

To create a form of control students who were not considered gifted were chosen either because they had been part of a writing group through their enthusiasm for English or had particular interests that were felt would motivate them to be part of the group. The study can be read at:

Robinson, R. (2003): The impact of Think.com on the learning of gifted students in English
3. HOME-SCHOOL LINKS

The use of an online environment to support student learning through homework activities was the focus of the work of Hanrahan (2004). She used an online forum on World Ecitizens to establish an environment to encourage pupils to develop independent communication skills in Modern Foreign Languages. Each strand in the discussion forum constituted a homework task: pupil threads within each strand were contributions to the task.

The project involved two groups of Year 7 students (a French class of 29 students and a German class of 28) within a large 11-18 comprehensive school in East Sussex. The idea for this project germinated from two distinct and (fairly common!) difficulties she had encountered, namely access to the IT suites in school and the setting of meaningful yet interesting homework. Therefore, the project’s aims were to investigate the viability of students’ use of ICT for Modern Foreign Languages at home (including their response to their own private forum) and whether this had any impact on their attitude to language learning. In addition, she proposed to examine her own e-learning throughout the project.

The homework tasks included visiting different language websites to complete various activities, writing reviews and reports of chosen language sites and games which students would then email to her, and participating in a language forum that was set up specifically for the project on the MirandaNet site. Her findings examined ways in which online homework could be monitored, and the effects of e-learning projects on students’ attitude to language learning. The final analysis looked at the success of the Year 7 discussion forum and ways in which it differed from an adult forum.

Hanrahan, K. (2004): Modern Foreign Languages Elearning Project:

4. CONTINUOUS PROFESSIONAL DEVELOPMENT

Thomas’ (2003) study was initiated by the need to ensure that CPD gains from short school-based activities could be embedded into professional practice. Continued professional development (CPD) through professional dialogue is difficult to maintain over diverse groups. Groups such as PGCE, GTP and existing teaching staff of varying levels of experience have a valid contribution to give any professional development group. Time to talk within any stage in the profession is always at a premium. His aim was to enable staff to develop professional dialogue after focused professional sessions on issues. The time to talk is sometimes difficult or impossible to find as the groups of people involved are diverse and on different time allocations and levels of professional experience. Dai was keen to change the reflective professional dialogue that in part takes place as a plenary of a session to an asynchronous online activity.

Dai used open source solutions such as PHP BB, which allowed him to develop his own online community with little or no funding, and also to control and customise his community solution to the needs of his organisation and its users. He also used solutions such as Mambo Server technology, Moodle groupware, Groove Workspace and PhpWebsite.

Thomas, D. (2003): Continued professional development (CPD) through dialogue online

McDonald (2004) also looked at CPD, this time through the impact of a subject association online community on his own professional development, and on others. He describes the community as ‘the largest history department in the UK’, and examines the ways in which its users contribute, and draw from the community.

McDonald, N. (2004): Teachers’ Use of Forums for E-Learning

Dave Wallbanks and Neil McDonald both collaborated on the forum. The separate study by Wallbanks (2004) describes ways in which the teachers used the forum for e-learning.


A slightly different professional development forum was examined by Semwayo (2005). The discussion forum formed part of a joint project between MirandaNet and Select Education to train supply teachers as e-facilitators. These e-facilitators would then work on the Select Education discussion forums to support supply teachers and contribute to online CPD. Ben’s study examined the ways in which the discussion forum progressed and how it compared with other discussion forums.

Semwayo, B. (2005): The Select Education Discussion Forum
A project of a rather different type was initiated by Witherington (2004). The project, conducted over a six-week period in the summer term, involved setting up and facilitating an online discussion forum for all 200 staff at his school. The project aimed to establish the feasibility, effectiveness and sustainability of such a forum and to investigate whether it could help to build a one-school ethos in a school created from two institutions. Evidence from questionnaires, interviews and from the analysis of transcripts was used to form some conclusions. The processes necessary to set up a forum were clearly established and a community of mutually supportive staff, reflecting on professional issues began to develop. Although only a small number of staff were actively engaged in the forums, the support for the idea and its potential was much more widespread. Barriers to wider use were the inevitable ‘lack of time’ and a number of other tensions for staff in a school facing challenging circumstances. The school has now formed a hard federation with two other schools and the need for such a forum for sharing of good practice within the federation is enhanced.

Witherington, A. (2004): Creating an online community in a large secondary school

5. PUSHING BOUNDARIES

The issue of virtual CPD activities was examined by Worthington (2004), whose research question was whether working with a colleague online (from the same setting) supported both individual’s learning. The study explored ways in which context and language supported learners in constructing understanding, and assessed the impact of involvement in collaborative discussion, on classroom practice. A further concern was to evaluate the extent to which e-learning provides an effective means of professional development. Innovative online facilities were used within a MirandaNet discussion forum to enable staff to exchange and critique images of children’s work.

Worthington, M. (2004): Collaboration and co-construction through on-line socialization

6. E-LEARNING

Work with pupils engaged in online activities led Smith (2005) to investigate the reality of what constitutes e-learning, and it concludes with a model of e-pedagogy, and the specific ways in which it can be related to the school environment. From a case study of the observation and description of a pupils’ online community, phases in the e-learning process are identified. A key theme is transformational learning. E-learning is seen as an emancipatory knowledge creation process in which teacher and pupil interchange roles in a collaborative learning environment. The teacher as facilitator guides the learners through the process of acquiring skills to the collection of information, which is then developed into knowledge streams for group analysis. The Internet offers a global information network and ICT hardware assists in maintaining an interactive learning environment. An important part of successful e-pedagogy is effective e-facilitation.


7. THE MIRANDANET ACADEMY

A number of MirandaNet Fellows have developed projects that they originally published on MirandaNet and have submitted them for post-graduate accreditation through the MirandaNet Academy, working in conjunction with Bath Spa University, whose innovative post-graduate programme enables teachers to obtain postgraduate qualifications for evidence-based curriculum and development work they are undertaking in their schools.

8. CONCLUSION

What these case studies illustrate is the effectiveness of online forums as a vehicle for local e-learning activities in schools. At the core of all of these case studies is the need for teachers to use an environment that can be customised for their specific project. In all case the main focus was on dialogic spaces for learning that afforded the greatest number of possibilities: when assessment of learning took place is was a formative
process that did not need the sophisticated tracking and assessment tools provided by the major commercial
e-learning platforms and managed learning environments. Large-scale online environments, centrally
administered and imposed on schools and teachers, assume a ‘one size fits all’ solution. The key to successful
implementation of e-learning, therefore, would appear to be the provision of tools that enable teachers to
customise the environment to their interests and the needs of the learners, rather than having to work with a
centrally-imposed and managed ‘learning platform’.

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ACCESS CONTROL WITHIN WEB BASED VIRTUAL CUSTOMER COMMUNITIES

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ABSTRACT
In Web based customer communities normally a single user cannot control the conditions on which others are allowed to access information items he has created. This paper describes the approach of a system that realizes access control for information items within a virtual customer community. For example this system enables the author of an information item to specify that he wants to receive notifications whenever others try to access his information items. Also the author can set a virtual price, which must be paid by others in order to access his information items. This paper gives both a brief introduction to the motivation of users to actively create information content and discusses important aspects of a prototype implementation for access control within virtual customer communities.

KEYWORDS
Customer communities, access control, user motivation.

1. BUYING DECISIONS AND CUSTOMER COMMUNITIES

1.1 Information needs for extensive buying decisions

A buying decision is defined as the selection of one of several comparable product offers, services, rights or net assets in return to the voluntary exchange of money (Kuss and Tomczak 2004). Depending on the stimulus and the cognitive control different types of buying decisions can be distinguished. Summarized there are the rather conscious and rational buying decisions and the rather impulsive and emotional ones. The type of buying decision depends mostly on the relevance of the product and the relevance of the product information from the point of view of the customer (cp. “involvement”, Antil 1984).

Whenever the product is of high relevance for the customer and/or buying the product corresponds with extraordinary risks (financial, physical, emotional, etc.) the customer performs a so-called extensive buying decision. This means that only after extensive consideration the customer decides for the purchase of a certain product. Before the decision can be made the customer searches for information, weights it and evaluates the existing alternatives (Kroeber-Riel and Weinberg 2003). Information is provided by the product manufacturer, by independent product reviewers, and by customers themselves. Here it should be pointed out that opinions and experiences of others are among the key influences for the individual buying decision (cp. “social validation”, Cialdini and Trost 1998). For this reason customers also utilize the Internet as a source of information. Nearly 66% of all online users in the USA use the Internet not only for buying products but especially for getting informed about products (Kerner 2004). In addition to official product reviews the experience reports and recommendations of “normal” customers in Web based product review systems more and more gain importance. The advantages for the individual customer are:

• Easy access to a great amount of product reviews.
• Opinions about nearly all kind of products.
• Impartial product reviews by customers like you and me.
1.2 Motivation of customers to publish product reviews

Still an interesting aspect of Web based product review systems is the motivation of those customers who write the actual product reviews. There are various motives for customers, ranging from selfish to altruistic behavior. Some customers simply like the feeling of being the “good Samaritan” (Vrooman et al. 2002), others want to have influence on peers (Vroom 1964) or improve their online reputation (Kollock 2001). Also some people write product reviews just because it is fun for them to do so (cp. “intrinsic motivation”, Amabile 1996). The author’s motivation can be influenced positively by the following conditions:

- Awareness about the topics, others want to get informed about (Terveen and Hill 2001).
- Awareness about the contents recently being published (Vrooman 2002).
- Possibilities to recognize and punish cheaters (Matzat 2004), which are those who only use the information of others but do not provide any information by themselves.
- Some sort of user-driven social control system (Cosley et al. 2005), which enables the author to control, who is allowed to view the information items he has published.

In Web based product review systems like Epinions.com usually all the provided information is public. This means that most often people can read all the product reviews without having to register to the system and without asking anybody for allowance. In this scenario the different users of the system do not know each other, they know nothing about individual information needs and of course there is no possibility for cheater detection and/or access control. This means that all the aspects of user motivation mentioned above are not taken into consideration for the realization of existing Web based product review systems. These thoughts are the starting point for the idea of implementing access rights and access control for Web based product review systems and virtual customer communities.

1.3 Characteristics of a virtual customer community

The fundamental idea of this paper is to transform a product review system to some sort of virtual customer community in which members know each other, have awareness about individual information needs, and are provided the functionality of access control. Before this idea is presented in more detail, the basic characteristics of a virtual customer community shall be summarized in the following:

- Community members have some sort of common interest (Bouras et al. 2005). In consequence a virtual customer community has to concentrate on specific types of products, which are then the common topic of interest for all community members.
- Community members can create and publish their own information items (Hagel and Armstrong 1997) within the community. These information items are the fundamental building blocks for the contents of the online community.
- Community members share common goals, needs and problems and promote solutions and progress if one gains insight into the accumulated knowledge (Markellou et al. 2005).
- Communication among community members (Koch 2003), for example via email or chat.
- Community members can establish and take care of relationships with each other (Rheingold 1993) within the system e.g. by friend lists and communication archives.
- Different member roles and user rights within the community (Kim 2000). More established members should have more privileged rights to read and modify community content.
- Even if some members leave the virtual community it should have guaranteed persistence (Kollock 2001). In other words there should be repeated active participation in the community (Whittaker et al. 1997). Otherwise users of the virtual customer community would not accept the effort for authoring product reviews and experience reports.

A more detailed discussion on different aspects of online communities can be found for example in Markellou et al. (2005). Summarized members of a virtual customer community can publish product reviews, product ratings, experience reports, recommendations, etc. about specific types of products within the system. All these kinds of user created content are called information items in the following. Besides members can actively communicate with each other and establish relationships. The main goal of this paper is to introduce a mechanism for access control on information items for this scenario. The reminder of this paper is structured as followed: First of all different user actions on information items are introduced in Section 2.
After this, Section 3 discusses various types of access control, all of them based on user actions. The theoretical framework is the fundament for the prototype implementation, described in Section 4. Finally Section 5 summarizes the results and gives an outlook about possible future research.

2. USER ACTIONS ON INFORMATION ITEMS

When an information item is published in the virtual customer community other members can perform different actions on it, for example:

- **List:** The information item is listed, but the actual content of the information item is kept hidden. For example all product reviews of one member can be listed in a table with the user-created captions, dates of creation and the author’s name, but not the actual review contents.

- **View/Comment:** The actual content of the information item is shown and (on demand) the person viewing it can create a comment for it.

Depending on the kind of online community and the type of customer cooperation (cp. Leckner and Schlichter 2005) additional user actions might be useful, like for example:

- **Copy:** The information item is copied, e.g. if someone wants to use it for his own purpose.

- **Modify:** The content of the original information item is changed.

Access control for a virtual customer community is based on the idea of giving the author the possibility to control the conditions on which others can execute specific actions on his information item.

3. IMPLICIT AND EXPLICIT ACCESS CONTROL

For all user actions mentioned in Section 2 the author of an information item should be able to define the group of community members, which are allowed to access the information item. Then, every time someone wants to perform a certain user action to the information item it can be validated, if the requesting user is allowed to do so or not. In other words it can be checked automatically if the requesting user belongs to at least one of the groups that are entitled to execute the user action. In case the requesting user does not have the necessary access rights, the author could have specified additional conditions under which at least temporal access is granted. More details about the process of getting access are illustrated in figure 1.

![Figure 1. Process of implicit / explicit access control](image-url)

In figure 1 it is distinguished between explicit and implicit access control: In *explicit access control* the author manually wants to control who is allowed to execute a certain user action. In consequence, the
requesting user has to explicitly ask the author for permission. Then the author manually grants or denies the requested user action. In *implicit access control* the author of the information item sets a *price* that must be paid by the requesting user. Thus, in implicit access control the actual grant of access can be performed automatically. But for realizing implicit access control some sort of *virtual currency* is necessary. Elements of this virtual currency are called *Credits* in the following. Figure 1 illustrates the whole process of the implicit / explicit access control mechanism.

In addition to the process shown in figure 1 the author can define that he wants to receive a notification message, whenever someone executes a certain action on one of his information items. After all, the whole concept provides a powerful access control mechanism to the individual author, which helps him to manage access rights and access conditions for every information item he has created for the customer community.

4. IMPLEMENTATION AND USER INTERFACE

4.1 Information for realizing implicit and explicit access control

To realize the proposed access control mechanism all the relevant user actions in the community have to be traced. Every *user action* is characterized by the following attributes: Time stamp, ID of the acting member, type of action, and ID of the information item. The traced actions can also be stored in the system in order to enhance awareness of community members about the activities of others (cp. Appelt 1999).

For the realization of an access control mechanism it has to be checked, whether the requesting user has allowance to execute the action, before actually processing it. This is done by a so-called *AccessControlManager*, which computes all the access rights and access conditions. One single access right entry, defined by the author of an information item has the following structure:

- ID of the information item.
- Type of action (list, view, copy, modify, etc. – see Section 2).
- ID of one or more groups of members that are allowed to execute the action.
- Condition (to define the wanted method of implicit / explicit access control – see Section 3).
- Number of *Credits* to pay, in case of implicit access control.
- Notification flag: If this flag is true the owner of the information item wants to receive a notification message automatically, if the specified action is executed.

The *AccessControlManager* handles the database which contains the list of all access right entries. Besides the *AccessControlManager* provides different methods in concerns of access control like:

```java
boolean isActionAllowed(infItem_ID, member_ID, action_type)
```

Depending on the information item, the requesting user and the type of action this method returns true, if the requesting user is allowed to execute the action, otherwise it returns false. The *AccessControlManager* also provides methods for checking whether explicit or implicit access control is activated.

4.2 User interface for defining access rights and access conditions

Figure 2 shows the screenshot of a graphical user interface prototype, which can be used by the owner of an information item to define his individual access rights and access conditions for a single information item.

Within this user interface the author can specify which groups are entitled to execute the actions list, view, copy and modify (see Section 2). For this purpose the author can search for groups and he can create new groups, too. For every single user action and group the author also can define access conditions, like “sending a message” or “paying credits”. Also the user can activate the notification checkbox, if he wants to receive a notification message whenever someone performs the specified user action. In the lower part of the window the author can assign certain access rights to an individual user. For this a “special group” will be created that contains all single users (not being part of a group) who are allowed to execute the specified action.
Finally it should be mentioned that users also should have awareness about their current access right status for a single information item via the user interface of the virtual customer community. For instance, if a user searches for certain information items, he will receive the results in a list of hits. Within this list of information items different colors could be used to indicate the access rights of the current user in concerns of every single information item, like for example:

- Item marked red: The user is not allowed to view any details of the listed information item.
- Item marked yellow: The user is only allowed to view details, if he pays a certain amount of Credits to the author.
- Item marked green: The user is allowed to view all details of the specific information item.

5. CONCLUSION

The presented approach realizes a system that enables members of a virtual community to assign access rights and access conditions for the information items they have created. For this purpose, the author can explicitly define groups of members, who are allowed to perform a specific user action on one of his information items. Additionally, authors can define the conditions under which personally unknown community members automatically will be granted the access right to execute a specific user action. Thus, the fundamental aspects for the presented access control mechanism are the different user actions and the declared will of the information item’s author. The different user actions have to be captured by the system and before a user action is effectively executed it has to be checked, whether the acting user has the right to do so or not. Further on this paper has presented a first user interface prototype that enables authors to interactively define access rights and access conditions.

The concept of access control within virtual customer communities was motivated by theoretical thoughts about customer behavior, buying decisions, and the motives of customers to publish experience reports in Web based product review systems. The presented work is a small part of my PhD thesis, which deals with customer cooperation during the Web based configuration of products. In this scenario a new concept of access control was necessary in order to support different forms of customer cooperation and to realize important transitions between these (cp. Leckner and Schlichter 2005). The combination of access control and product modeling here also allows further possibilities for information structuring and user-driven access
control. Although the presented concept of access control is somehow tailor-made for the scenario of customer cooperation during the Web based configuration of products, in my opinion it can be applied to other scenarios, too. For example it provides users of virtual communities and Web based product review systems a tool that enables them to manage detailed access rights on every single information item they have created. This could help in motivating users to contribute more information items and to more actively help other members of the virtual community. After all, the main goal of this paper was to present the new idea of author-driven access control for the information items in virtual communities and customer review systems.

So far, the whole concept of access control in virtual communities has not been tested empirically. The relevance and feasibility of the idea is only based on theoretical arguments, but no data about user acceptance is available yet. For sure it would be a reasonable and useful next step, to integrate the functionality of access control into existing Web based product review systems and/or other kinds of virtual communities in order to evaluate the effective relevance and user acceptance.

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AN IT PLATFORM FOR SME’S TO COLLABORATE AND SHARE RESOURCES

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ABSTRACT
The subject of this work is the implications of the implementation of a platform called DIAS.net with an approach oriented to collaboration and the management of shared resources. The architecture of this platform is oriented to supporting the organisations IT through virtual spaces for collaboration. SME’s and the ecosystem in which they coexist are analysed as a collection of services that are linked so that those services materialise through software and hardware resources provided by the platform.

This platform has been proposed as a solution for those organisations with neither the financial resources nor the technological knowledge necessary to be able to exploit information technologies using technological environments that are standard in large organisations.

This work describes the advantages associated to the use of the platform as well as the possible models of collaboration existing in common interest networks that have used the platform. It also describes the experience obtained in the process of introducing and using the platform. That experience has validated the proposed hypothesis and served to define a sustainable model of management of the platform itself.

The paper must have an abstract. The abstract should be self-contained and understandable by a general reader outside the context of the paper.

1. INTRODUCTION

Until the development of eBusiness, technology had been contemplated as a factor to support the business strategy; now, however, it is a key element of competitiveness. An unequal adoption of these technologies would exclude a significant part of the productive fabric. The term “digital divide” refers to that situation and can be defined in terms of inequality of possibilities to access information, knowledge and training through IT. The digital divide is basically due to the lack of infrastructures, inappropriate policies, insufficient qualification and deficiencies in the capability to obtain financial profit from IT [1]. There is no evidence that this divide is growing but it is possible that accumulative effects will appear in the future [2].

This reality is especially critical in the case of island regions, where SME’s form the cornerstone of the economy, since the digital divide would be in addition to their geographical isolation. It is essential that island regions are able to fill that divide since IT also have the potential to help overcome geographical barriers and provide new business and knowledge opportunities.
2. SUPPORTING BUSINESS MODELS AND COLLABORATION

The successful implementation of eBusiness is based on the creation of new business models in which there are channels of communication and collaboration between all the agents of the chain of value (employees, suppliers and partners). The insertion of the customer into the chain of value is also a factor in the success of eBusiness by giving direct knowledge of his/her opinions and complaints. This view of eBusiness accommodates business models that involve both horizontal and vertical integration.

DIAS.net platform offers support to these new business forms based on collaboration with transparent management of the necessary IT infrastructure. Small enterprises, or groups of them, can easily and flexibly have collaborative work environments called Collaboration Virtual Spaces available as an instrument that permits them to coordinate their activities and cooperate.

A Collaboration Virtual Space (CVS) is a "place" where users can work together irrespective of their location. Spaces aim to support communication, collaboration and coordination. Such virtual workplaces literally provide a ‘Space to inhabit’; individuals share that space with other individuals and use the tools that they need to work. This Space-oriented view allows us to address common definition mechanisms, transparency and uniform semantics.

Each created space is based on a specific space model, in which the services necessary to give support to business processes and collaboration have been previously identified. Each space model reflects a different model of business and collaboration. In a way, the requirements of organisations of the same type are represented in a space model.

When an organisation requests a space on the platform, we have to choose the space model that best meets its needs. The choice of space model depends on the services required by the organisation and its available budget. Each space model has a different price, the more services and/or more resources consumed, the greater the cost of the space.

The creation of a space on DIAS.net platform simply involves the choice of the most suitable model for the profile of the organisation. Therefore, models represent the different types of Collaboration Virtual Spaces that can be created on DIAS.net Platform.

The space inherits the structure and configuration of the space model, and so an organisation has available an immediate space on internet with a structure adapted, to a great extent, to its needs. However, once the space is created, it can be tailored to the specific requirements of the organisation, that is, the structure and services can be modified by the space administrator.

2.1 Abstracting IT resources: services

DIAS.net is a platform whose objective is to give support to the technological infrastructure that underlies the operations of an organisation. The platform is based on the concept of services and therefore, the analysis of the technological needs of each organisation is conducted from the perspective of that concept.

DIAS.net provides companies with a simple way of defining their business models on the basis of the services they require. One fundamental requirement in defining the business model is that the SME’s interrelate through services, in terms of both the internal configuration of the SME itself and of the interrelations between the SME’s.

Once an organisation’s services and the relationship existing between them have been defined, DIAS.net platform offers the software-hardware resources that implement the functionality required by those services. In DIAS.net, resources are defined as those IT elements that permit the services identified in the model to be instantiated.
It should be stressed that the resource instantiation is dynamic and flexible so as not to affect the business operation. This means that the resource with which a specific service has been instantiated can easily be changed at any time. The platform transparently manages the automatic migration of all the data from the resource in use to the new resource.

Thus, the user can retreat from the specific resource that is providing a service and so concentrate on the business. If the market matures and new resources that can support the service appear, the user is not tied to remaining with the current technological option.

DIAS.net handles the Resource Pool and represents the shared IT infrastructure. The resource pool is a set of carefully selected resources that have been integrated into the platform and can be assigned to meeting the needs of organisations while observing sharing constraints.

Resources are used to support the services that organisations require. Resources are included in DIAS.net by means of their services. If services that are unavailable were to be requested, the viability of incorporating new resources in the platform would be evaluated.

On the other hand, those resources with a bad quality level will have to be eliminated from the platform. Organisations are required to provide information that helps the search for resources and the evaluation of the selected resources. The purpose of the platform is to offer a wide variety of quality services and to guarantee the continuous improvement of these services.

However, DIAS.net platform not only manages those resources that support the services; it also solves the problems of interoperability based on the configuration models in which the interactions that are normally required between the services. Thus, resources are automatically integrated based on the requirements of interoperability identified in the configuration model.

Service orientation yields not only flexibility but also integration. It provides: implementation transparency, where multiple implementations may be rationalised, or an older implementation upgraded, with minimal impact on the consumer of the service; loosely-coupled architecture of services that have minimum dependences and that can be reused with minimum overhead costs. It is possible and very simple to change dynamically the resource that provides a service. This characteristic gives the configuration of the infrastructure a high degree of flexibility since migration to a new resource entails no cost to the organisation. The normalisation of resources to allow this migration is achieved with standard descriptions of services using XML. Each service is defined as a set of functions that organisations could use for their own purposes and that must be provided by specific resources.

The result is that any company in general, and SME’s in particular, whose size rules out the ownership of technology and the knowledge necessary to configure its eBusiness, can obtain the technological aspects required to implement eBusiness.

2.2 Technological view

From the resource management view, DIAS.net is an open architecture that defines a common framework able to manage resource sharing.

In DIAS.net, we have tried to free the infrastructure from dependence on the materialization of resources; in other words, that the IT infrastructure can be implemented using owned and/or external resources. This means that organisations pay for their use and not for their possession.
Organisations could decide at any moment how to configure the IT infrastructure based on the services that necessary to give support to the processes of the business. Furthermore, they can decide at any moment which resource is used to support each service. The resource used to provide a specific service can be changed without restrictions, even migrating data from the previous resource to the new one. It is an infrastructure that continuously adapts to meet organisations’ needs and budgets without them having to make any effort in installation and maintenance.

![Figure 2. Provision of web services and web interfaces through resources](image)

The primary mission of the resources is to provide user and/or application interfaces that are necessary for the organisation’s performance. The user interfaces materialise as web applications to permit worker, customer and supplier interaction. The application interfaces published as web services allow other resources of the platform itself or external applications to request that processes be conducted.

In general, a web service is a software component that can be activated by an application via Internet. It is a highly attractive technology since, using XML to communicate, it makes it possible to share information and link processes between SME’s.

DIAS.net platform helps the materialisation of Service Oriented Architectures (SOA) in organisations. In fact, the spaces have been conceptualised as containers and consumers of web services to allow communication. Even more, DIAS.net would permit application developers to treat the services of different domains like building-blocks that can be put together to configure a solution adapted to the needs of the business.

3. MANAGEMENT MODEL

Since the development of this platform began, we have proposed a legal framework that permits shared ownership of DIAS.net and facilitates its evolution through contributions of work or funds from those organisations, including those in different countries, that consider it profitable to invest in the improvement of the system.

