Teaching MBA Students the Use of Web2.0: The Knowledge Management Perspective

Meira Levy

Deutche Telekom Laboratories@Ben Gurion University, and
Department of Industrial Engineering and Management
Ben-Gurion University of the Negev, Israel
lmeira@bgu.ac.il

Irit Hadar

Department of Management Information Systems
University of Haifa
Carmel Mountain 31905, Haifa, Israel
hadari@mis.haifa.ac.il

ABSTRACT

The new concepts and technologies of Web 2.0 attract researches in a variety of fields including education, business and knowledge management. However, while the Web 2.0 potential in the education discipline has been widely studied, in the management discipline the Web 2.0 business value has not been fully acknowledged. This research suggests an approach for teaching Web 2.0 concepts in a Knowledge Management (KM) course for MBA students, introducing the Web 2.0 potential within business context. The paper describes MBA students' perceptions and attitudes regarding Web 2.0 concepts and how they evolved while being engaged in Web 2.0 practices. The findings indicate that most of the students were only partly aware of the Web 2.0 environments benefits at first, especially within organizational context. Moreover, for some of them, participating in the course's social website required overcoming personal barriers. During the course, students gained new perspectives of the Web 2.0 phenomenon beyond its technological merits. Most of them acknowledged the potential of Web 2.0 within organizational context and embedded Web 2.0 principles in their KM final projects.

Keywords: Web 2.0, Constructivism, Knowledge Management (KM), MBA

1. INTRODUCTION

Web 2.0 is considered as one of the emerging topics that encompasses both technological advances as well as new business models. Lytras et al. (2009) define Web 2.0, as a perceived or proposed second generation of Internet-based services, such as social networking sites, wikis, communication tools, mashups and folksonomies that emphasize on online collaboration and sharing among users.

This social collaborative dimension of Web 2.0 offers ways to cultivate and exploit knowledge sharing in enterprises, providing new form for Knowledge Management (KM) (Kirchner et al., 2009). Large organizations are beginning to explore the potential of these new tools and concepts for KM across the enterprise (Anderson, 2007). Current KM systems, based on the original Web technologies, aim at eliciting employees' tacit knowledge, best practices and relevant experience and put this information in