From a strategic point of view, the companies, by not wishing to be dependent on specific developers, imposed one key condition. Dependence on developers exposes them to risks, such as the developer ceasing to provide product support, changing the functionalities because they are not profitable or exercising monopolistic practises by imposing exorbitant rates to make small changes requested by the company.

The model of distribution of applications with free/open software (F/OS) licences may be a mechanism that serves to save costs, reduce risks and contribute a legal framework that guarantees rights. This distribution mechanism favours a situation of more open competition in which small firms have the opportunity to adapt and improve applications based on work previously done by others. They can also freely choose to contract professionals to implement the changes they require.

Similarly, the adaptations or extensions that they make can be used by other firms, thus generating constant feedback that will benefit all the firms.

Therefore, the development of DIAS.net is proposed under an F/OS licence, more specifically a GPL (GNU Public Licence), which permits continuous evolution based on the financial contributions and needs of organisations.
Although the definition of a Free Software project imposes no restrictions on the way in which the software must be developed, most Free Software projects follow a specific work model that Eric S. Raymond called the bazaar model [17]. That model is a distributed model of software development in which the participation of the programmers is voluntary and spontaneous.

The projects are organised as a virtual community of developers and end users who work online using Web-based work environments [18] in order to combine the efforts of geographically disperse developers who do not share the same working hours.

3.1 Preserving the integrity of the platform

This work structure finally has the advantage of offering greater flexibility, less risk of exploitation and lower costs in a constantly changing environment. However, when software is developed by a community of heterogeneous and geographically disperse developers, there is a risk of the product losing coherence.

Preserving the coherence of the platform is fundamental to being able to maintain it with guarantees of success, making it necessary to define the bases that enable its coherence to be preserved.

Conceptual integrity refers to the consistency and regularity of the platform. It is a quality that must persist during the evolution of the software, so it is necessary to maintain a balance between its functions and its simplicity of use. We start from the idea among the developers that it is better to have a system that reflects a small set of good designs than a system that contains many good ideas that are independent and uncoordinated [19].

In a way, there is an analogy between the conceptual integrity of software and the urban coherence of a city. Urban or territorial coherence cannot be achieved when the contributions take place in an isolated fashion; therefore, it is necessary to bring about the adoption of common principles regarding the treatment of problems. Thus, urban planning is an activity that negotiates and mediates in the relationship between the managers and users over time. The purpose of an urban plan is to indicate the lines of action that the users themselves understand to be the most suitable, and which permit coherent actions to be taken.

Conceptual integrity is achieved when control of the system, in other words, the lines of action that materialize in the software, is intellectually in the hands of a small group of good designers [19]. It establishes that the design must come either from a single mind or from a small group of individuals with the same vision, on which a strategy of top-down development is established.

Therefore, we are dealing with the definition of a system that harmonises the set of ideas and choice of techniques throughout the construction of that system. Thus, we have established a policy of vigilance of the conceptual integrity of the system and of the lines of action in keeping with the system.

3.2 Supporting user needs

To adjust the platform to the users’ real uses, it is not enough to have an adaptable and flexible architecture; it is also necessary to evaluate constantly how the platform adjusts to user needs. It is important to know at all times whether the companies and users are receiving support from the platform in order to reach their goals. As soon as we started to consider the life cycle for developing DIAS.net, we realised that we had to establish an evaluation strategy. Due to the dynamic nature of a platform like DIAS.net, an adaptive development policy had to be defined to address the ever-changing requisites of users.

We started with two fundamental principles: difficulties in using or understanding a system are due to a poor design and not to the user’s lack of skill; and users are tolerant of defects if they are quickly corrected.

Users perceive system quality as a function of the speed and effectiveness of the technical support in adjusting the information system to their everyday needs. This is a new dimension for determining system quality: the quality of the system is high if it can continuously evolve and improve.

Like most Free Software projects, this project is constantly evolving in line with customer needs. It is a continuous process with progressive fine-tuning to meet the needs of the users. There is constant developer-user communication, which makes the following version of the software even better, with the cycle being continually repeated. Thus, we are able to give a rapid response to the users since they are directly admitted into the design of the product [20].
In his explanation of the bazaar model, Raymond indicates the importance of users in the development process. “Users are wonderful things to have, and not just because they demonstrate that you're serving a need, that you've done something right. Properly cultivated, they can become co-developers” [17]. Users participate in the definition of requirements. “Treating your users as co-developers is your least-hassle route to rapid code improvement and effective debugging” [17].

Free Software introduces a completely innovative change: users are able to talk directly with the designer of the product they are using. No development of modern technology has included the possibility of direct contact with the designer to comment on the difficulties faced in understanding how the product is used, or on the aspects considered inconvenient or inaccessible. The traditional commercial product channels do not give users the opportunity to air their complaints and opinions about the design. The development of this Free Software has included the user as an essential element to identify needs that can be incorporated into the software as functional characteristics. The importance of the user is fundamental in addressing histories, use cases and planning meetings. Moreover, after each repeat, the users can give feedback to the development team by discussing the problems they have encountered, naming their priorities and expressing their opinions.

3.3 Customer assistance

Once the technology has been installed, it is necessary to guarantee a strategy to give support to users. The user support service is conceived at three levels:

**IT assistance.** The servers of the Dias.net platform are hosted in the Cibercentro IDC (Internet Data Centre). The Cibercentro is an organ of the Canary Islands Government that depends on the Directorate General of Information Technology. This IDC has an excellent infrastructure and offers unbeatable management.

**User assistance** available by various means: telephone, management software or e-mail. It is carried out by a User Assistance Centre. This centre is run by Ecosistemas Digitales S.L., a company constituted as a spin-off of DIAS.net project. It permits a first level of problem-solving and the receipt and processing of requests related to the evolution of the platform.

**Assistance for companies to deploy spaces.** This is in the hands of technicians specialised in the tools that comprise DIAS.net infrastructure. In each island region participating in the project there are technicians trained to perform this task, which must be undertaken directly with the companies. These technicians are also responsible for training the users.

4. CONCLUSIONS

DIAS.net was conceived as a platform that combines communications and corporate tools, with the idea of tailoring the virtual collaboration spaces to the needs of each organisation. Based on its capacity to bring together customers, suppliers, distributors and employees, DIAS.net makes eBusiness possible. DIAS.net platform is intended to support both horizontal (workers-associated companies) and vertical (customer-suppliers) relationships. The key is to increase existing, traditional relationships and personalise them.

On this platform, SME’s and the ecosystem they share are analysed as sets of connected services. In order to give technological support to that conception, the business services materialise as software and/or hardware resources whose objective is to offer adequate interface for their operation, both manual for users and automatic for applications making use of the service. The platform acts as middleware providing the connection between services.

The management of resources on DIAS.net platform has to be adaptive to be able to handle the heterogeneity and availability of resources and satisfy the ever-changing requirements of users.

The platform has been developed as a free software solution. Under our considerations, this decision has the following advantages:

- The efforts of administrations, companies and organisations who wish to improve the integration level of the architecture can all be recruited. Individual efforts accumulate and provide common benefits for all users.
- It enables us to use an evaluation strategy in which users take part in improving the architecture.
It reduces the costs and risks of exploiting the platform.

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THE ROLE OF VIRTUAL COMMUNITIES IN CONSUMERS’ DECISION PROCESSES FOR CONSUMER ELECTRONICS PRODUCTS

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ABSTRACT
Many virtual communities serve as platform for consumers to discuss their experiences with products and companies. This form of electronic word of mouth can be expected to have a significant impact on consumers’ purchase decisions. This paper proposes a framework for researching the effects of virtual community assessment on purchase decisions. The results should give an insight to which extent and under which circumstances other consumers’ statements play a critical role in consumers’ decision making.

KEYWORDS
Virtual Communities, Brands, Purchase Intention, Trust

1. INTRODUCTION

The Internet and related technologies have changed the way companies and consumers interact. In 2005 the United States and Europe had Internet penetration rates of 67.8% and 46.9% respectively (Internetworldstats, 2005). Consumers start integrating this medium into their everyday lives by spending more time using it and performing more routine tasks (EurActiv, 2004). This development has fostered the building of virtual communities (VC). Many VCs serve as platforms for consumers to discuss their experiences with products and companies. According to Henning-Thurau et al. (2004) between 9 and 10 million product- or company-related comments from consumers are available on web-based consumer-opinion platforms (e.g., epinions.com, consumerreview.com, rateitall.com).

By reporting positive and negative experiences, users create a form of electronic word of mouth. Previous research has shown that offline word of mouth significantly influences consumers’ product evaluations and purchase decisions (e.g., Mahajan et al., 1990). It is even perceived more powerful than printed information like advertisements, because consumers consider it more credible (Borgida and Nisbett, 1977; Grewal et al., 2003). We can expect that similar mechanisms are at work online. However, the effect of community assessment of (product as well as manufacturer) brands on consumers’ buying decisions remains widely unresearched.

The most important reason for the lack of research in this area may lie in the complexity of the topic. For example, the exposure to other people’s judgments possibly does not only change the reader’s attitude toward the product or manufacturer. It may also evoke attitude changes towards the VC itself including its credibility. Only the interaction of all three elements can create an effect on consumers’ purchase intentions. There are also a number of external factors that may have an influence on the consequences of reading VC comments. These are a) the degree to which a VC is sponsored by manufacturers and b) the personal background of the user (Internet experience etc.).

Following classical management and marketing literature (e.g., Porter, 1980) such a research project cannot be conducted for different products and industries at the same time. Comparable market conditions such as consumer involvement and competition are prerequisites for valid results. There are two important reasons for choosing the consumer electronics industry. One lies in the fact that the products are among the
most popular products that are discussed in virtual communities. The other motivation is the fact that consumer electronic products can be well compared among each other due to their technical features. Therefore consumers have an actual choice among different products that fulfill their requirements.

The paper at hand will give an overview of the research model, which aims at the further research of VC assessment of product and manufacturer brands. Its principal elements which are attitudinal effects, behavioral intentions, sponsorship of VCs, and the individual background of consumers will be discussed. The paper closes with an outlook of the methodological approach of this research and its expected contribution.

2. RESEARCH MODEL AND HYPOTHESES

Figure 1 shows the proposed relationship between brand assessment by a VC and attitudinal effects as well as behavioral intentions. These relationships are expected to be influenced by the sponsorship of the VC. It has been shown by previous research that attitudes are good predictors for behavior (Ajzen and Fischbein, 1977). Attitudinal effects therefore are likely to have an implication on consumers’ behavioral intentions. It also has to be taken into consideration that consumers will react in different ways to the exposure of VC assessment. As studies in related contexts have revealed, the personal background may be an important impact factor (e.g. Einwiller, 2003; Thorbjørnsen et al., 2002). For this reason Internet experience, virtual community experience, trust in the Internet, and attitude towards VCs in general are included.

![Figure 1. Research Model](image-url)
2.1 Attitudinal Effects of Brand Assessment by a Virtual Community

The assessment of a brand by a VC comprises statements from Internet users regarding a company or its products. This typically includes reports on experiences consumers have made with a product or a company. Examples are problems or malfunctions that have occurred during the use of the product or difficulties with customer service. The opposite may also be the case: Satisfied customers report how easy a product is to use and how helpful the customer service is. Brand assessment can be represented by a thread of statements that have a certain overall tendency. Three different occurrences of these tendencies are subject of this research model: 1) An overall positive tendency, 2) a neutral tendency, and 3) a negative tendency. All three occurrences contain negative as well as positive statements. This approach is chosen because it is the closest to existing VCs, which admit and even expect discussions and diverging opinions.

Hypothesis 1a: The more positive the brand assessment by the VC the more positive the initial response to the brand.

Even though the VC itself is not part of the information the respondents obtain, it can be expected that the statements themselves and the variation of the sponsorship will lead to different opinions about the community. This is reflected on the one hand by the initial response to the VC and on the other hand by trust of the respondents in that community. The credibility of the VC is likely to take over a pivotal role in this model. Consumers must make the decision whether the assessment by the VC is credible on the basis of trust. Previous research has shown that there is a relationship between trust and consumers’ willingness to pay a price premium in an online environment (Ba and Pavlou 2002). It is probable that this also applies to “buying the information” in the sense of developing a favorable attitude toward the VC. I assume that in this case the respondents will feel more positive and have greater trust when the assessment seems to be the most balanced which applies when the VC has a neutral tendency.

Hypothesis 1b: The more balanced a VC’s brand assessment the more positive the initial response to the VC.

Hypothesis 1c: The more balanced a VC’s brand assessment, the more credible the VC is perceived.

2.2 The Effects of Brand Assessment by the Virtual Community on Behavioral Intentions

Following the arguments by Ajzen and Fischbein (1977) that attitudes are good predictors for behavior, I expect that positive attitudinal changes will lead to positive behavioral changes. This is shown on the one hand by the intention to purchase the product that is assessed by the VC. On the other hand a positive impression and trust in the VC will lead to an increased willingness to adopt the VC assessment.

Hypothesis 2a: The more positive the initial response to the brand, the more likely respondents will intend to purchase a product from that brand.

Hypothesis 2b: The more positive the initial response to the VC, the more likely respondents will intend to adopt the VC assessment.

Hypothesis 2c: The more credible the VC is perceived, the more likely respondents will intend to adopt the VC assessment.

Nevertheless brand assessment is likely to have direct impact on consumers’ purchase intentions as well.

Hypothesis 2d: The more positive a VC’s brand assessment, the more likely respondents will intend to purchase a product from that brand.

2.3 Sponsorship of the Virtual Community

The above-mentioned relationships between brand assessment by the VC and attitudinal effects as well as behavioral intentions cannot be isolated from the degree of sponsorship of the VC. When it comes to judging VCs, consumers are expected to differentiate between communities that are sponsored by manufacturers and communities that are provided and operated independently by third parties, such as price comparison sites, forums or test report sites. For practical reasons only the two extremes, i.e. fully independent VCs and VCs provided by the manufacturer itself are investigated.
If a VC is sponsored, the attitudinal effects of the assessment are weaker than for an independent VC.

2.4 Individual Background

Attitudinal effects are not an independent result of the VC itself but are highly dependent on the personal background of the user. According to the results by Thorbjørnsen et al. (2002), differences in Internet experience may have an impact on the effectiveness of VCs. Internet users with different levels of familiarity with the medium are likely to prefer different sources of information. Hence, trust in the VC is not only caused by the VC itself, but also by the degree of the user’s Internet expertise. The same applies to the familiarity with VCs in general. In this context, also general trust in the Internet is playing a major role (Einwiller, 2003). As virtually everyone can contribute and only limited control over these contributions is given, consumers might rightfully mistrust information they find on the Internet. Furthermore I assume that if a consumer dislikes virtual communities he will not trust them and therefore trust can only establish when there is a positive attitude towards VCs in general.

H 6a: The higher the Internet experience, the stronger trust in the VC will be.
H 6b: The more experienced users are with VCs, the stronger trust in the VC will be.
H 6c: The stronger the general trust in the Internet, the more credible the VC will be perceived.
H 6d: The more positive the attitude towards VCs in general, the more credible the VC will be perceived.

After describing the research model and the proposed relationships between the constructs, the following section is intended to describe the suggested research design.

3. METHODOLOGY AND EXPECTED CONTRIBUTION

The research model discussed above provides the starting point for further empirical investigations. I plan to use a 3x2 experimental setting in which the variables brand assessment by the VC (positive, neutral, negative) and the sponsorship (yes, no) are manipulated. This is achieved by showing respondents manipulated VCs containing comments about a digital camera and its manufacturer. To avoid interferences during the experiment the investigation will take place in a controlled laboratory environment.

The different degrees of tendencies within the VC come from combining statements that will be classified in a prior survey according to their positiveness/negativeness. In doing so, the pre-study will also determine the manufacturer brand. The respondents will be asked to allocate different brands on a good-bad scale. The brand that is perceived most neutrally will be used in the experiment in order to avoid biases from strong brand attitudes. Sponsorship will be simulated by placing the statements into the environment of the manufacturer’s website. No-sponsorship will be signaled by putting the statements into the environment of a VC that has no connection to the manufacturer.

In order to increase the involvement in the experiment the respondents will have to fulfill a task that is not related to the questions they will be asked. Specifically, they will be asked to make a recommendation to a friend, whether he/she should buy the product that is presented in the VC. In addition, participants can take part in a lottery.

The results will allow researchers and practitioners alike to assess the influence of VCs on attitudinal effects and behavioral intentions. This could help to understand to what extent negative assessment by VCs can harm manufacturer brands and whether this effect can be weakened by placing this community within a manufacturer’s own website. At the same time the study can contribute to an understanding how consumers react to different sponsorship levels in terms of trust in the information and the willingness to take this information into account for their purchase decisions.
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THE COMPUTER AND THE CANOE: MAINTAINING TIES ACROSS THE PACIFIC ISLANDS

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ABSTRACT
Issues relevant to Web based communities in the Pacific Islands are described. A brief geographic and demographic overview is provided, and unique cultural, social, and educational challenges are discussed, with particular attention to Hawaii, American Samoa, and Chuuk, Federated States of Micronesia as illustrative cases. The computer and allied Web based communities are viewed as serving some of the same contemporary functions for voyagers as did the canoe, in the historical voyaging tradition. Projects that aim to address some of the educational and social needs of Pacific Islanders as voyagers at the University of Hawaii and as leaders in their home communities are presented.

KEYWORDS
Pacific Islands, Education, Web based Community, Virtual Community, Immigration

1. INTRODUCTION

The Pacific Ocean has been described as perhaps the largest or most distinctive feature of our planet. Throughout the Pacific, there are thousands of islands. As Peter (2000) explains by referencing the work of Hau’ofa (1993; 1998), an accurate description of the Pacific as a “large and encompassing sea of islands” (p. 261) as opposed to a vast ocean scattered with islands emphasizes the “connectedness” of these islands and respects Pacific Islanders’ long tradition of voyaging. These island groups encompass many different cultures and languages.

The authors’ work has focused primarily in three regions of the Pacific, Hawaii, American Samoa, and Chuuk, one of the Federated States of Micronesia. Hawaii, the 50th US state, is located in the central Pacific and consists of seven major inhabited islands and other smaller islands. Originally inhabited by native Hawaiians (Polynesians), the islands are home to people of European, Japanese, Hawaiian, Korean, Chinese, Filipino and other ancestries. As of 2000, 1,212,000 people lived in Hawaii. Hawaii in many ways serves as a crossroads, where many Polynesians and Micronesians go to college, receive medical care, or live and work while supporting family members at home.

American Samoa, a US territory; is located about 2600 miles (4184 km) southwest of Hawaii, and includes 3 major inhabited islands. The Samoan people are also Polynesian, with their own distinctive Samoan language and culture. According to the 2000 census, about 57291 people inhabit the three major islands (US Department of Commerce, 2003) and the median age is 21.3.

Finally, Chuuk, (formerly known as Truk), is one of 4 Federated States of Micronesia (F.S.M.). F.S.M., now an independent country, was formerly colonized by Spain, Germany and Japan, and also was a US trust territory. F.S.M. maintains a financial and military relationship with the US via a Compact of Free Association. Chuuk, is spread out over 800 square miles (1287 km), and consists of six main inhabited islands among many uninhabited ones. According to the 2000 census, Chuuk had a population of 53,945
people (Chuuk State Census Report 2002), primarily of Micronesian, or Malay-Polynesian mix. The median age was 18.5. Chuuk has its own language but also incorporates other indigenous languages in the outer island groups.

2. CENTRALITY OF VOYAGING

Peter (2000) eloquently draws on the historical centrality of voyaging in the lives of Pacific Islanders and he elaborates upon Chuukese’ traditional cultural conceptualizations of voyaging and traveling as a way to conceptualize contemporary Pacific Islanders’ movements, both back and forth between Hawaii (a crossroads) and other parts of the Pacific, such as Guam and the continental U.S. Here, we build upon Peter’s description of this Chuukese conceptual metaphor, both to understand this concept of voyaging and to apply it to the notion of Web based communities and how these communities serve both to extend one’s conceptual horizons as well as to assist the traveler in maintaining contact with “Muir,” “the steering point,” “point of departure” or home (Peter, 2000).

As Peter (2000) explains, people living in atolls always traveled among islands, for many reasons. Historically, Micronesians successfully traveled the Pacific without navigational tools, relying upon etak, or mental models of “moving islands past a stationary reference point” (Peter, 2000, p. 265). The last traditionally trained Micronesian navigator, Mau Pialug, trained Nainoa Thompson, a contemporary Hawaiian who has been instrumental in the resurgence of the once-lost tradition of Hawaiian voyaging in sailing canoes (Polynesian Voyaging Society, 2005).

The present authors speculate that it is only with the onset of vessels other than the waa (canoe in Chuukese, wa’a in Hawaiian and va’a in Samoan) that the concept of the voyage has been separated from its traditional vessels. Arguably, the further from the traditional voyaging vessel, the farther one is from the concept of home, both physically and culturally. As Peter (2000) explains, in Chuukese there is a concept of horizon called ppaileng that literally means the “edge of heavens,” (p. 255) and figuratively represents “the space within which the traveler is located that is ‘strange’ and ‘foreign’ (p. 255) or “where the sky meets the earth, beyond which a world of foreign things, people and spirits exists” (p. 265). Of course, within such a space, someone might be lost, or wander aimlessly or “likopei [which] is thought of as having no means of survival” (p. 262) and is not culturally acceptable.

Contemporary obstacles to traditional voyaging associated with waves of colonization, and manifested in constraints and regulations placed on free movements, as well as through the political creation and naming of artificial boundaries (Peter, 2000). For example, the islands that have been politically designated as Chuuk are different from Chuukese’ conceptions.

Peter (2000) explains that as the canoe is conceptualized as waa, a vessel that brings life (e.g., access to food, medical care), so too is the human body also referred to as waa. The present authors ask, could the computer also be viewed metaphorically as another waa, bringing and sharing life to dispersed communities in the best sense? Although the vehicle is different, the voyaging is similar, and one might view a Virtual or Web based community also as metaphor for Pacific Islanders as voyagers.

Viewed outside this metaphorical framework, aspect of immigration within the Pacific and the US have changed, and in the remainder of this paper we describe aspects of those changes and ways that Web based communities can serve some of the needs of Pacific islanders. In the past immigration or leaving one’s home country to settle elsewhere was a larger, more permanent decision. For example, when Europeans journeyed to American a few generations back, the farewells between one’s family members were far more permanent. Although the immigrant might send letters and money home, letters would take months. Even telephone communication was prohibitively expensive. Furthermore, when people emigrated, they often made every attempt to assimilate to the new culture, encouraging their children to speak the new language, etc.

In today’s world, the farewell is often far less permanent. Pacific Islanders travel to Hawaii for work, further education or medical care, and return to Pacific Island home communities. There is increased travel back and forth. People maintain ties through television, Internet and telephone, and increasingly, through Internet telephone systems like Skype. Thus, even displaced members of the community can remain active contributing members of their home communities, utilizing “virtual” media.

Among Pacific islanders, family and village ties are much more central features of everyday life than in the United States, where nuclear families and individualism prevail. Due to the centrality of extended family, re-creation of some of these ties occur in Micronesian and Samoan communities in Hawaii, frequently tied...
closely to a church and church-related activities. Maintaining the centrality of family and village ties can be difficult and become all the more critical, under the pressures of new and different social contexts.

Furthermore, as the world and culture itself becomes more global, and as people uproot from their home cultures in small Pacific islands and into larger, mainstream Western cultures, these “virtual” connections may become the only remaining psychological ties with one’s home culture, language, and oral traditions. Younger immigrants (i.e., children) are frequently the first to acculturate to the new culture, often maintaining bicultural roles. As the median age of persons in these smaller societies becomes younger, the role of elders as cultural repositories becomes more fragile, creating an urgent need for dynamic cultural sharing in Web based communities.

3. WEB BASED COMMUNITIES

Although in their infancy, Web based or virtual communities already demonstrate powerful responsiveness to the risks of cultural and linguistic endangerment and the corresponding challenge of empowerment for indigenous peoples of the Pacific, as the following demonstrate:

- Island teachers access and share culturally relevant educational resources, which are typically missed in the curricula of the “colonial powers” of the Pacific (Japanese, American and British) which may have little or no relationship to actual Pacific island climates, geography, geology, ecosystems, values or ways of life. For example, Western views of science often fail to respect the environmental knowledge of indigenous peoples – the farmer, the fisherman, the dispenser of medicinal knowledge, and the craftspeople/artists who use native materials for building and art.
- Dispersed, displaced and sometimes even dispossessed islanders maintain contact with one another even under extreme duress, such as the Marshallese who were dispossessed of their islands due to US nuclear testing; and the inhabitants of Bonaba who were forcibly removed due to phosphate mining in their region. (See Coming Home to Banaba, 2005).
- Islanders share news, both from their home region as well as events in the new locales, using e-mail, chat, Web logs and Internet newspapers.
- Islanders share and disseminate dynamic collections of oral traditions and stories

In response to the above, the University of Hawaii is in an ideal position to work with members of the Micronesian, Hawaiian and Samoan communities to create leadership in these emerging areas of cultural telecommunications and technologies for voice. In the remainder of this paper and the associated presentation, we describe a set of values and initiatives that are currently underway and inform our work with students at the University of Hawaii and in the Pacific, including:

- Using multimedia to honor Pacific voices. Given that the indigenous cultures of the Pacific are primarily and historically oral, we must train our students to employ audio and video technologies, including Internet-based broadcasting (e.g., pod casting), to capture cultural wisdom, in ways that can motivate and involve children both as “audience” and in “creation.”
- Exploring dynamic communications that involve dialogue and exchange. Rather than creating static repositories of information, the focus must be on facilitating dynamic communications, such as videoconferencing and video-journaling to vitalize teaching, share ideas and provide support in educational contexts that could seem or feel isolated.
- Employing the rich technology resources of the West to prepare island students to become leaders in their home communities, by supporting them to engage in digital communications and digital production as part of their college education, recognizing that students can make a difference in their home communities right now, utilizing the technologies available in the university.

The Pacific Voices Project at the University of Hawaii works in partnership with a network of school and village-based teams across the Pacific to realize the above possibilities, including “virtual” workshops and courses in technologies for voice, exchanges of digital curricula for health and education, video teleconferencing and video journaling for community building and inclusion, children’s television production and de-book publishing (Rao & Skouge, 2002; Segal, Nobrega, & Skouge, 2005, Skouge, Guinan, Nobrega, Rao, & Segal, 2004; Skouge & Tinitali, 2005; Skouge, 2006; Theale & Skouge, 2003). In the presentation, we share demonstrations of work in these areas. All of these projects exemplify aspects of Web based communities and resources useful for further building these communities among Pacific Islanders.
One immediate future direction involves the Pacific Voices Role Modelling Project, in which we propose that youth at the University of Hawaii should be considered as potential role models for many island youth in their home islands who have yet find their course and set their direction. It is our intention to “give voice” to those role models from the islands and to disseminate the voices both in Hawaii and throughout the Pacific region. This will be done through creating video interviews with these students and associated discussion guides to be disseminated via cable television and the Internet, throughout the F.S.M, American Samoa, and Hawaii.

4. CONCLUSION

The centrality of voyaging to Pacific Islanders is clearly exemplified by the Chuukese concepts of waa, the canoe and life-bringer, and ppaileng, or horizon. As we honor that tradition, we draw upon the metaphor of the computer as waa for maintaining cultural and community ties. Certainly, computers can connect islanders across different worlds. At the same time the virtual world of the World Wide Web is another set of “horizons” that islanders are now navigating. Computers and the Internet have brought about an explosion of boundaries so to speak. The old colonial boundaries are giving ways to a whole new set of horizons in virtual spaces. And, the tradition of voyaging continues, with promising Pacific Islander students at the helm.

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We thank our students from whom we have learned so much.

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VIRTUAL WORLDS: END USER LICENSE AGREEMENTS AND THE COMMODIFICATION OF VIRTUAL ASSETS

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ABSTRACT
This paper examines the impact of End User license Agreements (“EULAs”) in the context of Virtual Worlds and Massive Multiplayer Online Role Playing Games (“MMORPGs”). Within this context, the EULA stands as a declaration of the developers, a virtual ‘social contract’ which sets the degree of permeability between the real and the virtual, by allowing or banning the commodification of virtual assets. If the developers decide to isolate their virtual environment from the real world, their will should be respected, both by the participants and the law. In that case, freedom of artistic creation should prevail over the virtual rights of the player. On the contrary, the law should intervene more drastically when the developers permit the interaction between the virtual world and the real world, by allowing virtual purchases in real currency. In such cases, the virtual world surpasses the boundaries of a simple game, and therefore the EULA should be checked to ensure that virtual property rights are not suppressed. Finally, the paper reflects on the current legal framework regarding intellectual property from a perspective that would acknowledge the significant contribution of the players in the perpetual development of the virtual environment. This acknowledgement would in turn help to create and maintain a sense of trust and commitment among the participants of the virtual world.

KEYWORDS
Virtual Worlds, End User License Agreements, Intellectual Property, Virtual Property

1. INTRODUCTION
Virtual Worlds are more commonly known as Massive Multiplayer Online Role-Playing Games (“MMORPGs”). While the first “Multi-User Dungeon” (“MUD”), written in 1979, featured a text only interface, the rapid development of computing power has led to modern popular MMORPGs: Now, the player is given a rich, three-dimensional virtual reality image as if seen from the “avatars” perspective (the latter being the virtual projection of the player within the game). While most of the original virtual worlds such as Ultima Online and Everquest depicted imaginary worlds populated by mythical creatures, not all of them rely on an epic fantasy setting; The Sims Online for example (being an outgrowth of the popular stand-alone game) invites people to replicate features of real life: “Build a home and a livelihood. Build your dream home […] or the hottest neighborhood hangout around. […] Develop a network of friends. […]”. These type of games paved new ways of online interaction. And people gradually responded to their calling.

Today, virtual worlds have evolved beyond any expectation into major hubs of entertainment: some of them are the ‘virtual home’ of hundreds of thousands or even millions of subscribers1 (with the most famous, “World of Warcraft” amassing 4,5 million2). The magnitude of the numbers has transformed them from originally simple-minded combat oriented games into fully fledged virtual environments in which the players engage in various activities, including the production and accumulation of ‘virtual assets’. Buying and selling of virtual commodities began at first within the boundaries of the virtual world but gradually expanded outside its limits: among others, castles, magic wands, boots of levitation, talking mirrors and wizard scrolls

have changed hands in eBay and other auction sites, which function as a peculiar type of fantasy bazaar. However, the most peculiar characteristic of all is the fact that these virtual items are purchased with real currency. The figures speak for themselves: The projected U.S. revenue from sales of virtual objects in real world currency exceeds $100 million (the secondary market for virtual items exceeds $ 880 million), while over $1.5 billion worth of transactions occurs yearly through in-world trades.\(^3\) Norrath, the virtual kingdom of Everquest, had, as of 2002, a greater net worth than Bulgaria and a higher GNP per capita than India or China.\(^4\) Similarly, the individual and aggregate value of virtual ‘real’ estate within a virtual world is rising to unprecedented heights (e.g. in Project Entropia, a virtual island was bought for $26.500\(^5\), a space station for $100.000\(^6\)).

It follows that, in realizing real-to-virtual (or virtual-to-real) transactions, the boundaries that separate the real world from the virtual environments became permeable. Questions arose as to whether the law should intervene and regulate these types of transactions, which ultimately gave rise to the posing of further questions, regarding the very nature of these virtual environments: Who owns the virtual products of these virtual economies? The companies that create the games or the players who ‘produce’ the economies? In this paper it is argued that the answer to these questions lies in an unambiguous and carefully drafted EULA, which is respected by both the developers and the players.

2. THE FUNCTION OF END USE LICENSE AGREEMENTS IN VIRTUAL WORLDS

An End User License Agreement (sometimes also called ‘Terms of Service’ Agreement or ‘ToS’) is an agreement between the developer and the user of computer software that specifies the parameters of use granted to the user. Within the context of virtual environments, a typical EULA would include more than just the “rules of the game”, which regulate the behaviour of the players within the virtual game. Instead, due to the possibility of interrelation between the virtual and the real world, the EULA will also attempt to regulate the behaviour of the player outside the virtual environment. Usually, the EULA would grant the developers a right to exclude that can be exercised to eliminate emergent virtual property rights. For example, the EULA of the most popular MMORPG today (World of Warcraft) clearly disclaims any property interest in everything the user builds or creates:

“[The company] either owns, or has exclusively licensed all of the content which appears in World of Warcraft. Therefore, no one has the right to ‘sell’ [the company]’s content, except [the company]! So, [the company] does not recognize any property claims outside of World of Warcraft or the purported sale, gift or trade in the ‘real world’ of anything related to World of Warcraft. Accordingly, you may not sell items for ‘real’ money or exchange items outside of World of Warcraft».\(^7\)

In addition:

“All titles, ownership rights and intellectual property rights in and to World of Warcraft (including without limitation any user accounts, titles, computer code, themes, objects, characters, character names, stories, dialogue, catch phrases, locations, concepts, artwork, animations, sounds, musical compositions, audio-visual effects, methods of operation, moral rights, any related documentation, ‘applets’ incorporated into World of Warcraft, transcripts of the chat rooms, character profile information, recordings of games played on World of Warcraft, and the World of Warcraft client and server software) are owned by [the company] or its licensors. […] All rights are reserved”.\(^8\)

The above abstracts could indeed be found in the vast majority of the EULAs that accompany current virtual environments. The developers consider the virtual environment as an offspring of their imagination.

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\(^8\) ibid
and productivity, so they protest in the eventuality of virtual rights being acknowledged in favour of the players. This view seems to be supported by the current legal framework regarding intellectual property, which relies in a somehow linear model of production (where an intellectual work is authored, finished, published, distributed, and finally, ‘consumed’). However, as it shall be argued infra, the production process in the context of virtual worlds is not linear, but recursive: the players themselves play a significant role in the development of the virtual environment, after it has been launched.

As indicated, one of the purposes of the EULAs of virtual environments is to regulate the permeability between the real and the virtual. Allowing the buying and selling of virtual goods in real currency, the transferring of player accounts or the granting of any intellectual property rights to the players, all these determine the extent of rights that are granted to the players regarding their virtual assets. Although some authors have advocated towards a general legal recognition of player virtual property rights that should be applicable by default in any virtual world, this paper argues that the answer to the question of player virtual rights lies within the EULA of each particular virtual environment. The will of the developers, as it is expressed in the EULA, should act as a regulatory compass.

EULAs should be perceived as a type of virtual ‘social contract’: the developers of the virtual world offer the potential player a ‘regulatory framework’ to which he should adhere before entering. It follows that, if the developers’ intention is to isolate the virtual world from the real world (to keep it ‘just a game’) by prohibiting transactions of virtual goods in real currency, the players should comply. In such a case, the EULA regulates both the offline and online behaviour of the players. On the other hand, if the developers’ intention is to build bridges of interaction between the real and the virtual world, the law that regulates the real world should stretch to the virtual environment as well, and grant users virtual property rights. In the latter case, the EULA’s function as a dominant virtual ‘social contract’ is limited only to the extent that it regulates the in-world behaviour of the players. However, the developers should be free to decide whether to allow ‘real’ law principles to regulate virtual worlds, by determining the degree of permeability between the real and the virtual. This freedom could be seen as an aspect of the general freedom of artistic expression and as a right to self-determination of the artistic creation.

Deliberately choosing to ‘isolate’ the virtual world from integrating with the real world can be justified under several arguments: For example, it is a matter of artistic freedom to allow the developers to seclude their virtual world, so as to enhance the gaming experience. Abiding by a single set of rules (that is, the EULA) which limits the behaviour of the players reinforces the boundaries that separate the game world from the non-game world. These boundaries have been identified by game theorists as the magic circle that distinguishes game form reality. In that perspective, virtual worlds are treated as games, and as such, they use game conceit (that some freedoms must be willingly given up during the game time so that new freedoms could be experienced during that time). It usually occurs that the creators of such virtual environments are more actively engaged in the development of the virtual world, sometimes intervening to increase the dramatic atmosphere, which gives these environments a more narrative perspective. It follows that any external interference by the law, jeopardizes the developers’ incentive to design. To appreciate this argument it is important to understand that every aspect of life within a virtual world exists at the pleasure (and dispositional power) of the game developers who can eject or erase a character, if such eventuality serves the game conceit (that some freedoms must be willingly given up during the game time so that new freedoms could be experienced during that time).

Indeed, the effect of commodification on virtual worlds is illustrated by the way it breaches the game conceit, since it introduces reality into ‘virtuality’. For this reason, the developers should be allowed to erase traded characters or objects that were bought in real world. Indeed, such an act would raise fierce objections from the advocates of virtual rights: a player who has just paid $800 for a magical sword or a powerful mage would be furious to see his ‘investment’ obliterated, just because the developers demand strict abiding to the rules of the game. From his point of view, the developers have just wiped out $800 of his money. However,

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instead of allowing an a priori regulatory intervention to acknowledge virtual property rights, this paper argues that the law should not intervene as long as the developers have explicitly forbidden any commodification of virtual assets in the EULA and as long as they respect this prohibition as well. In such cases of ‘isolated’ virtual worlds, the law cannot intervene to the interna corporis of the game; it can only ascertain that EULA’s provisions are respected by both parties and that they serve the intention of the developers, to safeguard game deceit and immunize the virtual world against external interference. Therefore, an EULA such as the EULA quoted supra, which grants the developers complete ownership of the virtual world’s assets (characters, items, designs, etc.), would be legitimate as long as the developers themselves are not engaged in activities that would jeopardize the game deceit (such as the selling of characters or items). To the extent that the actions of the developers are legitimized by the virtual ‘social contract’, the players should respect them. However, if the developers disregard their obligations deriving from this contract (by breaching the boundaries between real and virtual world while simultaneously forbidding the players to do so), then the players deserve ‘external’ legal protection of their virtual property.

Indeed, the cause of the dispute between the developers and the users seems to begin from a failure to respect the sovereignty of the virtual ‘social contract’. This is a failure that concerns not only the players (who, despite the explicit provisions in the EULAs, commodify their virtual assets on eBay or other similar sites), but also the developers, whose behaviour is most of the times inconsistent with their declared intentions: They cannot simultaneously encourage the purchase and sale of virtual items and then condemn real-world commodification, by stipulating in the EULA that all virtual items remain their property. In There or Project Entropia for example13, the respective EULAs grant all rights to the developers, while at the same time they allow the participants to purchase virtual assets directly from the them. For this reason, it is likely that we see courts rejecting these types of EULAs. Not because the EULA is a priori overly restrictive, but because the behaviour of the developers is inconsistent with the EULA in question. By allowing commodification of virtual goods, the developers are breaching the barriers between the real and the virtual, therefore allowing ‘real’ law to regulate their virtual domain. It is the responsibility of the court to decide in concreto whether the degree of interconnection between the real and the virtual world is such, so as to allow for specific virtual rights—or even other types of rights14- to be granted to the participants.

It must be emphasized that the application of ‘external’ law will depend on the motives of the developers not to create a game but a place, which is closely related to the real world. In such cases the virtual world can be regarded as a very ‘real’ opportunity for profit.15 For some authors, these virtual environments should be considered as mundane ‘extensions of the earth’, and therefore, their participants should be treated by the law the same way as in the real world.16 Legal research has already indicated the need to protect the virtual property of the participants by arguing that virtual objects are indistinguishable from real world property interests.17 Furthermore, the same normative justifications of property interests in the real world apply – sometimes more strongly – to the virtual worlds as well: the utilitarian theory of Bentham, the labour theory of Locke, and the Hegelian theories adjoining property to personality, all seem to advocate towards a general virtual property right of the participants in the virtual world.18

3. ACKNOWLEDGING THE PLAYERS’ CONTRIBUTION IN THE VIRTUAL WORLD AND THE IMPACT ON END USER LICENSE AGREEMENTS

As the extract of the EULA quoted supra indicates, corporate (developers’) restrictions posed in EULAs regarding virtual property rights continue to stir resentment. Anything the players say or do while ‘being’ in Star Wars Galaxies or Ultima Online becomes property of the company owner. This practice is implicitly supported by the current legal framework for the protection of intellectual property rights, which adopts a linear approach towards the creation of an intellectual work. For this reason, it fails to recognize that the process of creating a virtual world (as an intellectual work) has a distinctive demarcation point: Until the world is released to the public, it remains solely the intellectual creation of the developers. After that point, however, the virtual world progresses and evolves through collaborative work. Developers and players are both involved in the bettering of the virtual environment, thus creating a recursive production cycle that distinguishes it from conventional publishing media. In that way, the development of the world is perpetual.

Player activity is productive in a number of ways. To begin with, the very nature of a virtual world as an online persistent environment requires player input. In addition, outside the world’s context, the players are a source of feedback and suggestions, they act as quasi bug-testers, they interact with the developers through various bulletin boards or even create websites dedicated to the specific virtual environment. More importantly, they constitute the social and community network within the virtual world, create in-world guilds, make friendships and team-like relationships that vest an ‘added value’ to the virtual world. Unlike simpler computer games, there is no set ‘storyline’. On the contrary, virtual worlds have histories. They allow not only the game developer, but also the participants, to make new meanings, to organize new adventures and to express themselves in various new ways, by assuming new social roles and participating in ‘narratives’ whose endings are contingent and unpredictable. It follows, that the most important distinctive feature of a virtual world, the complexity of social interactions between its members, is a feature not offered by the developers. It relies solely on the players, whose social and emotional input fuels the persistence and expansion of the virtual community. We might as well perceive a virtual world as an ‘online improvisational theater’: Just as improvisational theater, a virtual world is a combination of freedom and constraint that enlists the participation and the creativity of the actors-players to produce new works that none of the participants (or the director-developers) could have created on their own.

For these reasons, we need to acknowledge the players contribution to the recursive evolution of the virtual world. Otherwise, we end up in a situation where an EULA assigning all intellectual property rights to the developers of the virtual environment is deemed to be legitimate, thereby granting to the developers ownership of something that they were not in a position to own in the first place: the ownership of the community established by the players. This outcome follows from the way that, in legal terms, the virtual world and its contents are seen as products or assets. The law focuses heavily on ‘tangible’ objects and dismisses the ‘intangible’ socially produced networks despite their obvious productive and economic characteristics.

Still, it is not the purpose of this paper to push the interpretation of the intellectual property legal framework to its limits, so as to encompass within its scope of protection this social and ‘immaterial’ contribution of the players. It suggests that the law and jurisprudence must reflect on this contribution when evaluating the legality of a given EULA. Considering the aforementioned dichotomy of virtual worlds in those connected and those isolated from reality, the acknowledgment of the players contribution would be of significant importance for the second type of virtual environments, where developers’ freedom to design is limited only by the EULA (for the first set of virtual worlds, player contribution to the game is already acknowledged by granting virtual property rights). Within the context of the ‘sealed’ virtual worlds, an interpretation of the EULA that would consider the collective contribution of the players would lead us to the adoption of a more sympathetic approach towards the individual player. Instead of having unfettered power, the developers must base their decisions on the intention to safeguard the ‘magic circle’ of the game.

However, this approach cannot entail the granting of specific rights in favour of the users, if this is not the developers’ intention. But it would help us envision the virtual ‘social contract’ as a notion closer to the social contract envisioned by Rousseau, than by Hobbes. Closer to the notion of a *pactum unionis* than of a *pactum subjectionis*. While, in both cases, no virtual rights would be granted to the ‘denizens’ of the virtual world, still, the monarch (the developers) would have to honour the virtual ‘social contract’. Failure to do so would result in accountability. By acknowledging the players’ contribution to the production cycle, the developers would now have to provide solid justifications of their decision to cut off a player from the game (claim, for example, that his behaviour defied the rules of the game). Thus, the player’s ‘virtual’ presence in the game is guaranteed (and protected by the courts), as long as he respects the EULA. This fundamental ‘right to play’ can also be motivated from two articles of the Universal Declaration Human Rights: article 27 reads, “Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits”. In addition, article 24 asserts that “everyone has the right to rest and leisure”. Indeed, participation in a virtual world represents not only a temporary exclusion from the real world (which can be interpreted as a right to rest) but also an opportunity for cultural and social expression.

4. CONCLUSION

This paper emphasizes on the multilevel importance of EULAs within the context of virtual worlds. Acting as a ‘virtual’ social contract among the developers and the players, the EULA should be regarded as the regulatory cornerstone which sets the degree of permeability between the real and the virtual. However, in order for this social contract to be valid, it should be respected by both the developers and the participants. This consistent behaviour combined with a legal acknowledgment of the players’ contribution in the perpetual development of the virtual world, would further upgrade the importance of the EULA as a tool which helps to create and maintain a sense of trust and commitment among the participants.

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THE GENESIS OF A VIRTUAL WORLD

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ABSTRACT
Constructing a virtual world requires certain technical skills and the ability to make difficult decisions regarding how the world will look and feel. However, the most difficult aspect of building a virtual world has less to do with the building of the virtual spaces and more to do the conceptualization of how teaching and learning will occur in this new type of environment. This paper examines some of the issues involved in the process of planning a virtual learning world by focusing on key design questions that need to be asked prior to building virtual instructional spaces.

KEYWORDS
Social Constructivism, Virtual Worlds, Instructional Design, Learning Communities

1. INTRODUCTION
Due to the recent increase in interest regarding the application of 3D virtual world technology to instructional settings, my department has committed to and invested in the necessary hardware, software, and technical support to expand the capacity for the development of virtual worlds in terms of size (virtual acreage), number (of “worlds” and “population”), and faculty involvement. As a result, I have recently been “deeded” my own virtual plot to design and build spaces to facilitate the courses I teach in my graduate program. I understand from talking and observing my instructional technology colleagues that there is some skill involved in the actual building of the virtual spaces in which my students will eventually interact and learn. However, it is not in the construction process that I am most anxious. Rather, I am anxious about facing the more perplexing, philosophical, and theoretical questions I expect to have to answer; questions like, “What should teaching and learning look like in this world? How is teaching and learning in this new environment similar to and different from other online environments I’ve used in the past?” and, “How can our college’s social constructivist conceptual framework and instructional design theory inform and guide my design of this new virtual teaching and learning environment?”

I have long subscribed to a more constructivist, holistic, exploratory approach to teaching and learning than to other more directed, didactic approaches. I have, however, found it more challenging to implement this more constructivist approach in an environment in which teaching and learning is mediated by technology. I have held blame the design of the learning management systems and other online tools I’ve been provided for some of these challenges, arguing that these tools were designed with a behaviorist approach in mind, tending to support a more linear, sequential style of teaching and learning, in which a unit or course would consist of discrete lessons for the students to complete and master before moving on to the next. As a result, I’ve resisted using these popular learning management systems the way they were intended and have opted out of utilizing some of the more traditional features they offer. I do take full advantage of their communication and collaboration tools, and have experimented with various ways to organize and share content, resources, and project assignments that are more in line with my social constructivist framework. In spite of these attempts, I still feel that students are not truly engaged in my online courses they way I would like them to be and believe that there may be “better” tools available to create the type of constructivist learning environment that I envision.

It is my hope that as I now abandon these more traditional learning management systems and their inherent behaviorist designs, and move toward the use of new tools to design and create an immersive 3D
virtual world, I will no longer be limited by technologies designed for an approach to instruction that is
diametrically opposed to what I believe about teaching and learning. Until then, all I can do is think, reflect,
read, plan, design, and build. Along the way, I expect to encounter many challenges and confront many
questions having to do with what teaching and learning looks like in this virtual world I am about to create.
What follows are some of those questions I have already encountered and some thoughts on how I plan to
address these questions as I continue with the design process.

2. BODY OF PAPER

2.1 What Might Teaching and Learning Look Like in This Virtual World?

To begin the design process I revisited our college of education’s conceptual framework, which serves as a
guide to guide the teaching and learning that occurs within the college. This framework is based on five
assumptions supported by a rich theoretical and research base in the area of social constructivism (Reich
College of Education, 2005).

- Learning occurs through participation in a Community of Practice;
- Knowledge is socially constructed and learning is social in nature in a Community of Practice;
- Learners proceed through stages of development from Novice to Expert under the guidance of more
  experienced and knowledgeable mentors in the Community of Practice;
- An identifiable knowledge base that is both general in nature and also specific to specialties emerges
  from the Community of Practice;
- All professional educators develop a set of Dispositions reflecting attitudes, beliefs, and values
  common to the Community of Practice.

I have attempted to apply these core beliefs into the design of my online courses but have struggled with
the limitations the tools put on the social construction of knowledge and the development of communities of
practice, in particular. While email, discussion boards, and chat rooms may offer ways for students to
communicate and interact, they are typically used to simply recreate the types of interactions that take place
in a face-to-face environment. As such, the knowledge that has been shared and the communities that have
formd have been similar to what has occurred in my face-to-face courses. On one hand, it is reassuring that
online courses can be “as good” as a traditional face-to-face course. On the other hand, I believe the power in
using a 3D virtual world is that teaching and learning can be approached in a completely new and innovative
way, which empowers students to fully realize the vision of our college’s conceptual framework and inducts
them into a true, socially constructed community of practice. This approach implies and even requires a level
of presence, collaboration, and interconnectedness that I believe is difficult, if not impossible, to achieve in a
more traditional distance learning environment. It requires tools that are designed around the belief that
content should be driven by the usefulness of what is learned, needs determined by the students rather than
assumed by the instructor or the content delivery system employed, usefulness of the courses should be
linked to external value added rather than assumed, and opportunities for learners to interact frequently to

Having quality tools, however, doesn’t always ensure that good instruction will occur. I have examined
various examples of virtual worlds that were designed to resemble virtual classrooms in which a student’s
avatar enters a classroom, sits at a desk, and “listens” to a lecture on the topic of the day. These literal
recreations of traditional learning environment are uninspired examples of how learning technologies can be
under utilized. In contrast, Riedl, et al. (2005) have identified an approach in which students choose their
own paths through a series of “hypermazes” that contain information, resources, and discussions linked
directly to students questions and experiences generated while exploring the maze. According to the authors,
“these areas allow students to move to them and between them in a non-linear fashion according to their
needs and interests with timeline for projects, sharing (discussion, brainstorming entries, etc.), establishing a
flow for the class” (Riedl, et al., 2005).
Those who design courses in which students are passive recipients of information approach teaching and learning from a much different theoretical perspective than those who create a learner-driven environment in which student are expected to engage in learning according to their needs and interests. I want my virtual world to be student-directed and exploratory in nature and for my students to engage in critical thinking, cross-disciplinary dialogue and activities. I want to provide a resource rich environment in which students have access to content available in a variety of media formats (video, still images, audio files, etc.) and make available to them tools to manage and manipulate this content to create, construct, and make meaning from the information. I want to be able to provide all this in a safe and motivating context in which learning is both risk-free and enjoyable, and in which learning takes place through interaction, meaning making, and collaboration with other students in the course. In other words, I want to design a virtual version of a social constructivist classroom that embodies the five assumptions of our conceptual framework.

2.2 How Might the Teaching and Learning Differ Between this World and Other Learning Environments I've Used in the Past?

Many learning management systems are designed with features and tools that reflect a didactic approach to instruction. These tools have allowed me to design sequential lessons and units, post a lecture (as a text, audio, or video file, or as a PPT presentation), and create quizzes and tests to ensure that my students have viewed that lecture, read the required course readings, and completed the assignments. Since this is not the way I approach teaching and learning, I have found these tools to be inadequate for designing a course using a more social constructivist approach to which I subscribe.

Riedl, et al. (2005) support these concerns in stating that most online learning looks like traditional face-to-face learning and that there is nothing innovative in the use of the technologies available to us today to create engaging online learning experiences for our students. Subsequently, students end up doing the same lessons in an online course that they would in a face-to-face course. While this may be acceptable for some, I believe it is an unfortunate situation considering the powerful tools that are available to us as course designers and instructors, especially those tools embedded in the virtual world environment. These tools allow for a more immersive, metaphor driven environment that supports and encourages more personal interactions, collaboration, exploration, and discovery. The three-dimensionality of the virtual world also incorporates time, distance, and presence as important elements into its design and subsequently uses these elements to provide for more authentic learning opportunities than a flat, linear, online system ever could.

While a 3D virtual world offers many of the same online tools that other LMSs provide (i.e. chat rooms, discussion board, web pages), the immersive nature and the inherent aspects of time and space have the potential of making the virtual learning environment more engaging and student-centered. Students have a sense of presence as defined by time and distance as a result of their using an avatar to move around within the world. This presence provides the opportunity to interact with others in the world, not only in formal ways designed within the context of a class activity, but perhaps more importantly, in informal or serendipitous ways as students casually meet others as they “walk” from one space to another. This freedom of movement and the opportunity for both formal and informal interactions with others should not be underestimated. This feature of a virtual learning environment can be utilized in a variety of ways to support and promote several of the assumptions and beliefs of the conceptual framework discussed above, including but not limited to the idea that knowledge is socially constructed and that learning emerges out of a student’s involvement in a community of practice.

The social constructivist approach to teaching and learning is based upon the assumption that students need to work and learn within a community of practice. Fortunately, there is a growing body of research that focuses on the formation of virtual learning communities. While instructor and student work within these communities, each has different roles and responsibilities to ensure the viability of the community. Collins and Berge (2001) suggest that the instructor’s role is to “promote human relationships, affirming and recognizing students’ input; providing opportunities for students to develop a sense of group cohesiveness, maintaining the group as a unit, and in other ways helping members to work together in a mutual cause.” The students, on the other hand, are responsible for “using the guidance [of the instructor] in a meaningful way” and for seeking solutions to real-world problems, asking questions, and critically evaluating their own learning through reflection and dialogue (Palloff & Pratt, 1999). In this type of virtual collaborative environment, students work together and ideally, with others outside of the course, to “generate deeper levels
of understanding and critical evaluation of the material under study” through sharing, discussing, providing feedback, and building connections between communities (Palloff & Pratt, 1999). Ultimately, a virtual world can serve as a foundation for a new and innovative approach to teaching and learning in which students become members of a cross-collaborative learning community (Riedl, et al., 2005).

2.3 Does an Instructional Design Methodology Currently Exist than can Guide my Design of the Virtual World I want to Create?

Several design theories and strategies exist that I believe can also provide some guidance in the design of a virtual world. These include research in the area of metaphorical graphical user interface design, microworld learning environments, and Cyrs’ IMPPACTs model.

Metaphorical teaching and learning environments found in virtual worlds afford instructors many new possibilities for engaging students in different kinds of interactions than those found in other web-based course development structures. The design of such experiences requires a close look at how interface metaphors are used to support exploration, knowledge acquisition, collaboration, and reflection (Bishop & Cates, 1996; Cates, 1994; Henry & Crawford, 2001; Sanders & Tashner, 2004). Metaphors can and should be complementarily aligned with one another to assist learners in developing a “conceptual framework of understanding through which the learner can further enhance prior knowledge and conceptualize a higher level of understanding towards the knowledge being obtained” (Henry & Crawford, 2001). A study conducted by Sanders and Tashner (2004) suggests that immersive metaphorical graphical user interfaces (Immersive MGUI) may offer students a more engaging and stimulating learning experience than what they would have in a non-metaphorical GUI environment and that the role of metaphors may be to offer a level of familiarity and comfort to students while providing more concrete ways for students to better connect with abstract ideas and concepts. Findings in this study also suggest that a virtual world must be well designed and provide students with a complex array of complementary metaphorical tools, activities, and content they can utilize and explore.

Papert’s (1980) research in the design and use of microworld learning environments to engage learners in higher-order thinking is also relevant to the design of a virtual world. In a microworld, “knowledge, skills, and attitudes are integrated through problem-solving activities, and instruction is situated in rich meaningful settings” and that “microworlds are exploration environments that exploit the interest and curiosity of the learner, so they must contain phenomena that learners are interested in. They incorporate instructional strategies such as modeling, coaching, reflecting, exploring, and encouraging the learner to debug his or her knowledge rather than apply principles attained during direct instruction” (Jonassen, 1996). These strategies are not overtly supported by traditional LMSs but are, as Jonassen asserts, incorporated into microworld, or virtual, learning environments.

One final design approach that may prove practical in guiding the design of a metaphorical, virtual world based on a social constructivist framework is Cyrs’ IMPPACTs model (Cyrs, 2000). While this model was developed for use in a more traditional distance learning environment and as part of an instructional systems approach to design, it takes on new meaning when applied in the context of teaching and learning in the type of virtual world environment to be developed. This eight-component model offers a model for designing an online activity or unit. The instructor and learners are free to arrange, organize, and engage in these eight components in virtually any order rather than having to follow a more linear/sequential process of moving from one component to the next. IMPPACTS serves as an acronym for Introduce, Motivate, Present, Practice, Apply, Communicate, Transfer, and Supplement. While an instructional module may include all of these components, it is not necessary to include every component for every activity designed.

3. CONCLUSION

There is still much to learn about the potential of this new learning technology and its capacity to support constructivist learning environments. Further research is necessary to help identify models for designing new approaches for teaching and to further our understanding of how learning occurs in a virtual world. I am inspired by what others have done before me and by what I believe to be possible. With my college’s social constructivist framework in hand, I intend to continue asking the questions discussed above and aspire to
develop a world in which the spaces support activities that are designed according to our framework’s five assumptions. In this world, I expect students to begin forming the basis for the kind of community of practice in which learning emerges out of their participation in the community and their interdependence upon one another.

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ON THE STUPIDITY OF MOBS

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ABSTRACT
This paper explores the implications of social navigation used to assist online learning communities. It presents an experiment in social navigation employing a treasure map, comparing the behavior of users provided with social navigation cues and the behavior of those with no such cues. The experiment suggests that social navigation may cause poor decision-making in its users in two distinct ways. Some users may follow the actions of others (even poor ones), while others may actively try to behave differently. Neither strategy is useful at all times. The paper goes on to discuss approaches to limiting the dangers of such systems.

1. INTRODUCTION
This paper explores the implications of social navigation when used to support online learning communities. Following a brief discussion of social navigation, the first part of the paper presents an experiment which suggests that social navigation may in some instances cause poor decision-making in its users. The remainder of the paper is concerned with exploring approaches to limiting the dangers of such systems.

2. SOCIAL NAVIGATION
Social navigation uses information gleaned from users’ navigation behaviour, reflected back through the interface to influence the navigation behaviour of others. This can be direct, by signaling the presence of others (an approach sometimes described as aware-ware) or indirect, by capturing the history of usage (an approach variously known as history-rich or wear-ware). The principle on which it is based is a subset of the process of stigmergy, a form of communication mediated through signs left in the environment. Stigmergy explains, for example, the nest building behaviour of termites, the formation of ant-trails, the movements of money markets, the success of street entertainers and the nest tidying behaviour of ants (Bonabeau, Dorigo, & Theraulaz, 1999). Stigmergic systems are self-organized and emergent, generating structure and/or behavior through the combined interactions of individual, locally interacting agents. In the same way, online environments employing social navigation can generate a kind of emergent form or organization as a result of the collective behavior of their inhabitants.

2.1 Social navigation and e-learning
Some element of social navigation or stigmergy occurs in most computer mediated communication. The number of messages or depth of threads in a discussion forum may attract or repel users. Populous chat rooms tend to attract users, empty rooms repel. Similarly, hit counters, comments and annotations provide tangible indicators of the presence of others, affecting other users’ behavior. Bigger wikis are more popular than smaller wikis, popular rooms in a MOO encourage further visitors to join. However, social navigation cues may vary in their effects according to context and degree. For example, although popular sites can attract users simply due to their popularity, an over-populous community may be equally discouraging, depending on the needs and the intentions of its visitors (Preece, 2000).

A number of educational systems explicitly attempt to exploit social navigation including, for example, CoFIND (Dron, Mitchell, & Boyne, 2003), The Knowledge Sea (Brusilovsky, Chavan, & Farzan, 2004), Educo & Educosm(Kurhila, Miettinen, Nokelainen, & Tirri, 2002), OurWeb (Miettinen, Kurhila, Nokelainen, & Tirri, 2005), and Dwellings (Dron, 2005). Social navigation in an e-learning environment can provide information for free, helping to guide learners to places that others have found useful, reifying the cogitations
and decisions of many to form what might be seen as a kind of group mind. By doing little more than interacting with and using the system, the combined behaviours of multiple users are captured and turned into guidance for others.

Unfortunately, there is a darker side to social navigation, because those who contribute first may have a disproportionate influence on those that follow. Instead of combining the intelligence of multiple users, such systems may amplify the preferences of those who arrived first, whether they were smart, mediocre or dumb. This is sometimes referred to as the Matthew Principle, a positive feedback loop where the rich get richer and the poor get poorer. The dangers of the effect can be observed in many situations from bank runs to riots (Surowiecki, 2004) and can be exploited for personal gain by those who understand the dynamic (Dron et al., 2003). If social navigation is to be successfully used in e-learning, then it is important to understand how and whether the Matthew Principle works.

3. THE EXPERIMENT

To try to understand the nature of the Matthew Principle further and thus assist the ongoing development of the social navigation-based environments Dwellings and CoFIND, a simple experiment was devised. A ‘treasure map’ was presented to subjects through a web interface, in the form of a simple grey rectangle, devoid of features. Subjects were told that the map would be divided into chunks of an (intentionally) unrevealed size, and the winner would be the person who clicked the point closest to the average point clicked by those in the most popular chunk. In other words, there would be a reward for identifying where most people would choose to click. Subjects were divided into two groups: those who could see where others had clicked, and those who could not. In the former group, users could only see the selections of those who, like them, could see others’ behavior. However, they were informed that the choice of winner would be based on the clicks of the other group, for whom others’ selections were invisible. In keeping with the Matthew Principle, it was hypothesized that those able to see each other’s selections would be influenced by those who came first, following their lead, resulting in clusters in different (and consequently less appropriate) areas than those who could not see each other’s attempts. Acting as one whose trail was visible, the author seeded an area to the right of the rectangle which previous studies have suggested is frequently ignored on web pages, thus intentionally seeding the map with a ‘bad’ influence.

Over 200 subjects from the University of Brighton, both staff and students, completed the treasure map over a period of two weeks. The system randomly divided them between the different views of the map, giving an rough 50-50 split between those who could see each other’s choices and those who could not.

3.1 Results

Figures 1 and 2 show, respectively, the map for those who could not see each others’ guesses and the map for those who could.

Figure 1. could not see others’ guesses

Figure 2. could see others’ guesses
There are startling differences between the two maps. It is possible to see a clear X pattern in the map for those unable to see each others’ choices (Figure 1), with some fairly tight clustering near the centre, radiating towards the corners. There are four distinct areas bordering the straight edges which are virtually empty. Figure 2, showing those who could see where others had clicked, exhibits a far more even distribution overall, with some notable clustering towards the middle and at the top left of the map, with smaller clusters scattered throughout. There are no significant blank areas. From these observations and follow-up interviews with selected users, the following facts emerged:

- Those who could not see each other’s choices made decisions based on their beliefs about what others would be likely to choose. The tendency to cluster to the centre was due either to the belief that this was the most likely place others would click, or that the centre was closest to all points on the map.
- Those who could see each other’s guesses used one of three strategies, approximately equally spread:
  - To click near to or in the midst of apparent clusters, on the assumption that these would be in the most popular sectors. This was the expected behavior.
  - To intentionally ignore what others had done and make a rational choice. As social navigation is intended to influence rather than to determine behaviour, this too accorded with expectations.
  - To seek clearer areas and intentionally click where no one else had clicked before, on the assumption that they would stand a better chance if they were further from others. This behaviour was a surprising reversal of the sort of pattern that naively might be expected in a system employing social navigation.

4. DISCUSSION

Unequivocally, the experiment confirms that people are influenced by the behaviour of others: they behave differently when presented with social navigation information. More controversially, the choices they make are, when taken as a whole, worse than those made by people who are not influenced by social navigation. Subjects who were unaware of each other’s choices followed a recognisably rational and distinct set of strategies, rather than randomly clicking on the map.

As predicted, a significant number of those who could see each other’s choices arrived at less appropriate solutions through following early leaders. However, the behavior of users who actively sought spaces away from those occupied by others’ selections was unexpected. In retrospect, it accords with some other observations of the use of the Dwellings environment where it was noted that some users, when presented with a list of options that were known to be ordered by popularity, often preferred to select the last item and even occasionally preferred to choose the second item in the list (Dron, 2005). Unlike ants and termites, people are driven by complex social attitudes which differ considerably from one person and one context to the next.

4.1 Methodological weaknesses

The subjects were self-selecting, but as the target audience for Dwellings and CoFIND was precisely those in a university who would self-select to use an online system, this was considered beneficial. More seriously, the context of this experiment was very different from that of an e-learning environment, and the motivations of its users were at odds to those of learners seeking useful learning resources. In particular:

- seekers of treasure are competing with each other, whereas those in an e-learning environment are more likely to be collaborating with each other.
- Users of an e-learning system will make more informed choices, guided by semantic information as well as a desire to find useful aids to the learning process.
- The needs of learners are usually significantly more complex than making a simple decision about where others might click.

Also, as most of the subjects were not interviewed afterwards and the map was presented online, it is unknown how much collaboration occurred or how many glimpsed others’ selections. It is also possible that some users did not understand the task. It would therefore be foolhardy to read too much into these results. All that the experiment demonstrates is that the effects of social navigation may sometimes be harmful, but in more complex ways than the original hypothesis suggests. However this is still a useful result. If the dangers
are real, we should at least consider them when employing the process to design or use learning environments which utilize social navigation, including those in which such processes arise unintentionally such as forums and chat rooms.

5. POTENTIAL SOLUTIONS

The following recommendations to limit the potential harmful effects of social navigation in e-learning arise mainly out of the development of various software tools over the past few years, including CoFIND and Dwellings, combined with the insights from this experiment.

**Make signposts, not fenceposts:** Social navigation should aid but not constrain choice. Without choice, a system will be driven to a steady (and potentially poor) state. The results of the experiment demonstrate diverse responses from users which should be accommodated, not curtailed. Social navigation mechanisms should not hide options, but should emphasize those that are more useful.

**Evolve – build negative as well as positive feedback loops:** Stigmergic systems in natural and man-made systems are always self-limiting. Pheromones disperse, nests become tidy, food sources run out. Poor recommendations would eventually lead an e-learning environment to be abandoned, but it would be better to allow limits to be reached well before that point. In CoFIND, for example, novelty is rewarded, effectively penalizing older resources and allowing new resources to compete more effectively. This acts analogously to the dispersal of pheromones in a termite nest or ant trail, limiting the positive feedback loop. In addition, explicit negative feedback is used to de-emphasize less useful resources.

**Parcellate and Connect (weakly):** Creating clusters and small isolated sub-environments with relatively weak connections to the whole has two main benefits. Firstly, if the social navigation succumbs to the Matthew Principle, the effect will be contained. Secondly, it is an important evolutionary principle that parcellation drives evolution. Significantly, Darwin’s great idea took form on his journeys to the Galapagos islands, where new mutations were able to take hold without competition from established mainland species.

**Delay:** Delay is a vital feature of a self-organising system (Bateson, 1972), and might also be a useful way of preventing mob stupidity. If delay had been built into the treasure map, then the early rational decisions of those not given social navigation cues would have had a far greater influence, especially if this fact were known by later users. There appear to be few, if any systems that exploit this, but it would be relatively simple to build one. For example, a simple delay could be built in so that the social navigation cues only appear after a predetermined time or quantity of activity. However, motivating users to contribute without gaining benefits until some time in the future might be problematic, leading to a cold-start problem. Such a system would benefit from some top-down control and extrinsic motivation to prevent this.

**Exploit the diversity of users:** The range of strategies used by those who were shown each others’ choices shows that users are not all affected identically by social navigation cues. Although users are between three and four times more likely to follow an item on a list shown in a larger font, and generally prefer items at the top of a list, these effects are relative and far from universal. Because social navigation rewards success, if users discover useful resources by following a less popular route, that route will be further emphasised, making it more likely that others will follow. This process can drive dynamic change and help to push a system out of a harmful positive feedback loop.

**Valorise diversity using different cues:** Related to the need for parcellation is the need to emphasise diversity within the environment. The undifferentiated dots of the treasure map experiment provided poor information about the actions of others. Had the system identified users’ intentions or strategies beforehand and given different navigation cues based on these, the behaviour of the crowd might have been different. CoFIND, for example, uses a variety of cues which relate to novelty, current popularity, historical popularity and age to provide more semantic information from which users may make more informed choices.

**Balance the private and the public:** Surowiecki believes that the wisest crowds result from a balance of personal and public information. He tells us that “groups are only smart when there is a balance between the information that everyone in the group shares and the information that each of the members of the group holds privately.” (Surowiecki, 2004) Unfortunately, Surowiecki does not give us the means to identify how that balance may be identified and this remains a subject for further investigation.

**Exploit intention:** Context and intention are vital components of a stigmergic learning environment (Dron et al., 2003). If the intention of the participants is to learn, then a learning environment is created, otherwise it will be something else. Therefore, in addition to parcellating the environment, it is important that
the parcellations clearly relate to the needs of like-minded groups of learners. CoFIND employs topics and sub-topics to identify clusters of interest. These metadata are generated by users themselves, so they provide relevant parcellated spaces in which to explore a subject of shared interest. Another approach is to use the environment as a component of a larger learning ecology, an approach employed in uses of the Knowledge Sea (Brusilovsky et al., 2004), where students are given tasks to perform using the system as part of a traditional university course.

Embed pedagogy: If social navigation is limited to expressing preference, then one way to make it more effective is to allow learners to express preferences for pedagogically useful things. For example, the CoFIND system uses social navigation not only to emphasise useful resources and topics, but also to emphasise the pedagogical features of those resources that a learner is seeking. These features are represented by metadata known as qualities, words or phrases describing what learners feel to be valuable about a resource. Qualities are not imposed by a designer but, like tags in folksonomic systems such as del.icio.us\(^1\), technorati\(^2\) and flickr\(^3\), are added by learners themselves, making them relevant to their needs. This has two main advantages in terms of social navigation. Firstly, by maintaining focus on the intentions of users and the purposes for which they seek resources, any positive feedback loops will relate to pedagogical or practical needs, not to emphasise weak resources. Secondly, it is generally the case that metadata are fewer than the data they refer to, otherwise there would be little point in using them. Social navigation applied to a small number of items on the screen is less likely to exert a tyrannical hold on users than were it to apply to screenfuls of data, where the overwhelming quantity of information can make users more inclined to accept any cues they are offered.

6. CONCLUSIONS

Learning communities are usually filled with intelligent, autonomous learners with a multitude of interests, preferences and motivations. A social navigation system will only ever influence behaviour, never act as the sole determinant of where people will choose to navigate. People are different and often behave in ways that counter the logic of the designers of such environments. None-the-less, the treasure map study confirms that social navigation cues can help to shape behaviour, so it is important that we continue to explore approaches that yield educationally useful structures. The promise of social navigation is a low threshold mechanism to utilize the wisdom of crowds, providing structure in a learning environment as a result of doing nothing more than using it. However, the experiment presented here shows that it is at least possible we may achieve quite the opposite, nothing more than a system that lets the blind lead the blind, embodying not the wisdom of crowds but the stupidity of mobs.

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ABSTRACT
Graduate faculty members turned an experiment using case studies for teaching shared decision-making and the development of an educational leadership “voice” into a web-based environment housing a cadre of cross-disciplinary case studies. Designed to teach the skills of collaborative solutions, the website has led to an initiative to house the case studies in a 3D virtual school district. It is anticipated that in a virtual environment students can more fully participate through true communities of practice by creating solutions that have potential for positive change in schools where the analysis of complex microcultural elements is required for viable, lasting improvement.

KEYWORDS
Case studies, Virtual worlds, Learning communities, Problem-solving

1. INTRODUCTION
The focus of this paper is on building solution communities of school leaders who are committed to building systems in which the pressing multidimensional problems facing public schools are addressed collaboratively. For this work to positively affect public schools and have a lasting effect upon school culture, graduate students must experience the practice of shared decision-making and develop the voice of leadership committed to the work of involving all stakeholders in solution processes. The paper begins with this idea and follows its progression from birth through the process of designing a 3D working environment.

It is important to note that Roma Angel and Rob Sanders wrote separately on each of the agreed upon sections of this paper. Afterwards, the separately written statements were merged. The individual stories of our work was complementary and led to the short summaries at the end of each section titled “Building Teaching and Learning Solutions Together” where we point out the intersection of our work together on this project.
2. BODY OF PAPER

2.1 Statement of the Problem

2.1.1 From Our Perspectives

**Roma**—As a former school administrator, I often observed a lack of authentic communication among professionals from differing content disciplines and across grade levels. At the university I many times encounter graduate students who appear to be more interested in acquiring check lists for doing their work than those who want to attempt to make their own work roadmaps based on the researched knowledge of the field. Living and working in positive microcosmic and macrocosmic environments could depend upon the ability to communicate about essential issues and relationships in life.

I looked at several possible teaching strategies to address this need and came upon the research of Kathryn Merseth (1997) who completed some of the first work using case studies to understand educational leadership. I began by developing a rubric for analyzing case studies from the standpoint of school leadership (Angel, 2003). The case study analysis rubric required careful case study reading, identification of missing information, analysis of the perspectives of the case’s characters, identification of the primary problem (one that if solved would prevent the reoccurrence of this issue) and of the secondary problem(s), an outline and analysis of possible solutions, and an decisive action plan.

Next, I chose a pressing issue for the public schools and wrote a case study, which I then tried with my students. They found that individually they loved solving the cases and writing the briefs. What I discovered most, though, was that students loved talking with one another about case issues, about the perspectives of the characters, about their own solutions and those of others. I began to think that I had a possible answer to my larger concern of solving real school issues, and teaching about solving issues present in the larger world. I expanded this assignment into a framework where students engaged in solving cases in “solution communities.” They would discuss issues, come to consensus, and write briefs in groups. They uploaded these briefs to a threaded discussion board, read the briefs of other classmates, discussed the briefs of others using the discussion board, and later engaged in full-class dialog about the case and their various group solutions and actions. They were then given an opportunity to rewrite their own group’s brief using ideas they gained from other groups.

The question for me remained: How can I influence administrators to talk with teachers across all grade levels and disciplines about school problems and lasting solutions? My students expressed reservation about sharing their thoughts and case briefs with students from other content areas. I knew immediately, however, that this was the right thing to do. If they could learn to talk with teachers from other disciplines using discussion boards and in person, and if they could develop confidence in doing this, then this particular manner of practicing school leadership just might continue in the schools. Everyone could win from this. I explained to them that discussion boards would be a “safe place” to learn to solve school issues. There were no real or long-lasting negative consequences and the experience might help to prevent administrator isolation in the school setting. I then sought out several colleagues who had expressed an interest in the program. That is when I found Rob Sanders who had a special reason for thinking this project could be helpful to his students.

**Rob**—There is a belief held by many school media coordinators that administrators do not fully appreciate the role of the media coordinator. As such, coordinators often feel undervalued, marginalized, and unappreciated. Through interviews with practicing media coordinators and principals, my students often discover that neither completely understands the other, nor is either aware of the driving forces that guide what each does and the decisions each makes. My students also realize that there is a lack of communication between the principals and media coordinators, which appears to be a reason, if not the reason, for this breakdown in positive relations between the two.

While these observations are discussed in one course I teach, it has been my belief that this problem deserves more attention in our library science program. As such, I agreed to work with Roma Angel who was using case studies to examine and offer shared solutions to real school problems. I offered to write a case study that required my library science and her school administration students to begin a positive, solution-focused dialogue that might continue when these students moved on to become practitioners in the field.
2.1.2 Building Teaching and Learning Solutions Together
Together we envisioned a way to improve the use of shared decision-making within schools by working with our own students through the case study initiative. We decided to use a case study written by Rob focusing on the conflict between a media center coordinator and a technology specialist. The principal in the case did not understand the true job functions of either of her new employees and did not review the job descriptions with these new staff members. Thus, each new employee is left to fend for him/herself.

2.2 Phase I: Experimenting with Case Studies

2.2.1 From Our Perspectives

Roma—In our first use of this case, we encountered interesting discourse among the students. One group of media coordinators described the administrator in the case study as “clueless” when she neglected to define the jobs of the new media coordinator and technology specialist. I waited for my group to read this brief and enjoyed hearing their surprise that the students in library science had been so “blatantly disrespectful.” One of my students encouraged the library science group to take responsibility for its own actions by responding for the school administration class in a very pointed but non-inciting manner. This response was met by a series of responses from the media coordinator class describing their own responsibilities within a school setting and asking questions about the role of school administrators in solving school issues. This encounter led to a more positive understanding of shared leadership in schools, the development of voice about shared leadership, and about the power afforded by technology through programs that facilitate the building of relationships through dialogue that focuses on finding solutions in school communities. My students reported that they were pleased to have played a part in developing this bridge of communication with students who plan to become media coordinators.

Rob—An interesting and unexpected interaction occurred during our first use of this case. My students neglected to consider their audience when writing the brief and used language that was not appropriate for the circumstances. Their inflammatory comments initiated a lively dialogue among several students from both programs, first about the statements made, then later about the issues that prompted the library science students to make such statements. What started as a response to the offensive statements resulted in a thoughtful dialogue that addressed the fact that media coordinators and principals do not communicate effectively and that the comments made by the library students were simply made from frustration. In the end, all of our students discovered the power of the technology in opening up the lines of communication, the power of their own voices, and the power of cross-disciplinary dialogue focused on addressing real school problems and issues.

As a result of this pilot project, I now talk with my students about their professional voice. Now, when disagreements or conflicts in perspectives occur, my students address the issues professionally, politely, and with the goal of shared decision making and solution building in mind. It is no longer an adversarial relationship that we initially saw. My students now comment on the worth of this experience and the feeling of empowerment it brings. They tell me how they now have a voice and the courage to share that voice.

2.2.2 Building Teaching and Learning Solutions Together
We found this first experience to be revealing and enlightening, as the dialogue among students was rich and promising. We then discussed the concept of creating a website to house several case studies like these. Roma had a concept in mind; Rob had the technology knowledge. This combination proved to be a good match.

2.3 Phase II: Developing the School District Website

2.3.1 From Our Perspectives

Roma—I approached Rob and John Tashner, a colleague who had expertise in case studies and 3D virtual worlds, about writing a grant to support the development of a website to house several of these cross-program case studies. We met to develop a rubric for faculty from various programs to use in writing cases for the
website. We began work on the website, invited other faculty to write cases involving their disciplines, and continued using and perfecting the case study teaching method outlined above. Most of the case studies that Rob and I wrote involved school administrators and media center coordinators. Even as we worked on the website, we wondered about a more authentic means of communication among our student groups. We also wondered if there might be a more effective way to have our students interact initially than the threaded discussion board. Would a 3D virtual environment help? This was a question for consideration.

Rob—Supported by a grant awarded by our college, we were able to write additional case studies and organize them in such a way that each would be available to other faculty for use in their respective courses. It was decided that the website housing the cases should be designed to resemble a small school district, with each case residing in the most appropriate school setting for easier and more logical access and retrieval. The site included the cases, supporting resources for each case, and links to the analysis rubric and the discussion board. It was during the work on this grant project that the faculty involved began to question to effectiveness of the discussion tool that we had been using as an appropriate vehicle to support student dialogue. We didn’t feel that the threaded nature of a discussion resembled or promoted the type of authentic dialogue that we wanted to occur among our students. We therefore set out to identify other tools to better replicate a real school environment in which our students could come together, albeit still at a distance, to interact and solve problems. It was with this goal in mind that we identified and committed to using ActiveWorlds, an immersive 3D virtual world that would support the creation of spaces to support and stimulate a more engaged and authentic dialogue than what we had previously observed.

2.3.2 Building Teaching and Learning Solutions Together

While Rob captured Roma’s initial concept in his website presentation, we quickly found the site to be somewhat flat and traditional, and decided that we would prefer an environment that provided for a greater variety of communication modes. Since we were working with John Tashner, we wondered about using the Active Worlds virtual environment. We wrote grant to develop a 3D site for housing and working with the case studies.

2.4 Phase III: Developing the Immersive 3D World

2.4.1 From Our Perspectives

Roma—We now have a real opportunity to strengthen the communication among our students as we move from the traditional threaded discussion board to one where there can be on-going discussion among students about the cases and the case briefs. Each of our planning and design meetings is focused on learning environments that are rich in conversation and collaboration. We have discussed the location for the case studies in the virtual world that we are creating, about an entry area to the worlds named “The Commons,” and about what will be housed there. This is truly exciting, collaborative work and I’m beginning to see how my vision of learning to solve macrocosmic issues through our work in a microcosm can be potentially powerful. I can see how students can develop voice for shared leadership in a richer environment that affords more opportunity for discussion. This is the social construction of knowledge at its optimum. Our work has the potential to save and to create the language of community and communication, and of shared leadership.

Rob—The virtual world development group has decided to begin our development with a shared, common space that we have named, “The Commons.” This space is being designed as a plaza consisting of open areas, fountains, benches, and signage, surrounded by buildings like an alumni center, a library, a coffee shop, and a case study “conference center.” We believe that all students, regardless of program should have immediate and unimpeded access to the cases we’ve written. Since the Commons is being designed as a shared space where all students pass prior to entering other program specific worlds, this space was a logical location to build the case study conference center. Each floor of the conference center would house a separate case, providing ample space to create the unique environment that the case might require. This organization of the cases will provide the access we desire and more importantly, provide an immersive environment in which our students will more realistically interact with their colleagues in a safe, authentic, solution community.
2.4.2 Building Teaching and Learning Solutions Together

Working with this expanded group to design the space in The Commons for the case studies has been exciting work. Each floor will represent one case study and will include the resources needed for each. In addition, we plan to include a variety of opportunities for dialogue about each case study and through the case study analysis rubric.

3. CONCLUSION

3.1.1 Continuing the Work

*Roma*—I have no doubt that Katherine Merseth would be pleased by our virtual application for case study analysis, that John Dewey (1897) would agree that these representations would force better and richer conversation, and that even Bellah (1996) would be pleased that we just might preserve the language to facilitate deeper and more meaningful conversation. I’m ready for the continuation of the adventure and looking forward to using the virtual world with my students. This work gives me hope for the future of shared leadership and the solving of the real issues that present themselves in schools and that perpetuate themselves in like kind in the larger society.

*Rob*—I have been documenting the process by which we are developing this new virtual world. Since it may be several months before the Commons and the conference center are ready for use, we will continue to use the website and discussion board described in Phase II to continue our case study activities. We are also currently in the process of developing a survey instrument to collect data about the types and nature of interactions that occur among the students participating in the case study project. We intend to use these data to further guide our development of future cases and to refine the process by which our students compose their case analyses.

3.1.2 Building Teaching and Learning Solutions Together: The Work Continues

We agree that this is good work and have been strengthened in our ability to communicate with one another and with other faculty members who have joined our efforts to use case studies as instruments for shared leadership and positive change in real school environments. As we continue to develop the 3D environment, we are refining our research agenda to determine the actual impact on work in schools, universities, and the larger world.

REFERENCES


THE WEB-BIB DATABASE: BUILDING AN ANNOTATED WEBLIOGRAPHY OF TEACHING RESOURCES THROUGH ONLINE COLLABORATION

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ABSTRACT
All students in the ELD 376 - Teaching Science, Social Studies and the Arts course are asked to collect and annotate resources which they contribute to an online database called the Webliography-Bibliography (Web-Bib) database. Web-Bib is a growing online resource for pre-service and in-service teachers, currently containing over 1500 annotated entries. Research indicates that contributing to a shared resource can engender a sense of online professional community among users (Hester, 2002). This paper describes the Web-Bib database, examines student feedback on using and improving it, and discusses the potential impact of Web-Bib on future teachers.

KEYWORDS
webliography, database, teaching resource, learning trajectory

1. INTRODUCTION
College students in the United States preparing to become teachers of grades K-5 must master many academic subjects in order to be certified as highly qualified teachers under the No Child Left Behind Act (U.S. Department of Education, 2003). Prospective teachers frequently feel under prepared in one or more of the academic disciplines (e.g., science) prior to entering the teaching profession. They need ready access to educational materials that they can use to learn (or re-learn) about topics they will be teaching to children in the classroom. My teaching methods course at Rider University addresses this problem directly through a model I call a trajectory of learning experiences. As part of this trajectory, students identify perceived areas of weakness in science and/or social studies, locate resources that will help them teach those topics, create annotations that describe the usefulness of each resource, and post their annotations in an online database called Web-Bib (Hester, 2005a). This paper briefly delineates the learning trajectory approach, describes Web-Bib online database, indicates whether students anticipate using the database in the future and discusses students’ suggestions on how Web-Bib can be improved.

2. A TRAJECTORY OF LEARNING EXPERIENCES
My main teaching responsibility for the Department of Teacher Education is a methods course for junior-level education students entitled ELD 376 – Teaching Science, Social Studies and the Arts. Enrollment in the course varies from 45 to 70 students per semester, with approximately 20 students in each of three sections. ELD 376 is designed mainly to prepare students for teaching science, social studies, and the arts in grades K – 5. However, it also serves secondary education majors who double major in one of the sciences or social studies. This makes for a challenging mix of three disciplinary areas and three different audiences in the course each semester. In order to best serve the needs of these distinct groups, I have developed (and continue to refine) an adaptable framework for the course that I’ve come to describe as a trajectory of
learning experiences. The trajectory approach is constructivist in nature, designed to engage students in the process of learning to teach themselves, a vital ability for all practicing educational professionals.

The trajectory of learning experiences I designed for the ELD 376 course engages students in a series of activities which include: 1) describing what they know about a topic in science or social studies that they will eventually be teaching, 2) identifying what they still need to learn about it, 3) gathering and reviewing appropriate resources, and 4) developing a plan for teaching the material to their own students. Throughout, students are asked to share their efforts with each other, engage in peer review, and write frequent reflections. These activities are designed to encourage professional dialog between these prospective teachers.

At the start of each semester, I ask students to write a brief autobiographical statement in which they identify and analyze their prior knowledge and experience with science (or social studies). Students then visit the New Jersey Core Curriculum Content Standards website (bookmarked in the course’s Blackboard™ website) and read over the science (or social studies) standards to get a sense of what K-12 students are expected to learn about those areas. Students then select a topic from among these standards that they feel a bit nervous about teaching (it is most often either physics or chemistry) and write a reflection about what makes them nervous about the prospect of teaching that topic. This assignment is designed to help students identify areas that they’ll need to work on in order to be effective teachers.

In class, students are placed in groups according to the topics they are uncomfortable with. Each group Brainstorms about their topic area, and then uses the list of terms generated by the group to begin constructing a concept map of the topic. For this task, students are introduced to Inspiration™ software that is loaded onto laptop computers in Rider’s Teaching and Learning Center. When group members experience difficulties finding an appropriate place for terms on the concept map or have trouble describing the relationships between terms already on the map, it means that they need to develop their knowledge of the term or relationship more deeply. This leads to the next step in the trajectory model.

Students then begin developing a file of resources to help them address their self-identified area of weakness. This assignment is called Web-Bib and it entails students constructing an annotated list of resources (from websites and libraries) that are germane to their topic and will help them in constructing their concept map (Hester, 2005a). Students post their completed entries to the Web-Bib database, a web-accessible library of resources compiled by my students over the last several years. This list of annotated references serves two functions: 1) it is a resource for past and current students to find materials that may help them develop a better understanding of topics they will teach and 2) it provides students with a model for how the body of disciplinary knowledge is accumulated in science and social studies by engaging students in contributing to their own growing body of knowledge.

The culmination of the learning trajectory in ELD 376 is the completion of the planning projects, utilizing the ideas, concept maps and resources that the students have developed over the course of the semester. Using the text and online resources from the Web-Bib database, students conceptualize the material for their plan in several different ways, formulate clearly defined learning objectives for their students and develop appropriate teaching and assessment strategies.

2.1 The Web-Bib assignment

The ELD 376 course includes a requirement that students construct a file of web-based and bibliographic materials that will support them in teaching elementary school children. For each source included in their file, students must prepare an annotation that indicates how the source would be useful to a teacher. A source could be a lesson plan, supplementary material for a lesson, or reference material for the teacher to learn more about a particular topic before teaching it. Approximately half of the sources must come from websites and the other half from library sources. The list that each student compiles is called a Webibliography-Bibliography, or Web-Bib for short (Marino, 1998). The assignment is described in my course syllabus as follows:

"Webibliography-Bibliography of professional resources (Web-Bib) – A key part of your success as a teacher will be your ability to find resources that are appropriate for use in your current and future lessons. The aim of this assignment is for you to start collecting such resources and annotating them with a short paragraph for your use at a later date. Material may come from at least three different areas, including the CRC [Curriculum Resource Center] at Rider, the Internet, and from the school library where you are placed. Ideally, you should use this opportunity to find materials to help you teach in areas where you feel weak (e.g., a topic of science, social studies or the arts which is confusing for you). You will be posting a
minimum of ten well-written annotations (five websites and five bibliographic references) to a web-linked Web-Bib database which will be available to you and your peers long after you have graduated from Rider University.”

When I first designed the Web-Bib assignment, students posted their annotated lists to a designated discussion forum in Blackboard™, so that the resources gathered and reviewed by individual students could be shared by the entire class. This approach had one major drawback. The collection of Web-Bib sources were only available to those who have access to Blackboard, which means that only students who were currently enrolled in my course could make use of the resource. I wanted students to be able to use this resource after their coursework was finished, during student teaching and perhaps even as first or second year teachers. To accomplish this, the Web-Bib database has gone through a series of evolutionary changes, described in a previous article (Hester, 2005a). In fall 2005, students posted their entries to the new web-accessible version of the Web-Bib database, which includes multiple fields for entering pertinent data (e.g., author, editor, publication date, title, etc.) as well as spaces for the student-composed annotation and selected keywords. The new database provides resources and ideas for teaching to its users, and as students contribute to Web-Bib, they are engaging in a critical aspect of online community participation (Hester, 2005b).

2.2 Student feedback

In December of 2005, I asked my students to complete a brief online survey that included two main questions about the Web-Bib assignment. The first question was “Do you think you will use the Web-Bib database that you have helped create as a resource for your teaching in the future? Why or why not?” Of the forty-one students who responded, thirty-one indicated that they were certain that they would use Web-Bib in the future, eight were unsure, and two said they would probably not use Web-Bib once the course was over. While it is gratifying that over 75% of the respondents are sure they will use the resource, it is important to examine factors that may inhibit its future use as well.

Four respondents (including both of those who said they would not use Web-Bib in the future) plan to specialize in teaching a world language. For these students, Web-Bib would clearly be of limited value, as the database currently focuses on resources in science and social studies. The remaining six respondents cited a variety of reasons for being unsure about using Web-Bib in the future. Several students did not understand that the database is no longer password protected, so that all former students may use Web-Bib by simply adding its URL to the bookmarks of their web browser. Two students felt that they may be more likely to use Internet search functions such as Google and Yahoo than the Web-Bib database.

The second question on the survey was “Can you suggest ways to improve the Web-Bib database (or the assignments) that might make you more likely to use it in the future?” Responses to this question were classified into four categories and then sorted fourteen subcategories (see Table 1) which are discussed in the conclusion.

Table 1. Responses to survey question #2, regarding ways to improve the Web-Bib database

<table>
<thead>
<tr>
<th>Major categories to improve on</th>
<th>Number in major category responses</th>
<th>Subcategory of responses</th>
<th>Number of subcategory responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>5</td>
<td>No improvements to the database are needed</td>
<td>5</td>
</tr>
<tr>
<td>Improve database functionality</td>
<td>11</td>
<td>Streamline access/improve search functions and interface</td>
<td>8</td>
</tr>
<tr>
<td>Improve the content of postings</td>
<td>8</td>
<td>Multiple reviews/include review function</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Add and delete functionality</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assign specific topics to research</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Include other methods courses/fields in the database</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>As more sources are posted, entry quality may decrease over time</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase applicability for secondary students</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Base on what students plan to teach</td>
<td>1</td>
</tr>
<tr>
<td>Improve course assignments</td>
<td>23</td>
<td>Make Web-Bib entries homework assignments due weekly</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discuss Web-Bib more frequently/clarify expectations</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make them mandatory in lesson plan assignments/Use in class</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduce or increase the number of sources required</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make Web-Bib entries an extra credit assignment</td>
<td>2</td>
</tr>
</tbody>
</table>
3. CONCLUSION

The feedback provided by my students will be used to modify the Web-Bib database over the coming year. More than half of the suggested improvements can be accomplished by simply altering the assignment structure for the course and I anticipate that the majority of these changes will be in place for the spring 2006 semester. Increasing the Web-Bib database functionality (e.g., improving the search, add, and delete functions and incorporating a function that allows readers to post reviews) will all require more time and expert assistance. The target date for the functionality modifications is fall 2006. The issue of declining quality of the entries will be addressed by the proposed review function. Entries that receive several poor quality reviews can eventually be removed from the system.

The learning trajectory model helps prospective teachers identify topics areas that they are inadequately prepared to teach, gather and review resources that support learning in those areas, and develop plans for teaching their students about those topics. As students contribute to the Web-Bib database, they engage in a collaborative, constructivist effort that builds an ever enlarging a web-accessible, annotated pool of resources that they and their peers in teaching can benefit from for years to come.

ACKNOWLEDGEMENT

I would like to acknowledge the work of Dr. Marc Boots-Ebenfield, the instructional technologist for Rider University’s Teaching and Learning Center. His seemingly tireless efforts have contributed tremendously to the design and successful integration of the Web-Bib database into the ELD 376 course.

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ABSTRACT
As Korea is one of the most advanced IT countries either as users or as manufacturers, the Internet cannot be separate any longer from the daily lives of Korean people. Among different online activities that Koreans participate in and enjoy, Cyworld is one of the very popular online community services. The major hypothesis of this proposed study is that the Cyworld activities may encourage and generate informal adult learning and that ‘communities of interest’ such as Cyworld can be expanded as ‘communities of practice’ facilitating learning. With this hypothesis, a pilot study was conducted with three research questions: (a) does learning take place while users participate in Cyworld activities? If so, how does it occur?, (b) are participants conscious of their learning process when learning takes place?, and (c) does participants’ own definition of learning affect their Cyworld activities? To answer these questions, structured interviews were conducted and the findings were indicated and discussed.

KEYWORDS
Online community, Adult learning, Informal learning.

1. INTRODUCTION
Korea’s enthusiasm for virtual space has been remarkable: The country’s Internet penetration rate reaches 73% (11 million) of South Korean households (Beardsley, et al., 2003) and Koreans spend the most number of hours (13.40 hours per month) with Internet in the world (Yun, et al., 2001). These statistics contribute to the recognition of Korea as one of the leading IT countries.

Then, what do Koreans do in these virtual spaces? Among many on-line activities, like many others out of Korea, on-line communication takes up a significant part of many Korean people’s lives. The “Cyworld,” one of the most popular on-line communication services in Korea has shown quite intriguing growth within the 3 years since it was launched in 2001. The number of its users exceeded one-fourth of the total Korean population, which was equivalent to 10 million (Lee, et al., 2004). Besides, the services are not restricted by the national boundaries: it started providing services to China and has already secured 14 million Chinese users (Whang, 2005). It is preparing to extend their services in other countries such as Japan and the U.S. this year.

* Park, Y., Heo, G., and Lee, R. contributed equally to this study.
The best feature of Cyworld is its “mini-hompi” (same as a mini blog), a smaller version of an individual homepage. Its huge popularity is based on its design to maximize self-expression, interaction, and simplicity (Lee et al., 2004). It adapted simple tool designs that enabled users to show their intended identity. The initial purpose which made Cyword different from other blogs was maintaining and strengthening present social relationships rather than sharing their own thoughts or experiences. The minihompi takes a unique form in on-line communities but is based on the display of single individuality, which makes a critical difference from other on-line communities.

The huge popularity of the Cyworld services has brought all sorts of analyses on the cause and impact of its success. While the “step forward” features of the Cyworld have been spotlighted as the factors to facilitate on-line communications, its functions to help informal learning for its users seemed to be worth studying further as there has not been much known.

2. CONCEPTUAL FRAMEWORK

According to Livingston (2001), informal learning is “any activity involving the pursuit of understanding, knowledge or skill which occurs without the presence of externally imposed curricular criteria” in comparison with formal and non-formal learning, which are generally worked with a clear learning objective and structured curriculum. Schugurensky (2000) more specifically categorizes three types of informal learning according to intentionality and consciousness: self-directed learning, incidental learning, and tacit learning (socialization). Self-directed learning is “both intentional and conscious” as an individual learns something. Incidental learning refers to “learning experiences that occur when the learner did not have any previous intention of learning something out of that experience, but after the experience she or he becomes aware that some learning has taken place.” Tacit learning (or socialization) is depicted as “the internalization of values, attitudes, behaviors, skills etc. that occur during everyday life. Not only we have no a priori intention of acquiring them, but we are not aware that we learned something.” In case of tacit learning, it is often missed that learning is taking place because people don’t intend and aware about it.

From the sociocultural perspective (Vygotsky, 1978), as one of the contemporary learning paradigms, learning occurs not only through the individual cognitive process but also through social engagement and interaction in social practices and the appropriation of the psychological tools of that culture. Learning takes place in the context of authentic social activities in everyday situations and hence learning is seen as a process of participation in these activities (Brown, et al, 1989; Lave & Wenger, 1991; Rogoff, 1998). Informal learning has been emphasized in the cognitive apprenticeship and situated learning literature (Brown, et al, 1989; Lave & Wenger, 1991) in relation with the socio-cultural perspective. In particular, that research perspectives builds on observation of learning as it is affected not only by formal schooling but also by the appropriation of cultural and social practices in authentic settings. Currently, for instance, as web-based technology develops rapidly, the sociocultural perspective has been applied to design and understand effective learning environments, such as online communities (e.g., Owen, et al., 1998) and weblogs (e.g., Efimova & Fiedler, 2004), for informal learning as well as formal learning. Marsick and Watkins (2001) explain that “given the distributed, asynchronous nature of technology – facilitated interactions, more may be learned incidentally by learners reading between the lines.” They also claim that more studies which explore how people learn in this kind of context need to be conducted.

An online community thus seemed to foster informal learning, especially incidental learning and tacit learning. Anticipating that an inquiry focusing on one of the most popular phenomena in Korea would reveal interesting findings, we conducted a pilot study with the three following research questions:

(a) Does learning (i.e., implicit and tacit learning) take place while users participate in Cyworld activities? If so, how does it occur?
(b) Are participants conscious of their learning process when learning takes place?
(c) Does participants’ own definition of learning affect their Cyworld activities?
3. METHODOLOGY: Descriptive Data Analysis

For the pilot study, a qualitative methodology seemed appropriate for exploring the relationships laid out in broad research questions. Structured interviewing was utilized in an attempt to comprehend the phenomena. The interview attempted to understand the following three points about the participants: demographic background, personal experience with Cyworld, and perception for learning in general. All of ten interviews were conducted in MSN messenger and the transcripts were captured and saved. The eight women and two men who were acquaintances to authors were personally invited and participated in the study. The average age of the participants and the average hours using Cyworld per week were 31 and 4.6 hours respectively with eight in their 30s and the remaining two in their 20s. The participants consisted of three office workers, two engineers, one staying-home mom, and one university lecturer. The descriptive data although only ten participants, still enlightened us with more vivid explanation and revealed factors.

All descriptive data sources were analyzed using assigned codes to facilitate further analysis. In accordance with the procedures suggested by Strauss and Corbin (1990) a codebook was developed and an open coding method such as microanalysis was applied (Strauss & Corbin, 1990). As seen in Table 1 below, in total, 15 codes were developed and they were grouped in four key categories: reasons doing Cyworld activities, outcomes through Cyworld activities, understanding of learning, and learning achievement the participants believed they obtained through Cyworld activities. Finally, for the subsequent main research, messages and pictures posted by some interviewees will be further analyzed according to detailed criteria developed for the study.

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons doing Cyworld activities</td>
<td>Writing Diary/Journal</td>
</tr>
<tr>
<td></td>
<td>Self-Expression</td>
</tr>
<tr>
<td></td>
<td>Observation of Other Lives</td>
</tr>
<tr>
<td></td>
<td>Practice of Writing and Feedback from Others</td>
</tr>
<tr>
<td></td>
<td>Building up and Maintaining Social Network</td>
</tr>
<tr>
<td>Outcomes through Cyworld Activities</td>
<td>Self-Reflection</td>
</tr>
<tr>
<td></td>
<td>Sustaining Social Bonding</td>
</tr>
<tr>
<td></td>
<td>Cultivating a constructive life</td>
</tr>
<tr>
<td>Understanding of Learning</td>
<td>Specific Contents-oriented Curriculum</td>
</tr>
<tr>
<td></td>
<td>Practical skills or applications to an everyday life</td>
</tr>
<tr>
<td></td>
<td>Understanding through Observation of Other Lives or</td>
</tr>
<tr>
<td></td>
<td>Interacting with Others</td>
</tr>
<tr>
<td>Learning Achievement the Participants</td>
<td>Skills related to the Internet and/or software</td>
</tr>
<tr>
<td>believed Obtained</td>
<td>Social and Emotional Interaction</td>
</tr>
<tr>
<td></td>
<td>No learning</td>
</tr>
</tbody>
</table>

4. FINDINGS

Two major findings are indicated from the pilot study. First, participants indicated how they made meaning in their lives through joining activities of Cyworld: meanings were created to the participants largely from three sources: first, building up and maintaining relationships with their friends and relatives; second, personal journaling by use of text and/or image for either private or sharing purpose(s); third, information sharing exclusively with the people who belong to the networks.

Second, informal, in particular, incidental and tacit learning was widely practiced while they engaged in Cyworld activities. When they were asked to link the meaning gained through these activities and the understanding of learning, most of them at first hardly indicated that learning was happening through these activities since their major goal doing Cyworld activities was to interact with close people for fun within the established network(s) in the Cyworld; rather, they believed that informal learning via web could possibly happen through active information sharing and specific content-oriented knowledge acquisition with extensive numbers of people. However, they indicated that the Cyworld activities opened critical paths leading to positive outcomes such as self-reflection, sustaining social bonding and cultivating a constructive
life. In addition, role-modeling through cultivating thoughts on their own and being close to people’s lives, and knowledge and skills as accompanying gains often came along with these experiences.

These responses can possibly be interpreted that the participants learn: first, by managing the Cyworld interface as ‘catalyzer’ of active human relationships to develop creative know-how(s) which mature along with time and depth of experiences of the Cyworld activities; second, by utilizing a range of others’ knowledge, skills, and attitudes, for example, from trying application of information to their own situations, to gaining insights and/or wisdom from others’ lives; third, by linking positive motivation gained from incidental and tacit learning to more purposeful meaning making from other sources in the off-line world.

Finally, it seems to have a correlation among understanding of learning, outcomes through Cyworld activities, and learning outcomes the participants believed obtained. The data leads us to assume that the participants perceive outcomes of Cyworld activities as learning achievement if they have possessed a broader range of understanding on learning. The participant who believed that a casual social activity also could be seen as a learning process showed her strong motivation developing more meaning making activities out of common Cyworld activities, for instance. We, the authors believe that it is worthy to investigate further as the data is not sufficient at this stage.

5. DISCUSSION & CONCLUSION

At first glance the study’s findings lead us that certain characteristics of informal learning seem to occur in Cyworld. That is, there is a potential possibility that ‘informal networks’ or ‘communities of interest’ such as Cyworld can be expanded as ‘communities of practice’ that support informal adult learning. While a growing number of people make use of personal webpublishing and weblogs to successfully support their own learning and these people exhibit remarkable skills for the initiation and maintenance of personally meaningful learning (Efimova & Fiedler, 2004), these personal relationship-oriented fun features also seem to nurture similar “personally meaningful learning” as they construct their meaning making activities while they are listening, observing, and sometimes contacting others who publish visible traces of thoughts and experiences. Depending on one’s own understanding of learning, the depth of meaning-making activities appears to vary in that the wider they define the learning, the more productive their activities are and the more positive their activities are identified by themselves. Based on the claim that informal and incidental learning can be enhanced with facilitation or increased awareness by the learner (Marsick & Watkins, 2001), it is hypothesized that Cyworld users can have their usual fun-oriented activities directed towards making more meaning if they re-define learning or put at least deeper thought into their activities. Although this interpretation is very preliminary, it can be considered as one of major hypotheses for the main study in which we plan to survey a larger number of participants, conduct a focus group, and analyze in more detail the contents of on-line interactions. Eventually the main study is anticipated to suggest useful strategies for how to cultivate online activities for the purpose of informal learning.

REFERENCES


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ABSTRACT
This paper addresses issues concerning the impact of pirating music files in globalizing cyberspace. It points out that the Internet access is limited to very small percent of the wealthiest human population. It, also, looks into the future of cyberspace music, and predicts that most of the cyberspace activities are going to be the unleashing one of many of humanity's predispositions—the predisposition to steal. Cyberspace represents a perfect medium for concealing a person's identity and for the masking of any of the responsibility that is expected from socially acceptable human behavior. With these aspects in mind the paper concentrates on the Internet's distribution of pirated software and the trading of MP3 files.

KEYWORDS
cyberspace, pirating, MP3, meme, internet, globalization

1. INTRODUCTION

The term cyberspace literally means "navigable space" and it is derived from the Greek word kyber (to navigate). In William Gibson's 1984 novel Neuromancer, the original source of the term, cyberspace refers to a navigable, digital space of networked computers accessible from computer consoles; a visual, colorful, electronic datascape known as "The Matrix" where companies and individuals interact with, and trade in, information. Since 1984 the term cyberspace has been reappropriated, adapted and used in a variety of ways that all refer to the computer-based conceptual space within information and communication technologies.

The term meme used in the title of this paper was coined by the biologist, Richard Dawkins. Memes are tunes, ideas, catch phrases, and their ilk; and just as genes propagate themselves in the gene pool by leaping from body to body via sperm or eggs, so memes propagate themselves in a cultural meme pool and leap behaviorally from person to person. The important rule for memes, as for genes, is that they must constantly replicate. This replication is a mindless process not necessarily for the good of anything; replicators that are good at replicating flourish for whatever reason. Meme X spread among the people, because X is a good replicator. (Dawkins 1976)

Dawkins states that the primary difference between the human species and others is our reliance on cultural transmission of information, and hence on cultural evolution. If we decide to fully exploit the applications of the term meme, it would reveal its truly powerful role in our understanding of human culture in general.

To illustrate how useful the term meme may be let's take a moment and look at the case of one particular meme—the success of a four-note meme at the beginning of Beethoven's Fifth Symphony. Certainly, it has much less to do with the absolute value of its pitch-set "internal" design, i.e. the way a musical piece is compositionally structured, and much more to do with the design this meme presents to the listening world. What is important is its phenotype, the way it affects the minds and other memes in a particular socio-cultural environment. The minds are habitats of the memes, and they are certainly in limited in their capacity. Each mind has only a limited ability for the support of memes; therefore, there is considerable "competition"
among memes for entry into as many minds as possible. This competition is the major selective force in the
infosphere, just as it is in the biosphere.

But, before I concentrate on what kind of music-related memes flourish within the cyberspace
communities, I have to address the question of cyberspace globalization and the music-world within that
setting. However, it is important to be truthful about the whole framework in question.

2. CYBERSPACE GLOBALIZATION

Globalization has become the most important economic, political, and cultural phenomenon of our time. This
process is reshaping the world economy, creating new social classes, and reordering the lives of thousands
and thousands of people. The word globalization stands for all kinds of different things depending on who
uses it. It could stand for the so-called progress and modernity of western culture, or American domination of
world culture or the arrival of world-wide hypermodern chaos loaded with inequality and instability for
almost everyone.

One of the important aspects of cyberspace and globalization has to do with the "tyranny of the place"
that was always a synonym for restraints on liberty that puts restrictions, both political and economic, on
where people can live and go, what to buy, eat, read, hear or see. Globalization by its nature brings down
these barriers and empowers the individual with "unlimited" choices. One can live in England but eat Greek
food, read Suddeutsche Zeitung on the Internet, buy books from Amazon.com in Seattle, and visit Egyptian
pyramids without changing money or having a passport. All this increases people's freedom to shape their
identities in a way that their ancestors could not have possibly imagined. This picture of the world as global
village may appear to be very appealing and interesting to dwell in, but this is only one side of the coin—the
western imperialistic side of the coin.

What do I mean by "imperialistic" will be perfectly illustrated by looking at the following statistics that
reveal a very uneven distribution of wealth, and consequently selective privilege regarding who can and
cannot gain access to the cyberspace information. The average American boss now earns 419 times the salary
of the average American factory worker, the richest 2.7 million Americans earn as much as the poorest 100
million, Switzerland's per-capita income is 400 times that of Mozambique.

Knowing that vast majority of the Internet users live in the western highly developed countries, mostly in
the United States, makes it difficult to claim that the Internet's role as a medium is globally powerful. On the
contrary it is rather limited to the wealthy small percentage of world's population who own a computer, or
those who can use it in an Internet Café sort of setting. In many parts of the developing world, there is a
tremendous shortage of telephones, let alone computers. There are fewer telephones in sub-Saharan Africa
than in Manhattan, and for the most people in the world, the World Wide Web and the entire cyberspace is
just another unobtainable American toy. CNN and MTV worldwide have more influence than Internet does,
because there are more people globally who own a TV set than those who own a computer. The highest
number of computer owners who actively use the WWW at their home is still in the USA – 135,827,225, but
most of the “developed world” countries are lately showing huge increases, especially United Kingdom,
Spain, and Australia.

Thus, talking about WWW communities is really neglecting the vast majority of humans who live on this
planet. However, to keep my paper going, I must arrogantly assume the less than convincing western
imperialistic position and see how the Internet related globalization and music may be viewed from that
narrow perspective.

Looking into the cyberspace let me concentrate on what kind of cultural memes are being exchanged
through the Internet. There are three kinds of memes that travel most frequently from one computer to
another and cause all sorts of Internet trouble and lost bandwidth. The best known is Internet porn, which is
beyond the scope of this paper; the other two are the distribution of pirated software (warez) and the trading
of MP3 files. So, let's see why MP3 files and warez are so successful as cyberspace memes.
2.1 Warez

Pirated software (warez) has been around since the very beginning of the personal computers. In the eighties, people exchanged audiocassettes with computer programs recorded on them. Now, everybody can download a cracked version of almost any imaginable software using the Hotline Client. According to the Software Publishers Association (often called Software Police) 50% of all software worldwide is bootleg. In Hong Kong, Russia, and other emerging countries, but particularly in economically and politically semi-isolated countries such as Serbia, one can get every piece of software Microsoft has ever written for $10. Needless to say that all warez activities are illegal but, as mentioned before, half of the Internet users are still doing it in spite of the possibility of serious prosecution. This makes me believe that the future of cyberspace activities is going to be the unleashing one of many human predispositions—the predisposition to steal. Cyberspace represents a perfect medium for concealing a person’s identity and the encouragement of irresponsible behavior. There are the entire illegal and anonymous WWW communities that exist for nothing but exchanging warez.

Now, what are the consequences of all this illegal warez interchange for the future of music. On the global scale, it gives an opportunity for people who live in countries where access to software is either too expensive or physically impossible, to download, for example, the latest version of Waves plug-ins, or Cubase software and experiment with it. On the other hand, by having free access to software, one may download all string instrument DVD-ROM sound samples, try them all out and then decide which one to purchase. DVD-ROM sound sample manufacturers regularly make fancy covers and attractive descriptions of their CD and DVD contents, but never allow one to try those sounds out. Once consumer legally purchases a CD-ROM it may soon discover that only 10% of the goods are really useful and that rest of it is completely worthless. However, this perception comes too late, for the deal is already concluded and there is no possibility for the software to be returned. Warez downloading activities give more power to the consumer, forcing the software manufacturers to behave differently. Providing much better technical support, may be the only incentive that software manufacturers could offer to Warez Dudez when persuading them to purchase the software instead of downloading it for free.

2.2 MP3 Files

The trading of MP3 files is far more interesting topic to talk about than the pirating of the illegal software. First, not all MP3s are illegal. If one owns the copyright for the music, the MP3 platform may be the best way for music promotion in cyberspace. The MP3 sites, such as www.mp3.com, are virtual jukeboxes stuffed with hundreds of thousands of recordings downloadable for free. "Ripping" the CD tracks, placing and exchanging them on the web in MP3 form, is a breach of the copyright laws and is legally considered a theft. Not surprisingly, there are more people committing these web criminal acts than those who don't. Chat groups are favorite places where virtual WWW communities, predominantly in 12-25 age range, illegally agree who exchange the millions of MP3 files. These new "distribution" methods are sending shock waves through the music industry, because they lack the means for content originators to collect royalties and to protect copyrights on music.

All this means that the Internet has altered how music will be distributed. Consumers are now able to bypass the traditional distribution network by eliminating the intermediaries involved in the music industry supply chain. Under the old industry model, the music artist would produce a CD and the record company would use its distribution network to reach the retail stores and ultimately the customers or the consumers of music. Under the new (Internet altered) music industry model, the artist may entirely bypass the record labels reaching the music customers directly via E-commerce website and the Internet. Without having to sign a record contract, artists have an incentive to provide MP3 files for free download, in exchange for exposure. This makes perfect sense because most of the artists do not make any significant income from their CD sales anyway but have rather earned their "fortune" in the concert-touring arena. All this points out that breach of the copyright laws, by exchanging the MP3 files over the Internet, is not that much against music artists' interest at all, but rather against the record label's interest.
2.3 Individual Songs as MP3 Files

One of the most interesting things that happened in the musical economy is that the digitization allowed function (in this case, music) to be separated from form (CDs) in a way never before possible. Before, consumers were forced to buy a particular CD and pay the full price even if they wanted to hear only one or two music selections on that CD. Now, customers may logon to say Apple’s iTunes site and select any song from their song library and have them downloaded for $0.99 per song. If one were to purchase say all 10 songs from a particular album, this would amount to the usual $10 retail price of a CD ordered through Amazon.com. Now, if one were to download 10 top songs from the US pop-music charts, the price would be still the same - $10. Trying to do the same thing at the local record store would have the major difference in that the consumer would be forced to purchase 12 separate CDs, a value of $191.88. All kinds of lame excuses were put in place in order to undermine downloading of individual songs as MP3 files, such as ruining a concept of an album, or missing the graphic design that goes on the cover of the original CD. The essence is that both, the record labels and the music artist, were more than usually selling on a single CD 20% of listenable goods and 80% of ballast that nobody wanted to hear. So, the new MP3 files downloading model is making everybody to rethink if the old album producing concepts are still viable or not.

3. CONCLUSION

Like with everything else, the cyberspace and the Internet give us a plethora of both the good and the bad. It is becoming a battleground for the fight between those who want to see the world reshaped into a global village (according to their definition of that term) and those who want to cling onto traditional values of their own local cultures. The same technology that helps to make the world less parochial also helps it to become more ethnocentric.

From the practical point of view, globalization through cyberspace forces music businesses to operate according to consumer choice. Globalization does not mean homogenization. People want to consume music, books, movies, and even potato chips that reflect their own identities. When society is defined by a compact national economy under corporate control—an elite who controls that economy has a chance of co-opting it and enforcing their values on the society. But when a society becomes an open-ended international system, any common values of a powerful elite get lost in the multitude of choices presented to the proletariat that is primarily driven by their limbic and intellectual cravings. Which of these two trends do I think will take the existential musical day? This time I think corporate control is whipping one very dead economic horse!

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ABSTRACT
As Japanese society have become internationalized, the Ministry of Education, culture, Sports, Science and Technology of Japan (MEXT) recommended “intercultural education” in the period of integrated study in order to promote mutual understanding among different cultures. In addition, Internet has been set up at schools in Japan, and collaboration with foreign schools is getting more popular as one of learning styles in intercultural education using Internet. There are, however, many problems needed to be resolved, such as languages difference, different school calendar etc. In this paper, the authors develop a collaborative learning model which indicates how to support Web-based intercultural education.

KEYWORDS
Collaborative learning on WWW, intercultural education, collaborative learning between foreign countries

1. INTRODUCTION
As Japanese society have become internationalized, the Ministry of Education, culture, Sports, Science and Technology of Japan (MEXT) recommended “intercultural education” in the period of integrated study in order to promote mutual understanding among different cultures. As the result, some schools carried out various intercultural activities. Some children, for instance, gather information about foreign countries through books, magazines and Internet. The some other children visit associations, such as culture centers, and participate in international exchange programs. Some schools also communicate with foreign students using video conferencing and e-mails.

As describing above, many schools have shown interests in collaboration with schools in foreign countries. Inagaki (2004) points out that the children are expected to achieve following learning outcomes through collaborative learning among different schools.
1) Communication ability,
2) Ability to understand different culture and other viewpoints,
3) Motivation for learning,
4) Ability of utilizing information,
5) Ability of collaborative working.

There are, however, many problems needed to be solved, such as languages difference, matching objectives, different school calendar, and learning style difference in order to carry out collaborative learning between foreign countries.
2. THE PURPOSE AND METHODOLOGY

2.1 The purpose of this research

In this paper, the authors collect data from questionnaire, interviews and participant observation from the viewpoint of intercultural understanding and computer literacy. After collecting the data, the authors analyze the learning outcomes based on Web data among schools. Based on the analysis, the authors develop a collaborative learning model which indicates how to support Web-based intercultural education.

2.2 Research method

The authors employ the case study method. Collaborative intercultural education was carried out two schools between Japan and Korea. The authors interviewed teachers at both schools including the following questions:

1) What merits have you got from this collaborative learning?
2) What difficulties did you face?
3) What do you want to challenge in future activities?
4) What kinds of support do you need to implement intercultural learning?

The authors also implemented questionnaire to children in order to clarify their learning outcomes from the 4 perspectives, such as “interest”, “achievement”, “consciousness of Korea” and “self-culture”. The authors also took pre-test to children before starting the activities at Japanese school. The authors observed class once a week in order to know how children participate in the activities.

3. THE PRACTICE AT K ELEMENTARY SCHOOL

Kurokami (2002) points out that there are five styles for collaborative learning, such as collaborative investigation type, collaborative production type, information exchange type, agent type, and debate type. In this practice, the way of information exchange is taken because of 1) different language; 2) theme should be close to children’s experience.

In this practice, children formed 4 groups consisted 8-9 children and each child in the group gathered information about the topics the teachers decided in advance, such as food, society, technology, tradition etc. Children discussed the topics and asked questions to deepen their understanding more about each country. The authors played the role of facilitator during practice and support web-based learning.

The way of communication is the following.

1) Children use Bulletin Board system (BBS) in order to share information between other children and other groups and to look back own comments.
2) Children write down their name by alphabet in order to show who wrote the comments.
3) Children use pictures to give clear image of the theme.

Children use their mother language in writing and reading message from Korea as to deepen their understanding. Teacher makes use of translation system named Korai that translates from Korea to Japanese and Japanese to Korean.

3.1 Development of the curriculum and support system

The practice started from November 2005 to December 2005. In the first two weeks, the authors found some obstacles such as 1) miscommunication between teachers, 2) immorality in using Internet, 3) Japanese
composition ability, 4) difficulty of gathering information using Internet, 5) inaccuracy of computer translation.

Based on the above obstacles, the authors suggested the teachers to improve curriculum and supported web-based system after each lesson.

3.1.1 Curriculum

The practice was based on problem-based learning. Teacher set up theme such as food, tradition, social study etc. Children wrote messages concerned with the theme. Korean children read the message and reply back to Japanese children. After reading message from Korean children, Japanese children picked up the theme from the messages, and looked for information related with the theme. Children summarized the information from Internet. After the teacher checked the contents that children wrote, children typed them on BBS.

Table 1. The data and theme of communication

<table>
<thead>
<tr>
<th>Time</th>
<th>Date</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>16th of November</td>
<td>Food of our country</td>
</tr>
<tr>
<td>Second</td>
<td>24th of November</td>
<td>Social Study</td>
</tr>
<tr>
<td>Third</td>
<td>1st of December</td>
<td>Technology/Tradition</td>
</tr>
<tr>
<td>Forth</td>
<td>9th of December</td>
<td>Technology/Tradition</td>
</tr>
<tr>
<td>Fifth</td>
<td>15th of December</td>
<td>Cultural heritage</td>
</tr>
</tbody>
</table>

3.1.2 Support System

1) Introduction of Translation team

The translation system “Korai” translates directly from Japanese to Korean and Korean to Japanese. The program translates under the condition that the Japanese is written correctly. Some children make sentence properly, but others don’t. In this case, “Korai” does not translate properly and wrong translation does not make sense for Korean children. To solve this problem, translation team were composed.

2) Introduction of Team teaching in the class

Children cannot read Kanji that is translated by “Korai”. Japanese children learn Kanji according to their grade, but “Korai” shows many Kanji that children have not learnt yet. So children need help to read translated message. And the themes Korean children gave are so difficult that Japanese children can not understand very well, such as Ubiquities, ceramics etc. In addition, when children look for information from Internet, Internet shows too much information including difficult Kanji and sentence for children to understand and to pick up proper information. In a short, the authors and the teacher help each group to let children read Kanji, understand the theme, look for information on Internet and summarize.

4. CONCLUSION

This practice is in progress at the moment, thus the result and the perspective clarified in this interview, questionnaire and participatory observation of this research will be presented at the conference.

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HOW SHOULD WE PERCEIVE ROBOTS? : THE SURVEY RESEARCH AT ROBOFESTA KANAGAWA 2001 YOKOHAMA COMPETITION

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ABSTRACT
In order to examine how people perceive robots, the authors conducted a survey for 493 visitors to RoboFesta Kanagawa 2001 Yokohama Competition, and then analyzed the images of seven stimuli: Humans, animals, machines, inorganic materials, and three robots (AIBO, ASIMO, and PaPeRo). The results showed that the seven stimuli were classified into the human and animal group, the machine and inorganic material group, and the robot group, and that the robot group fell between the two other groups. These results indicate that very different types of robots could be put into one category: The image of a robot.

KEYWORDS
Image, Robot, Survey research, Perception, Psychological effect

1. INTRODUCTION
With the advances in scientific technologies, the life with robots that has often appeared in the world of Science Fiction is becoming non-fiction. Until recently, robots usually meant industrial robots used in factory production lines; however, small and light-weight robots for daily household use have been developed and sold recently. Such daily use of robots will become more and more common in the future, and interactions between humans and robots such as domestic robots or nursing-care robots will become
everyday routines. Therefore, there has been an increasing necessity to examine interactions between robots and humans. However, while a large number of studies focus on functions of robots, there have been few studies on the psychological effect of robots on humans. More importantly, studies using a highly reliable method to determine how humans perceive robots have rarely been conducted.

Robots that we are currently familiar with come in various shapes such as human, animal, and other shapes that do not resemble any existing objects, and each of these robots has different functions and characteristics. Do these robots in various types as a whole create a category of its own (the robot category) based on their similarities? In other words, is there a set of images that apply to all robots? Also, do we or do we not perceive robots that are unique in existence as something that resemble already-existing objects such as machines, humans, animals, or inorganic materials?

To answer these questions, we used the Robot Image Scale created by Suzuki, Kashibuchi, Sakamoto, & Osada (2006) to conduct a survey with visitors to the Yokohama venue (Pacifico Yokohama) of Robot Festa Kanagawa 2001, and then examine the detailed images that individuals had of robots. This survey was conducted at this exhibition since a large number of robots were displayed in the venue and therefore those who actually saw these robots could become study participants.

2. METHOD

2.1 Participants

The number of participants who completed questionnaire was 493 (221 males and 272 females) in total; under ten of age was nineteen (eight males and eleven females); from ten to nineteen was 132 (61 males and 71 females); from 20 to 29 was 55 (nineteen males and 36 females); from 30 to 39 was 126 (45 males and 81 females); from 40 to 49 was 91 (50 males and 41 females); from 50 to 59 was 34 (fifteen males and nineteen females); and 60 and over was 36 (23 males and thirteen females).

2.2 Stimuli

We presented seven stimuli: Three robots of AIBO (SONY), ASIMO (HONDA), and PaPeRo (NEC), and four already-existing objects of humans, animals, machines, and inorganic materials.

2.3 Questionnaire contents

Questionnaire contents were the Robot Image Scale developed by Suzuki et al. (2006) on bipolar six-point-scale, and demographics (participants' age and gender). The scale consists of ten constructs; (1) Friendly-Unfriendly (Closeness), (2) Emotional-Unemotional (Emotion), (3) Useful-Useless (Usefulness/productiveness), (4) Animate-Inanimate (Artificial/living), (5) Can relate-Cannot relate (Interaction), (6) Acts on its own will-Acts on the will of others rather than on its own will (Autonomy), (7) At ease-Uneasy (Machine anxiety), (8) Warm-Cold (Social evaluation), (9) Complicated-Simple (Intellectual evaluation), (10) Likable-Not likable (General evaluation). For details, see Suzuki et al. (2006).

2.4 Procedure

Inside the NEC booth at Robot Festa Kanagawa 2001 in Yokohama (Pacifico Yokohama), we handed questionnaires to the booth visitors and asked them to provide answers inside the booth. The questionnaires were collected on the spot.
3. RESULTS AND DISCUSSION

To examine whether or not the images of seven stimuli were different, we conducted an analysis of covariance (ANCOVA) with each of the ten constructs. In the ANCOVA, the dependent variables were the scores of constructs; independent variable was the stimuli; and covariates were the demographics. With this analysis, we can examine the main effect of the stimuli while controlling the effects of demographics. If the main effect of the stimuli is statistically significant, it means that the score is different between the stimuli. In this case, to examine which images of the stimuli are different from the others, we conducted multiple regression analysis; the dependent variables were the scores of constructs and independent variables were all covariates. Then, we conducted subtests with Student-Newman-Keuls' (SNK) test for the score of residuals that these covariates could not explain. Results showed that the main effects of the stimuli were significant in all ten constructs. We showed the mean scores of residuals in Table 1.

Overall analysis results did not show any significant differences in most of the obtained constructs among three types of robots, indicating that all robots were regarded as one category. In many of the constructs, the robot category fell between the human and animal group, and the machine and inorganic material group. This result suggests that, even though individuals were not familiar with robots, they perceived the robots as one group presence, and their image of the robot category was somewhere between the image of the human and animal group, and the machine and inorganic material group. The image of robots, however, was never the same as the images of these groups.

For constructs that did not follow the abovementioned tendency, AIBO and PaPeRo obtained the highest score for construct (7) At ease-Uneasy (Machine anxiety) (meaning that individuals evaluated these robots as comfortable to be around). ASIMIO and animals followed, and then humans, machines, and inorganic materials. In discussions regarding machine anxiety, individuals in general felt uncomfortable with unfamiliar and delicate machines. The result of this study however, interestingly showed that individuals did not exhibit such tendency with robots. Also for construct (3) Useful-Useless (Usefulness/productiveness) and (9) Complicated-Simple (Intellectual evaluation), humans and machines obtained the highest scores, followed by animals and robots, and then inorganic materials. Although robots embody the frontier of scientific technologies, they do not seem to be regarded as useful and complicated objects yet.

Table 1. Mean scores of residuals.

<table>
<thead>
<tr>
<th></th>
<th>AIBO</th>
<th>ASIMO</th>
<th>PaPeRo</th>
<th>Humans</th>
<th>Animals</th>
<th>Machines</th>
<th>Inorganic materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closeness</td>
<td>0.39b</td>
<td>0.19c</td>
<td>0.55b</td>
<td>0.44b</td>
<td>0.83a</td>
<td>-1.04d</td>
<td>-1.36e</td>
</tr>
<tr>
<td>Emotion</td>
<td>0.01c</td>
<td>-0.19c</td>
<td>-0.04c</td>
<td>1.64a</td>
<td>1.39b</td>
<td>-1.26d</td>
<td>-1.57e</td>
</tr>
<tr>
<td>Usefulness/productiveness</td>
<td>-0.43e</td>
<td>0.00c</td>
<td>-0.16d</td>
<td>0.33b</td>
<td>0.09c</td>
<td>0.65a</td>
<td>-0.48e</td>
</tr>
<tr>
<td>Artificial/living</td>
<td>-0.53b</td>
<td>-0.38b</td>
<td>-0.39b</td>
<td>1.74a</td>
<td>1.67a</td>
<td>-1.18d</td>
<td>-0.94c</td>
</tr>
<tr>
<td>Interaction</td>
<td>0.01b</td>
<td>0.02b</td>
<td>0.08b</td>
<td>0.86a</td>
<td>0.89a</td>
<td>-0.81c</td>
<td>-1.06d</td>
</tr>
<tr>
<td>Autonomy</td>
<td>-0.02c</td>
<td>-0.18c</td>
<td>-0.22c</td>
<td>1.54a</td>
<td>1.35a</td>
<td>-1.15d</td>
<td>-1.34e</td>
</tr>
<tr>
<td>Machine anxiety</td>
<td>0.38a</td>
<td>0.15b</td>
<td>0.42a</td>
<td>-0.20c</td>
<td>0.04b</td>
<td>-0.42d</td>
<td>-0.37d</td>
</tr>
<tr>
<td>Social evaluation</td>
<td>0.11d</td>
<td>0.11d</td>
<td>0.43c</td>
<td>0.60b</td>
<td>1.18a</td>
<td>-1.15e</td>
<td>-1.27e</td>
</tr>
<tr>
<td>Intellectual evaluation</td>
<td>-0.08c</td>
<td>0.41b</td>
<td>-0.30d</td>
<td>0.65a</td>
<td>0.06c</td>
<td>0.34b</td>
<td>-1.07e</td>
</tr>
<tr>
<td>General evaluation</td>
<td>0.09b</td>
<td>0.05b</td>
<td>0.20b</td>
<td>0.10b</td>
<td>0.41a</td>
<td>-0.25c</td>
<td>-0.60d</td>
</tr>
</tbody>
</table>

NOTE: The same alphabet means no significant differences between them.

The effects of age and gender were controlled.

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HOW TO MEASURE OUR PERCEPTION OF MEDIA?:
THE CONSTRUCTION OF THE ROBOT IMAGE
SCALE USING THE TRIAD METHOD

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ABSTRACT
The purpose of this study is the construction of a scale for measuring our image of robots. Six participants were shown three targets of seven stimuli: Humans, animals, machines, inanimate objects, inorganic materials, and three robots (AIBO, ASIMO, and PaPeRo), on a questionnaire, and asked to find similarities as specific things common to two but not applying to the other, and also, contrasts as constructs opposite to the similarities (the Triad Method). The constructs were grouped into categories having the same meaning with these similarities and contrasts. As a result, we extracted six categories such as "Closeness" and "Interaction." Moreover, we added four categories such as "Machine anxiety" in order to assess new media, and "General evaluation". Then a total of ten representative bipolar constructs in each category were obtained.

KEYWORDS
Media, Robots, Image scale, Triad Method

1. INTRODUCTION

In today's information society, media has reached deeply into daily living, and individuals go through a wide variety of experiences through media. In such a situation, it is believed it is important to understand what kind of images individuals have of media.

Among various types of media, a small, light-weight robot for household use has been developed and sold, and the possibility for daily interactions with a robot has received much attention. There have been studies to examine what kind of image individuals have towards a robot by focusing on individual functions or movements of a robot (Ikeura, Otsuka, & Inooka, 1995); however, there are few studies in which the overall image of a robot was empirically examined with a highly reliable study method.

To examine an image in general, development of a special scale is necessary. In this study, we first
created the Robot image scale, and then we conducted a large-scale survey by using the created scale with visitors to "RoboFesta Kanagawa 2001 Yokohama Competition" in order to compare images towards robots against other objects (machines, humans, animals, and inorganic materials) (Kashibuchi, Suzuki, Sakamoto, & Osada, 2006).

When we created the Robot image scale in this study, we applied a method called the "triad method," which has been used in the field of person perception (Kelly, 1955). In this triad method, a participant is presented with three items and then he/she is prompted to identify what is common to two of the three items (similarity) and an antonym of that similarity (contrast). As a result, a pair of the similarity and the contrast would be extracted as a construct. People tend to use these bipolar dimensions (similarities-contrasts) in describing their images, for example, friendly or unfriendly and useful or useless. Table 1 showed a questionnaire based on the triad method. Since extraction of a construct is based on a comparison between specific items, this triad method is believed to be especially useful when identifying a perspective that leads to understanding of items that are not easy to imagine. Currently, robots come in a wide variety of shapes: Human, animal, or shapes that do not resemble any existing objects. Functions and characteristics of robots also differ with each robot. In this study, we selected a pet-shaped robot (AIBO by SONY), a human-shaped bipedal robot (ASIMO by HONDA), and a communication-oriented robot (PaPeRo by NEC) as specific items among a wide variety of robot types in order to extract a construct that leads to understanding of a robot as a new existence through comparisons among three types of robots or comparisons between the robots and machines, humans, animals, or inorganic materials.

2. METHODS

2.1 Participants

Four female graduates and two female undergraduates who majored in psychology and had a good knowledge of robots as well as a good deal of contact with them were asked to answer the questionnaire. They engage in the multimedia evaluation research, and have a high knowledge and contact experience concerning the robot.

2.2 Stimuli

Three of the same seven stimuli in Table 1 were randomly selected; three robots of AIBO (SONY), ASIMO (HONDA), and PaPeRo (NEC), and four already-existing objects of humans, animals, machines, and inorganic materials. Combinations of triads were compiled in two questionnaires and the participants completed one of them.

2.3 Procedure

Participants individually answered questionnaires when their scheduled permitted.

<table>
<thead>
<tr>
<th>Line</th>
<th>AIBO</th>
<th>ASIMO</th>
<th>PaPeRo</th>
<th>Humans</th>
<th>Animals</th>
<th>Machines</th>
<th>Inorganic materials</th>
<th>Similarity</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>O</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>O</td>
<td></td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: In the table, pairs with the "O" symbol are similarity-based pairs, and the "X" symbol is contrast.
3. RESULTS AND DISCUSSION

Categorization

The constructs were grouped into categories having the same meaning based on the questionnaire cited as being similar or contrasting. For example, expressions like "useful for living" "work", "workforce" and "used as a tool" were grouped into the "Usefulness/productiveness" category. In this way, "Usefulness/productiveness", "Artificial/living", "Interaction", "Autonomy", "Emotion", and "Closeness" categories were finally obtained.

In addition, to further evaluate objects, we added a general "Likable-Not Likable" assessment, a "Warm-Cold" one, based on a social-evaluation dimension used in interpersonal evaluations, and "Simple-Complicated", based on an intellectual-evaluation dimension. Anticipating the feeling of unease with new media like computers (Machine anxiety), we also included "At ease-Uneasy".

The categories gained using this triad method and the representative constructs in each category are listed below (Table 2). Since future image surveys must be conducted with subjects of a wide age range, from elementary school students to elderly people, we selected constructs that incorporated the meaning of each category and that were also easy to understand for all age groups.

Usefulness of the triad method in creation of the scale

As described above, the advantage of the triad method is that it can extract the perspective that an individual uses when he / she compares specific objects to understand a particular object among them. The procedure used in this study, one in which answers based on the triad method are collected from multiple subjects so that a typical category construct can be identified, can be used with a wide range of objects. By switching objects presented in the triad method with other media, it is possible to compare images of a wide variety of media contents such as TV programs in TV-related studies, software in video-game studies, and Web-pages in Internet-related studies. It is also possible to make comparisons among media by presenting different types of media, such as TV, video games, and the Internet. Therefore, the triad method is a useful method for measuring various media images and is expected to be widely applied in the future.

Table 2. Categories extracted by the Triad Method and constructs.

<table>
<thead>
<tr>
<th>Category</th>
<th>Construct</th>
<th>Construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closeness</td>
<td>Friendly</td>
<td>Unfriendly</td>
</tr>
<tr>
<td>Emotion</td>
<td>Emotional</td>
<td>Unemotional</td>
</tr>
<tr>
<td>Usefulness / productiveness</td>
<td>Useless</td>
<td>Useful</td>
</tr>
<tr>
<td>Artificial / living</td>
<td>Animate</td>
<td>Inanimate</td>
</tr>
<tr>
<td>Interaction</td>
<td>Cannot relate</td>
<td>Can relate</td>
</tr>
<tr>
<td>Autonomy</td>
<td>Acts on its own will</td>
<td>Acts on the will of others rather than</td>
</tr>
<tr>
<td></td>
<td>(autonomous)</td>
<td>on its own will (heteronomous)</td>
</tr>
<tr>
<td>(Machine anxiety)</td>
<td>At ease</td>
<td>Uneasy</td>
</tr>
<tr>
<td>(Social evaluation)</td>
<td>Cold</td>
<td>Warm</td>
</tr>
<tr>
<td>(Intellectual evaluation)</td>
<td>Simple</td>
<td>Complicated</td>
</tr>
<tr>
<td>(General evaluation)</td>
<td>Likable</td>
<td>Not Likable</td>
</tr>
</tbody>
</table>

Note: categories in parentheses are newly added categories.

REFERENCES


ABSTRACT

Nowadays Virtual Learning Environments are widely used by educational units of all types. Such use has practical and educational aims (Sasse et al., 1998). However, it is often acknowledged that virtual technology is used merely to build a virtual learning community (Garber, 2004). Yet virtual environments which allow access to learning resources and facilitate communication among users are not necessarily characterized by features of virtual community (Oren et al., 2000). Neither should we assume that a learning community would develop by itself in a virtual learning environment (Kreijns et al., 2002). The crucial desideratum is the design and use of logismics which bring a community into being and help it flourish. This is what the presented logismic VirCom-LT aspires to do and we believe that it can be used by both secondary schools and educational departments.

KEYWORDS

virtual learning communities, on-line learning

1. INTRODUCTION

The proposed software allows the creation of virtual learning communities. It is an on-line finalized project continually upgraded, which allows access to it through a web browser. It is user friendly, easy to navigate, and orients users to special educational aims. Its construction relies on Hypertext Preprocessor (PHP) and Structured Query Language (SQL) applications.

2. DESIGN

The design of this software rests on the theory of communal costructivism (Holmes et al., 2001), which advances the creation of learning communities. VirCom-LT allows: 1. the parallel creation of internal communities, the dynamic presentation of subject-matter and the creation of closed action teams and internal sub-teams dealing with a subject matter and the production of relevant material, 2. the submission of essays or papers accompanied with an account explaining the rationale behind them and any collaborative efforts, as well as the tutor’s reports on users’ progress, 3. the appointment to, or exchange of roles between the participants and the member’s co-responsibility in the production of the material and in the building of a common tank of learning, 4. the evaluation of all participants on the grounds of their quality of work (i.e. interaction, response to collaborative work, completion of questionnaires, assessment of papers).
2.1 Basic features

The software’s basic features are the following: **identification**: community members obtain access to it and act according to their roles, **administration rights**: there are three administration levels, administrator, moderator, member, **accession rights**: the accessible areas in the community are specified for each member according to one’s classification, specialization and role in the action teams.

3. FUNCTION

This software may allow the above mentioned range of activities, but it is up to the administrators to determine its function precisely and adjust it to the special character of the community they want to realize. The members’ duties and responsibilities are the following:

3.1 Administrators

The administrators of the virtual learning community are responsible for the most crucial choices regarding the operation of the community and the specification of the processes concerning the treatment and channeling of information. Below we outline the steps they should follow: 1. Analysis of educational aims, posting and updating of information on the initial page, 2. Specification of internal communities and creation of files. Administrators must specify the criterion determining the constitution of internal communities as well as the basic topics to be discussed, 3. Registration of users, classification in communities and determination of the accession rights and responsibilities for each participant (administrators, moderators, members), 4. Selection of subject matters and appointment of members responsible for the presentation and upgrade of these units, 5. Creation, distribution of, and comments on questionnaires.

3.2 Moderators

Some members act as moderators. This involves some special rights. One of them can create a closed action team by selecting its members from the members’ registration board. The aim and constitution of this team are determined by the moderator. Such aim may include the analysis of a subject matter of special interest, the assignment of written work (i.e. essays) to the members of the team, and the evaluation of its members’ work. The same or different moderators can create several closed teams in order to produce a comparative study of a subject or the parallel development of parts of the same study. Moderators are also responsible for posting progress reports on the community’s board of announcement, for marking all written work and for its classification in the environment’s virtual library.

3.3 Members

Members can act within the communities or the closed teams. They have access to a wider community, to the environment of their subject matter, to the announcement boards, and to the community’s library. Every member has at his/her disposal a personal pad where the member writes down his/her remarks. Besides, a member can communicate with any other via the internal email service.

4. IMPLEMENTATION

4.1 School unit

The logismic VirCom-LT imparts a new educational mentality to all users through. More specifically: 1. allows the links between classes and specializations so that they form communities of different types, 2. facilitates not only communication and exchange of views but collaboration, assessment and evaluation of
information, examination and negotiation of meanings and thus the construction of knowledge, 3. allows the interdisciplinary approach in material presentation, discussions and essays, 4. places school at the center of a wider team which includes parents, professionals and teachers which have different roles in the school learning process.

4.2 Department of education

The use of this logismc makes clear its underlying educational policy. More specifically VirCom-LT: 1. allows the creation of communities in-service teachers and student-teachers where the upgrade of knowledge goes together with the evaluation of professional experience and the theories of learning are viewed in connection with everyday teaching praxis, 2. supports the creation of probationary action teams aiming at the parallel treatment of subjects, the comparative study of results and the building of knowledge through collective action, 3. favors the adoption and familiarity of teachers with new roles in the educational practice (facilitator, moderator, colleague, fellow student), 4. enables a department of education to set up and transmit an educational policy to school units through in-service teachers.

REFERENCES

ADVANTAGE OF ANONYMITY IN MUTUAL-AID ON THE WEB: OVERCOME PREJUDICE AGAINST NON-CONFORMING MARRIAGE STYLE IN JAPAN

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ABSTRACT
This paper indicates the effect of anonymity in the context of knowledge sharing among web communities. When treats web-based community around marriage and surname issue. We classified the communities to four kinds. From the interview and case study, log analysis, anonymous mutual-aid community has advantage to the personal, sensitive problems and also overcome the difficulty causes from prejudice.

KEYWORDS
Anonymity, Mutual-aid, non-conforming issue, prejudice, knowledge sharing

1. INTRODUCTION
The purpose of this paper is to indicate the effect of anonymity in the context of knowledge sharing among participants of web communities. When encounter personal, delicate and non-conforming problem, what shall we do? Ask your friends by your name? Or ask for Google to search for the same cases?

Anonymity has been thought as irresponsible and cause of “flaming”. At the same time, however, when one asks questions in existing relationships, there shall be prejudice formed by needless attribute information such as gender, race, disease, and so on. This paper surveyed “marriage and separate surname” issue in Japan, which is not allowed by civil law, but commonly increasing demand. We did case study on three kinds of web-based communities related to the issue, then evaluated them by its credibility.

2. CASE STUDY ON MUTUAL-AID ON MARRIAGE ISSUE

2.1 Method and approach

2.1.1 Case Study and Working Hypothesis
Our approach can be called action research, a kind of case study (Yin,1994). In these area, the research approach forms the cycle of design science behavioral science. As for behavioral approach, we did interview and analysis of BBS logs, attend meetings and analyzed newsletters. The subjects are gender ombud provided by local government, civil groups, personal BBS and Q&A services. We created our own website which contains blog, BBS and pointers to administrative information.

There we classified three kinds of groups; real-name based, handle based, and anonymity based one. Working hypothesis are as follows;
H1: real-name and handle based communication brings more credibility than anonymity based communication
H2: anonymity based communication decreases barrier to disclose sensitive, personal situation

2.1.2 Non-conforming case: keep surnames after marriage in Japan

In Japan, 98% of married couple choose husband’s surname. With an increasing number of women who remain in the work force following marriage, some couples have started to keep their respective surnames after marriage (Hisatake, 2002). As a result couples trying to keep their surnames under the current restrictive legal system choose mainly two ways: retain the woman’s maiden name as the name by which she is known at her work place or de facto marriage.

When selecting this style of marriage, keep both surnames, there are two problems. The first problem is misunderstanding and prejudice at the clerk. Social services do apply to de facto marriages in part but as there is room for interpretation by the clerk, handling of each case may be somewhat different (Orita, 2004). The second problem is the prejudice against women that women should be absorbed to husband’s family, which strongly remains especially in the countryside.

2.2 Type of the communities

Mutual aid, such as post and answer to questions on the web, encouraged them by collecting legal evidences and precedents to increase bargaining power at the clerk. From the log analysis of BBS and interviews, we found that not only friends but also ad hoc communication brought useful advice. From interviews, some civil group members attending meetings said that when they have troubled, if the problem is too personal and sensitive, they post questions on the Internet by different name or anonymously. Thus, we classified communities as follows by the treatment of identity.

Real-name based community: Public ombud, regional civil groups are mainly corresponding to this. They require registration by real name to join both online and offline communication.

Handle based community: Personal BBS, blogs and a kind of Q&A service are corresponding to this. Participants need not disclose all the real attribute online but require to use sustainable handle to be identified.

Anonymous based community: Personal BBS, comments of blogs and a kind of Q&A service are corresponding to this.

3. EFFECT OF ANONYMITY: EVALUATING HYPOTHESIS

3.1 Credibility

To evaluate H1, especially compare the effect of anonymity, we analyzed the data of Yahoo and Goo Q&A services for a year (from July 2004 to July 2005). Figure1 shows the result. We choose “de facto marriage” and its related words, “separate surnames” and “cohabit”. “Separate surnames” are often used in gender area and “cohabit” includes both positive and negative meanings. Yahoo allows anonymity but Goo requires ID to post question and answers. At first, we assumed that Goo provides more accuracy. But as the result, in the two words, Yahoo, anonymous platform shows lower incorrect answers. Goo has interactive function, which may cause complicated “cohabit” answer be relevant.
3.2 Barrier to disclose sensitive, personal situation

To evaluate H2, we analyzed the relationship and effect between kinds of communities and each problems (Table 1). As for real-name community, sensitive problems are not solved there. Anonymous, especially designed as Q&A specific platform, showed the advantage in posting both questions and answers.

<table>
<thead>
<tr>
<th>Use of maiden name</th>
<th>Real-name</th>
<th>Handle</th>
<th>Anonymous</th>
<th>Anonymous(Q&amp;A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>De facto marriage</td>
<td>weak</td>
<td>Yes</td>
<td>Yes</td>
<td>Strong</td>
</tr>
<tr>
<td>Illegitimate child cohabit</td>
<td>None</td>
<td>Yes weak</td>
<td>Yes Strong</td>
<td>Yes Strong</td>
</tr>
</tbody>
</table>

4. DISCUSSION

Face to face communication has been thought to be better to computer mediated communication (CMC) because of lack of social context of CMC(Kiesler,1984). Moreover, we added how to abolish prejudice and stereotype(Brown,1995). Anonymity, in this context, saves privacy of who ask questions, and who answers to it that encourage anyone communicate with. Traditionally, community has been sustainable support and empathy but meanwhile, keeps participants to disclose sensitive privacy.

From our study, we argue that to share tacit knowledge (Nonaka,1995), it is necessary to design platform to make the use of anonymity, not only real-name, handle based communication.

REFERENCES

PERSPECTIVES ON WEB-BASED E-HEALTH MODELS FOR EDUCATIONAL COMMUNITIES

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ABSTRACT
As society progresses into a new era of health information, health providers of educational institutions are exploring the notion of implementing an online electronic health platform at educational institutions. Students would be able to login to this system through the Internet and perform various tasks such as scheduling appointments with physicians, and viewing/updating their personal health records profile. One of the tasks for this conceptual stage is to evaluate society’s responses toward this web-based e-health venture. Dalhousie University students have been chosen as the convenient sample. Their perspectives on a virtual e-health technology are delivered through surveys that have been conducted on campus. The main results illustrate that the public is keen on the implementation of this model, and would like to have access to their personal health information online. However, their primary concerns revolve around Internet security and privacy, making them slightly reluctant in adopting an online e-health system at educational institutions.

KEYWORD
Electronic health, students perspectives, responses, security, privacy, consent, data access, health information, Internet, Dalhousie.

1. INTRODUCTION
Numerous global organizations are taking initiatives to improve the quality of health care services by undergoing the transformation of paper based data to digitized records in a database. Advances in this technology include accessing their e-health records through a web portal for patients and booking medical appointments with health care professionals. Modernizing the health system will eventually reduce costs and errors, enhance the clinical workflow practice and increase overall efficiency with a more complete and rapidly available patient data. In addition, the e-health model promises to offer consumers an opportunity to better manage their own health care.

As a result, there exist facilities that can fully exploit the benefits of this technology, such as the health centers in educational institutions. They are exploring the notion of implementing an online electronic health platform at universities. Students would be able to login into this system with the Internet as a medium and perform various tasks such as scheduling appointments with physicians, and viewing/updating their profile regarding their personal health records.

2. HYPOTHESIS
According to a study carried out by Jones et al., 86% of college students go online daily and they are early adopters and heavy users of the Internet [3]. Based on this fact, school health providers can assume that students will be open and willing to adopt this e-health concept as a hypothesis. Nowadays students are utilizing modern technologies and the Internet in their daily routine. For example, they purchase books and airline tickets online, register for courses online, even access banking and other financial information online. In addition, students also share and access via web their personal information, such as addresses, contact numbers, etc. This illustrates that students are fairly comfortable having their personal information online,
despite their awareness of a lacking robust Internet security. Numerous fraudulent activities have occurred in the past, where personal data have been hijacked online. Despite these cases, students continue using the Internet for their daily activities. Based on this, a hypothesis can be formulated that students would also be willing to access their personal health records online. On the other hand, this theory can be falsified by the fact that students view their personal health information as the most sensitive information available which can be misused for fraud, malpractice, and other misdeeds.

Based on this relationship, a logical assumption to make is that students are moderately comfortable in providing their health information for the creation of a web-based e-health system. Moreover, they will be accepting to adopt an e-health system at school and harmonize it with their ‘digitized’ life.

3. METHODOLOGY

To confirm the above hypothesis, one of the primary tasks for this conceptual stage is to evaluate society’s responses toward this e-health technology. It will determine whether the educational health centers should proceed with the proposal of implementing a virtual e-health system at schools and if it is desirable by the targeted audience. Particularly, Dalhousie health services center will know whether the students are interested in adopting an online e-health system and how their health care services will be affected by it.

The subsequent stage is constructing a suitable research design that will provide adequate suggestions and attitudes from individuals regarding an online e-health implementation. A systematic test model has been developed to prove that the predicted students’ attitudes toward e-health system are consistent with the theoretical knowledge provided earlier.

The initial step of the research framework is to define the target population for this hypothesis. The health care facilities are targeting the students at the university level. The 13,612 students at Dalhousie are the primary focus population. The most essential characteristic that the category sample must have is being a full-time or part-time student at Dalhousie University. Afterwards, a random selection has been applied on the sample of 60 students, representing 0.44% of the total population. Every member in the Dalhousie population has the same probability of being selected, and the selections are independent from each other. This type of sampling would avoid any bias of experimenter or selection of group.

The general function that would best describe the hypothesis is based on several variables such as their Internet time usage, the level of trust in submitting personal data online, and how sensitive the students are toward their personal health records. Hence, questions in relation to these factors have been incorporated in the assessment of the public’s opinion.

The testing framework then addresses the defined function of this experiment along with its variables during the design stage of the survey. The questionnaire poses the current trends of student’s activities online, the Internet security for personal information, and the risks that are associated with an e-health implementation.

A field study has been primarily applied for the experimental environment. Written questionnaires have been distributed around the Dalhousie campus, including the health services center. This course of action has been taken to target the type of students who may less frequently use the Internet. The online version of the survey has been announced by posting ads in various lobbies of campus buildings. As well, it has been emailed to a student listing at Dalhousie University. Unfortunately, the overall response rate is considerably low, considering the number of students this questionnaire has been sent out to. This rate is somehow predictable since the general population may not be interested or motivated in participating in surveys.

There are several threats to this experiment that are observable and should be taken into consideration. A possibility exists that the participant’s comprehension to this survey may differ from the experimenter, hence justifying the various results. They can be also affected by the surrounding conditions when the individuals are conducting the survey. Good-subject tendency or evaluation apprehension can play a role in the results. In addition, the results can vary from a laboratory environment to a ‘real world’ setting in which the questions have been posed to the students.
4. RESULTS

During the administration of the questionnaire, 60 respondents have been collected. A significantly higher response rate is found with the online survey than the written version, and this can be explained by the availability, popularity and convenience of the Internet.

The average hours that students spent online are 3 to 5 per day, represented by 84% of the sample. 45% of the respondents are ‘somewhat comfortable’ in providing their personal information online, and 40% trust the Internet as a secure medium of information transmission. Security of the Internet has been rated as the most significant concern of the sample. Approximately 68% of the population would like to have access to their personal health information online, and 63% think that health centers at schools should adopt an online e-health platform. Features including booking appointments, questions/answers forum, and access to personal health information are the top three suggestions for a virtual e-health system.

5. DISCUSSION

The results justify the initial statements and assumptions proposed by the health centers at school. Students are utilizing the Internet for several activities such as online banking since they are moderately comfortable in giving and having access to their personal information online. A majority of the students have agreed that the school’s health facilities should have an online e-health system with supporting features such as accessing personal health information, scheduling appointments with health professionals, and conducting a health discussion forum and interactive games. The students are keen to have access to their personal health information, as long as the security of the Internet is robust.

However, there is a minor percentage of students who replied negatively toward the adoption of an e-health system for Dalhousie. They suggested that booking appointment is a good feature to include, but not accessing personal health information. This can be explained by the fact that students consider their personal health information as extremely sensitive and they believe that there is a lack of security/privacy associated with the web.

6. CONCLUSION

Overall, the viability and prospects for this web-based e-health venture appear to be an excellent approach to reinforce the importance of high quality health care and services to students at educational institutions. The development of an e-health platform will surely be a challenge initially, but it will greatly impact and transform the health care communities’ infrastructure and strategies at school for the better in the long run.

APPENDIX

The survey can be found online at: www.cs.dal.ca/~asharma/survey.htm

REFERENCES

COMMUNICATION PROBLEMS IN A VIRTUAL LEARNING ENVIRONMENT

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ABSTRACT
Virtual learning environments are frequently used as support of a traditional educational process in classrooms and computer labs. These sophisticated systems also provide communication tools that can be exploited by both teachers and students whom together create virtual study teams. Unfortunately, these teams have significant problems with the utilisation of the provided tools. This paper is primarily focused on the explicit identification and description of some non-technological communication problems. Nevertheless, some recommendations of how to overcome these barriers are outlined. However, these recommendations have to be substituted by a more complex and systemic solution in the near future.

KEYWORDS
E-learning, virtual learning environment, communication problems, motivation.

1. INTRODUCTION
Fast development of information and communication technologies (ICT) leads to their use in many different areas of our lives. ICT are utilised in business, public administration or in educational institutions. This situation is closely related to the existence of knowledge economy, where, for example, single companies utilise ICT to fulfil their operational and strategic objectives or physical teams can become virtual (Tapscott, 1999). These transformations can also be applied to universities, where, in connection with e-learning, the creation of virtual classrooms and virtual study teams occurred several years ago. Usually, enablers of this shift are virtual learning environments (VLEs) that are plentifully utilised. This utilisation of an e-learning approach is also, very often, focused on the support of a traditional approach to an educational process. Despite some years of experience, traditional “stone” universities suffer from problems connected with communication in these virtual classrooms. Described communication problems were identified during the deployment of a VLE WebCT at a faculty with an orientation on management and informatics.

2. IDENTIFIED PROBLEMS WITH COMMUNICATION TOOLS
The faculty has been focused on the support of an educational process by e-learning since 1997. E-learning has been supported by WebCT at the faculty for several years. 74 e-courses were created, presented and used in the year 2004. If we consider the size of the faculty, the system is relatively widespread. Nowadays, almost 80 e-courses are in the process of creation, e-courses are created by 40 teachers and there are more than 10 000 student places (Annual report, 2004). The main point is that the aim of the majority of these e-courses is to support traditional subjects that are taught in classrooms or computer labs.

One of the basic and general assumptions of a successful educational process is the sufficient realisation of communication processes that lead to an interchange of information and sharing of knowledge. WebCT offers for this purpose several communication tools (CTs), which are Whiteboard, Chat, Discussions, Mail, Calendar and Student tips.
In comparison with the usage of e-courses in a standard e-learning approach, the way in which they are utilised at the faculty, causes a high volume of problems. Combination of these tools with a traditional educational approach based on teaching in classrooms causes effects that trouble all the people involved. Due to space limitation of this paper, only examples of the most frequent and widespread effects are outlined.

2.1 Tools for synchronous communication

Whiteboard and Chat are CTs for synchronous communication. However, their support of a traditional educational process is doubtful. One of the main advantages of e-learning is a possibility for students to study whenever and wherever they want or need. The limitations are usually only presented by task deadlines and the semester period (Olševičová, 2005). Nevertheless, these CTs force students to be a definite time and place (i.e. behind a computer either at home or in the computer lab at a time that is defined by the teacher). It is not possible to use the computer, when it is more suitable for them. Although the CTs for synchronous communication are frequently utilised, the advantages of e-learning are decreased and in this sense they lose their significance. Unfortunately, they are also perceived in this way by students, who are therefore more resistant to them.

2.2 Tool for asynchronous communication

Discussion and Mail are in WebCT considered as tools for asynchronous communication. Their advantage is an absence of the problem that was described in the previous paragraph. Students can use them whenever and wherever they want. The greatest problem related to Mail is the parallel utilisation of an email account that is possessed by every user of a university computer network. The result is that students do not know which email they should use, and therefore they send some messages with both mail services at the same time. Consequently, teachers have to check two emails and students can not know where to find an answer. Although some teachers try to realise all the communication related to a given subject only with the help of CTs in WebCT, it is always possible to find students, who have not noticed this fact or who simply ignore it.

Quality of a discussion is always dependent upon selected discussion topics. The greatest problem is the unwillingness of students to publish their attitudes and opinions. Another problem is the relatively high percentage of contributions with topics that do not belong to the discussion thread. Of course, it is possible for the teacher to moderate the discussion and erase unsuitable contributions. Unfortunately, this procedure discourages students from further publishing and does not ensure absolute homogeneity of the thread. The reason is that only a whole contribution can be erased. In the case of a relevant article, where only one paragraph does not correspond with the topic of discussion, is this procedure inapplicable.

2.3 Calendar

Calendar is sometimes considered as a tool for course management (Poulová, 2004). However, WebCT offers it as a CT. Therefore, it should be utilised in this way. Despite its construction which enables students to add entries into particular days, it is only used for teacher-to-student communication. Regrettably, the one-way communication process is not sufficient and suitable enough for a high-quality education process.

2.4 Student tips

Student tips are used very rarely as CT. There are two main reasons. Firstly, man is a social creature creating social groups. Therefore, it is more natural for students to discuss and share their experience and tips or provide advice face-to-face, instead of substituting this natural communication by an information system. Secondly, some students do not have a need to share their experience or knowledge. This is a typical social barrier of knowledge sharing that is well known in knowledge management (Bureš, 2003).

A common problem that is related to all the mentioned CTs, is the endeavour of some teachers to utilise as many of the tools as possible. Then, students have to communicate with several tools at the same time and it makes them more resistant and confused. The reason is that it can be difficult for students to monitor the content of all CTs and they can not know which tool has the higher priority or is more suitable to use.
3. PARTIAL SOLUTIONS AND FURTHER STEPS

Although WebCT has been utilised for several years, described problems have appeared at the beginning of its exploitation and a lot of teachers have been involved, a sufficient systemic solution of these problems still does not exist. Nowadays, only partial solutions or recommendations for the described and other problems, developed by individual teachers, are available. Examples include:

- Selection of a limited number of CTs that would be utilised intensively.
- Positive support of communication (e.g. acquiring points for credits by using CTs).
- Negative support of communication (e.g. restrictions for not using CTs – this is more of a possibility than a recommendation).
- Deliberate selection of single topics like Chat or Discussion.
- Interrelation of particular CTs and other tools in VLE (e.g. discussion about tasks, chat-based tasks, etc.).
- Every communication related to a given subject can be realised only with CT in VLE.
- To pay special attention to CTs during the students training of VLE, etc.

It is obvious from the extent of the paragraphs above that nowadays there are more problems than solutions (even if we consider that the described problems are only examples and frequent technical problems are not mentioned here). The reason is that partial solutions are not interconnected and do not represent a complex system. That is why, it is necessary to start an internal project with all the interested teachers and to create a more complex and general solution. One component of this new solution can be for example a motivational program for students, since positive students’ motivation was identified as one of the key aspects of the majority of the identified problems.

4. CONCLUSION

The utilisation of VLE as a support and completion of a traditional educational process causes certain problems. Most of them are connected to CTs. These problems need to be overcome. Unfortunately, nowadays only partial solutions exist. A complex and systemic solution that would increase both the quality and quantity of the utilisation of these tools, still does not exist. This is the direction, in which it is necessary to go in the near future – to start an internal project, where all people utilising a WebCT environment and interested in the solution of existing problems will be involved.

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P2P NETWORK TO FACILITATE STREAM CONTENTS DELIVERY ON THE WEB

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ABSTRACT
We propose a quasi-broadcast platform for contents delivery over the Internet by applying newly defined reverse-query mechanism on existing P2P network. Under the percolation theory to propagate the reverse-query message, our simulation shows that our model will cover more than 80% of all the clients, while reducing the total traffic generated by relaying reverse-query messages.

KEYWORDS
P2P Network, Percolation Theory, CDN, Power-law Distribution, Broadcast

1. INTRODUCTION
Digital broadcast began in December 2003 in Japan, and standardization activity for server type broadcasting expects breakthrough for digital contents market demand. With emergence of newly developed web applications in cooperate with such broadband contents delivery services, people can enjoy any contents which satisfy their own lifestyle anytime anywhere from a huge amount of contents archives beyond existing TV broadcast.

Although we are looking forward to rapid growth in broadband contents demand on the web, the total throughput of stream delivery will be determined by any bottleneck somewhere between contents provider to consumers, which is so-called “Middle-mile Problem.” On the Internet, CDN(Content Delivery Network) architecture [1], and contents distribution algorithm for replication [3] are actively studied for this problem. But those solutions hold difficulty because the number of acceptable simultaneous access is almost determined by hardware specification of cache servers, which falls into enormous facility distribution for supporting a large number of clients accesses.

This study aimed for overcoming this problem by building our proposed overlay network over the Internet, and managing generated traffic under our control, to be a new quasi-broadcast platform. We develop new contents delivery architecture for broadband contents, based on the fact that many link status on the Internet follows power law distribution [2].

In this study, we employ percolation theory [7] that is mainly studied in physics, to model the “message propagation” for contents delivery over the pure-P2P network. In other words, the query message released by clients seeking for requested contents is not merely used for this purpose, but we define a new “reverse-query” message to find any client who needs a certain contents. This will lead to reduce the explosive P2P query traffic while maintaining fairly high clients cover rate over our proposed overlay network.

2. REVERSE-QUERY MECHANISM

2.1 Algorithm
The message structure we propose for our model essentially consists of messageID, relay probability, TTL,
contents name, attributes, source node IP, clients IP who downloaded the contents. Initially, this message is released by origin server to randomly selected first peers, and the first receiver peers will compare the attributes of the contents with its own preferences, and if they match, it will pull the contents file from the initial server. Then, the peer will forward this message to its neighbors after implanting its own IP in the message, according to the relay probability in the message. Each receiver peer repeats the same transaction, to cover almost whole network within a certain period of time. An outlook for our model is shown in Figure.1.

![Percolation on the P2P Network](image)

### 2.2 Percolation on Generalized Random Graph

The percolation behavior on generalized random graph can be led as follows [4]. Suppose the degree distribution of each node be \( \{ p(k) \} \), then the general function of this distribution can be defined as:

\[
G_0(x) = \sum_{k=0}^{\infty} p(k)x^k
\]

(1)

Suppose the vertex distribution of connected component on generalized random graph holds general function \( H_0(x) \), and general function for the size of connected component from a certain branch to be \( H_1(x) \). Then the average size of connected component \( \langle |c_0| \rangle \) to be

\[
\langle |C_0| \rangle = H_0'(1) = 1 + G_0'(1)H_1'(1) = 1 + \frac{G_0(1)}{1 - G_1(1)}
\]

(2)

The state transition will take place when right-hand side becomes 0,

\[
G_1'(1) = 1 \Leftrightarrow \sum_k k(k - 2) p(k) = 0 \Leftrightarrow \frac{<k^2>}{<k>} = 2
\]

(3)

The percolation threshold can be

\[
q_c = \frac{1}{<k^2>/k} - 1
\]

(4)

We can say that almost all node will receive the transferred messages when each node relays received messages on probability more than \( q_c \).

### 2.3 Evaluation

By considering scale-free nature that pure-P2P network holds, we analyzed how the message “percolates” over the power-law overlay network. In order to evaluate our proposed model, we prepared a random network with a power law link distribution generated by Pajek [5], and implemented our algorithm on R environment. This overlay network is generated based on generalized BA model, which presumes that every vertex has at least some baseline probability of gaining an edge, to generate edges by mixture of preferential
attachment and uniform attachment [6]. For generating condition, we set the total node number $N = 1000$, $M_0 = 3$, $TTL = 25$ and average degree $= 2.7$. In order to evaluate the results, we counted the number of generated messages (= reverse-query) and cover rate (= how much of nodes receives the reverse-query) upon relay probability implanted in the reverse query message.

![Simulation Results](image)

Figure 2. Simulation Results

Figure 2 shows a typical example of message propagation over this generated overlay network. The propagating message will cover almost 80% of nodes upon relay probability 0.08, and the total traffic increases linearly. After several hops of relaying messages, the copy of message body will just go out from the P2P network by using up the TTL, and this will lead to reduce the explosive P2P query traffic while maintaining fairly high clients cover rate over our proposed mechanism.

3. CONCLUSION

In this study, we employ percolation theory to model the “message propagation” for contents delivery over the pure-P2P network. We defined a new “reverse-query” message to find any client who needs a certain content and try to apply the percolation theory to prevail the message over the network. We analyzed validity of the model through dynamics of simulation. This concludes that our proposal is effective for contents delivery over the Internet.

For commercial application example, we can attach a small video clip in the reverse-query message, which is possible to use this contents delivery mechanism as propagating electric flyer all over the clients, just like a quasi-broadcast platform.

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EVOLVING AN EXISTING WEBSITE INTO A WEB COMMUNITY PORTAL IN ORDER TO PROMOTE ALUMNI NETWORKING: UNIVERSITY OF JOHANNESBURG (UJ) CASE STUDY

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ABSTRACT

The establishment and nurturing of mutually beneficial relations between a university and its alumni, as its primary stakeholders, should be a top priority for any Higher-Education institution that wants to prosper and grow in a fast-changing and highly competitive market. In a recently completed research project (constituting the first phase of a longitudinal study), Barnard (2004) investigated Information Dissemination to Alumni of the University of Johannesburg (UJ) as a newly merged institution. The research results indicated that respondents wanted the Alumni Office to establish contact with them via electronic means (email, Web, etc.). This paper introduces the second phase of the longitudinal research project. The perceived “one-size-fits-all” notion with regard to communication and information sharing with stakeholders in tertiary institutions will be placed under the spotlight to explore more customised options. One such option is to establish an online community portal for alumni of tertiary institutions whereby a customised approach could be taken in terms of information content, communication, context and commerce in accordance with the mission and vision of an alumni organisation.

KEYWORDS

Web Based Communities, Portal Technology, University Alumni

1. INTRODUCTION

The establishment and nurturing of mutually beneficial relations between a university and its alumni, as its primary stakeholders, should be a top priority for any Higher-Education institution that wants to prosper and grow in a fast-changing and highly competitive market. The alumni of a tertiary institution could be one of the most valuable resources of the institution, due to the contributions, whether those be financially, strategically or socially, that they could make towards the credibility and longevity of the institution. The input they could have in terms of institutional fundraising activities, institutional council representation, networking and community development could significantly contribute to the strategic positioning of the institution as a market leader in the South African Higher-Education sector. Furthermore, the alumni’s potential for becoming the primary candidates for lifelong learning at the institution should also be recognised and encouraged, to the benefit of all parties concerned (Barnard, 2004).

Interactive information dissemination should stand at the core of the relationship building activities to be initiated by the alumni office of a tertiary institution. Web technologies and services could be employed as cost-effective and timely media in this networking process to reach the greatest number of intended recipients.
of the relevant information. These technologies could possibly also facilitate an interactive environment in which information could be disseminated and shared freely.

In a recently completed research project (Barnard, 2004) with regard to Information dissemination to Alumni of the University of Johannesburg (UJ), it was determined that a total of 98.2% respondents wanted the alumni office to establish contact with them. The vast majority (86.7%) of respondents preferred to receive the information by means of electronic mail or by means of the World Wide Web (i.e. websites). As was clearly reflected in the research findings, the alumni target audience of the UJ forms part of a privileged section of the South African population. The socio-economic circumstances, the levels of education, the language capabilities and the accessibility and usage of Web technologies by this group secure a most favourable position with regard to the global and national digital divide. This, in turn, affords the alumni office of the UJ with an opportunity fully to explore and exploit the information-sharing options offered by these technologies.

The integrated network approach of relationship management could give an organization the opportunity to create a win-win situation (Galbreath, 2002) for all stakeholders involved. According to Ihator (2001) technology has changed the relationship and power structure between organizations and its publics, stakeholders and the media significantly. It has become extremely difficult for organizations to define and segment these audiences as, for example, Internet audiences are widely spread across geographical, cultural, and economic boundaries. This makes the packaging and dissemination of information a much more challenging task as information needs to be generic enough to be commonly understood, but also needs to be personalized in such a way that it still addresses the different audience segmentations effectively. However, the identification and profiling of target audiences is critical for successful information dissemination as this knowledge will guide the information managers within organizations to compile relevant (to the target audiences) content and package the information in such a way that is most suitable to the needs and resources of the targeted group.

This paper introduces the second phase of the longitudinal research project. The perceived “one-size-fits-all” notion with regard to information sharing with target audiences of or stakeholders in tertiary institutions will be placed under the spotlight to explore more customized options. One such option could be to establish an online community for alumni of tertiary institutions whereby a customized approach could be taken in terms of information content, dissemination, context and commerce (Von Campenhausen & Lubbe, 2002) in accordance with the mission and vision of an alumni organization. According to Szmigan & Reppel (2004) online communities allow and encourage conversations that are of value to all involved as these communities can exist beyond boundaries of location or time. Not only do they foster the potential to promote business-to-consumer interaction, but also consumer-to-business and consumer-to-consumer interaction. “The power encapsulated in the community bonding framework comes from the interrelationship of service value with technical infrastructure and interactivity between participants” (Szmigan & Reppel, 2004).

2. RESEARCH PROBLEM STATEMENT

The proposed research project would serve as a second phase in a longitudinal study as it would take the research findings of the first phase as a starting point to address the proposed research problem and sub-problems. The following research problem has been identified:

To what extent can an online community portal manage the information needs of alumni in the South African Higher-Education Sector (SAHES)?

To address this problem successfully the following aspects has to be investigated:
1. What is the value of alumni for the South African Higher-Education Sector (SAHES)?
2. Which components are characteristic of an online community and a portal?
3. To what extent will online community portals meet the information needs of alumni of tertiary institutions in the SAHES?
4. Case Study: Alumni of the University of Johannesburg (UJ):
   4.1. What is the need of UJ alumni to become an online community?
   4.2. What type of information should be available to the UJ alumni online community portal?
   4.3. In what way could a UJ alumni online community portal be facilitated?
4.4. To what extent can the existing UJ IT infrastructure (Oracle, WebCT, Corporate Website, etc.) be used as implementation vehicle?

4.5. What are the components of a generic conceptual model for an alumni online community portal?

3. METHODOLOGY

An extensive literature study was done to establish the theoretical foundation for addressing the research problem. An empirical survey will be conducted among all the Alumni Offices of the SAHES to establish the way in which they disseminate information to their Alumni and test their attitudes towards alumni online communities.

As part of a qualitative case study, a second empirical survey will be conducted among the alumni of the University of Johannesburg to determine their information needs with regard an online community portal and the content required from such a community model.

In addition, a conceptual prototype, which will be based on the analysis of the findings of the above empirical surveys, will be proposed.

4. CONCLUSION

An online community environment will offer alumni opportunities to re-establish contact with peers and nurture relationships with one another through frequent social interaction (chat). In addition to this, an online community portal will enable alumni to participate in B2B and B2C e-commerce activities and even exploit the possibilities of human resource-placements. The concluded best-practice model will have a significant impact on the information and communication methods used to build alumni networks to the benefit of both the alumni stakeholders and the Higher-Education institutions in South Africa. This will be a valuable contribution, as the sector is drastically different from the sector in first world / developed countries, however, not always acknowledged as such.

Although the alumni of the University of Johannesburg would serve as a case study for this project, a model for implementation would be proposed that could be tailored to the needs of other alumni organizations throughout the South African Higher-Education Sector.

In terms of inter-institutional collaboration, this research project offers a priceless opportunity to liaise and share information with other alumni organizations of the SAHES. This could result in successfully identifying a best practice model for managing the information needs of alumni stakeholder groups in the tertiary institutions of developing countries, which is significantly different from these stakeholder groups in first world countries. As a result, the employment sector of Higher-Education institutions in South Africa could gain from the research outcomes, as the proposed prototype will offer an ICT and Web-based solution which will be applied to the mutual benefit of the relevant stakeholder groups as well as the institutions.

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Doctoral Consortium
ABSTRACT

This paper presents an outline for an approach for automatically establishing communities of interest, that is groups of users sharing a common interest, based on implicitly collected data about how users use structured information sources (e.g., documents topically related to ontologies).

We want to test these ideas in the domain of open-source software development. We are planning to set up a portal for an open-source project providing and monitoring access to Javadoc documentation. Besides, the portal will provide features for identifying and interacting with other developers with shared development interests.

KEYWORDS

Communities of interest, social navigation, clustering, software development, Javadoc

1. INTRODUCTION

This paper introduces an outline for a novel approach for automatically discovering communities of interest (COIs) (Francq & Delchambre, 2005; Agostini, 2003). Such COIs are communities built around one or several common interests.

Our idea is to collect data about how users search for and consume material from a resource repository and to cluster that data. Based on the assumption that search for resources and resource consumption is guided by interest, data collected about search and consumption behavior will be analyzed, clustered and used to establish groups of users with similar interests. Ultimately, these groups should be utilized to establish cooperation and foster knowledge exchange between community members.

Our approach is based on the following assumptions. The resources are related to a structured and formalized set of concepts, e.g., an ontology (Fensel, 2000). The relations serve as an indicator for the semantics of the content. The set of concepts is representable as a graph such as a directed, acyclic graph or a tree, where nodes correspond to concepts and edges depict relations between the concepts. The content of the resource repository covers different interests.

We want to test this approach within the area of open source software development by looking at how developers make use of documentation for Java source code, so called Javadoc (http://java.sun.com/j2se/javadoc/index.jsp). For this purpose, Javadoc documentation will be made centrally available in a Web portal for developers providing features for presenting COIs and interacting with COI members.

Section 2 will explain the problem background and why such a system can be useful for developers in (physically distributed) development projects. Section 3 will elicit the approach in more detail. Next, section 4 will present related research efforts. An outlook to future work and a discussion will conclude this paper.
2. BACKGROUND

Software developers often face problems that other developers have already encountered and solved. Getting in contact with such developers can save time, resources and cost by either sharing or cooperating to find solutions. However, finding the right person is not a trivial task. Agostini & colleagues (2003) have found that though knowledge exchange within project groups in a large company might work well, knowledge exchange across organizational borders like project groups might be insufficient. The problem is aggravated when it comes to global software development like open source projects (German, 2003) or projects in large, distributed companies. In order to find developers with the required knowledge, such projects employ digital communication facilities like email, mailing lists, forums, problem information management systems (Gao et al, 2002) or similar for posting problems and discussing solutions. This is a non-optimal solution:

- Users need to actively participate and search for information, which means additional effort.
- Such communication facilities might not be consulted until problems have indeed appeared and other developing resources, such as available documentation or source code, have failed.
- Postings usually relate to one specific problem in the context of a larger development effort involving various components and technologies. However, this context is rarely specified extensively.
- Authors of postings might no longer be part of the project or company. This holds especially for constantly fluctuating open source communities (Elliott & Scacchi, 2003).
- Often, digital communication facilities allow identifying the author of a piece of information, but rarely its readers. However, these might also contribute to problem solutions.

All this makes finding other developers with the knowledge required for solving a particular programming problem a difficult and time-consuming task.

3. APPROACH

Our goal is to assist software developers in finding others with similar development interests in order to improve software development processes. For this purpose, we want to design and implement components for building COIs. We want to test these components by embedding features for using COIs in a Web portal to foster development-related interaction between developers, thereby supplementing aforementioned digital communication facilities. Such features could be access to personal profiles of other COI members (“Who else is in my COI?”) or features for posting problems to all members of a COI (“Who in my COI can help with this problem?”).

The portal will require users to log in, which is a prerequisite for personalizing services. At the same time, it allows users to separate different development interests (for instance, different projects) by maintaining several accounts.

The portal will contain a Javadoc repository with keyword search facilities, both as a data collection mechanism and usage incentive (Javadoc itself doesn’t come with such facilities). Javadoc meets the demands specified in the introduction: the Javadoc pages serve as resources, with Java entities – classes, packages, etc. - being the formalized concepts which they are related to. The relations between the concepts (e.g. inheritance or “used by”) manifest themselves in links between the Javadoc pages.

There are several reasons for basing our approach on Javadoc documentation:

- Javadoc comes in the form of linked HTML pages and has a defined structure. It can be easily published on the Web and is, unlike e.g. multimedia items, accessible to automatic procedures.
- The standard, default Javadoc is freely available.
- There is a standardized way to create it from Java source files.
- It is a resource every Java developer is using regularly.
- It covers various, diverse development interests, such as APIs for networking, GUI development, or XML processing.
- Its structure can be represented as a graph, nodes representing concepts such as packages, classes, or methods. Mechanisms researched for Javadoc can be adapted to ontologies with similar structure.
• It is possible to define and consider distance between these concepts. For instance, a package is close to its contained classes, and a class is close to its member variables and methods.
• Fully qualified names of classes, packages, etc. have unambiguous meaning.

The portal should not require software developers to change their current software development practices. In order to reduce programming efforts, it should be based on existing tools, such as the open source products LibreSource (http://dev.libresource.org/) or Maven (http://maven.apache.org/).

Data about Javadoc usage can be collected via the portal’s access logs, minimizing user effort. Such access logs give access to visited pages, number of visits, or visiting order of links (Xiao et al., 2001). Besides, search keywords will be stored.

This data should then be clustered to yield COIs with high accuracy. There are different aspects concerning data representation, for instance granularity of the feature space (packages, classes, methods, etc.), timeliness and fading of interests, or representation structure. One idea would be to use a vector space model (VSM) (Salton, 1989) where each feature is mapped to a single dimension. However, this would not consider distance between different features. Viable alternatives are ordered, labeled trees (Zhang, 1995) of visited pages or navigation paths (Xiao et al., 2001). The representation also limits the number of applicable similarity measures (e.g. cosine measure (Wilkinson & Hingston, 1991) for VSM vs. the measures discussed in Xiao et al. (2001) and Zhang (1995)).

It is desirable to use a clustering algorithm that doesn’t require an a priori determination of the number of resulting clusters. Possible candidates are artificial neural network approaches like self organizing maps (SOM) (Ampazis & Perantonis, 2004), nearest-neighbor or mutual neighborhood algorithms (Jain & Dubes, 1988), genetic algorithms (Francq, 2003), or self organizing tree algorithms (Khan & Luo, 2002). WEKA (Witten & Frank, 2005) is an open source software providing a collection of machine learning algorithms and clustering tools.

Compared to the aforementioned traditional communication facilities, the envisioned system is expected to have the following advantages for developers. Besides log-in and account maintenance, no extra effort is imposed on users. Data for user accounts and COIs are kept up to date, even when there is no imminent problem. COIs can not only be used for solving problems, but also earlier, for instance, when it comes to discussing design ideas or forming project groups. The system monitors context in terms of which other documentation has been consulted and hence can consider information about developer background for building COIs. Finally, it includes information consumers as a valuable information source.

Thorough evaluation will have to show if the original goals of reducing development time and cost and improving software quality (Jung et al., 2004) can be achieved, too.

4. RELATED RESEARCH

Clustering (Jain & Dubes, 1988; Jain et al., 1999) is a well-established research discipline.

Social navigation (Svensson, 2003) refers to navigation that is driven by communication with other agents, be they human or artificial, to navigate an information space (Svensson, 1998). It is closely related to information retrieval. Some of the corresponding computer tools augment information with cues about the history of previous activities performed with that information. Wexelblat and Maes (1999) describe a system called Footprints that provides different tools visualizing augmented interaction history of the pages of a Web site.

In theory, COIs allow to create any kind of collaboration between their members (Francq & Delchambre, 2005). Kuechler and colleagues (2003) present an architecture for supporting structured and flexible descriptions of resources and of COIs. It is based on directory services and manually defined COIs. The MILK system (Agostini et al., 2003) supports COIs which are manually created and assigned to a topic in an ontology. Membership is established manually or partially induced by the system (the article doesn’t specify how). In both cases, effort is imposed to users through manual COI definition.

Rossmanith (2003) describes an approach for bootstrapping metadata for multimedia objects via user feedback. Users are grouped into interest profiles in order to maintain different points of view in metadata descriptions. The major drawback is that users need to subscribe to these profiles themselves.

The approach of Francq and Delchambre (2005) automatically establishes COIs by representing both users and COIs as term vectors derived from rated documents. This allows an easy way to compare users
with one another and even with documents. However, keyword approaches have problems with synonyms and homonyms. In addition, they do not take distances between concepts into account.

In Hofmann (2003), COIs are represented as latent variables and are computed via probabilistic Gaussian Latent Semantic Analysis of user ratings. Communities can be overlapping. The drawback here is that users are required to rate visited items.

Reichling, Schubert and Wulf (2005) propose an approach for matching human actors with similar interests based on latent semantic indexing of documents they have written. The approach works without relating documents to an underlying set of concepts. However, this comes at the cost of associated user effort.

Xiao and colleagues (2001) describe different similarity measures based on Web access logs and a matrix-based clustering algorithm. Again, distances between concepts are not considered.

In the educational domain, Hoppe and colleagues (2005) propose the usage of learning objects connected to an ontology for establishing contact between learners. Their procedure only considers immediate context and ignores user history.

Ontocopi (Alani et al, 2002) identifies communities of practice (COP) by analyzing relations of an ontology representing objects and relations in a domain of work, including the potential COP members. Our approach doesn’t need such a representation of users.

5. FUTURE WORK AND DISCUSSION

The project is still at the stage of inception. The next required steps involve design and implementation of a prototype and setting up a testing environment. Focusing on open source projects simplifies certain implementation aspects. For instance, access to source code documentation is open to everyone; nondisclosure is not an issue as would be the case in a company setting.

Once such an environment has been established, evaluation needs to follow. Both individual components of the approach (e.g., clustering procedures) and the overall system need to be evaluated. The prototype needs to prove that the introduction of COI features into software development projects is accepted by developers and has a positive influence on developers’ performance and software quality (Jung et al, 2004).

In the long run, the approach should be improved and tested with other resources, in other domains, and with other goals for COI internal interaction. Java class names not only appear in Javadoc, but also in other developer resources (mailing lists, tutorials, etc.), which could be utilized, too. Implementation of the presented ideas is not limited to providers of a Web portal – by setting up a proxy, companies might monitor Web access of their personnel to establish company-internal COIs.

The basic approach is domain-independent. Rather than on the meaning of represented concepts, it is conceived to operate on the syntactical level of the formalized, structured set of concepts in use, only. We have discussed plans for testing the approach in an educational setting, too, where COIs would have been built based on the usage of learning objects tagged with ontology-constrained metadata.to enable content recommendations.

In all these settings, privacy can become an issue and needs to be discussed.

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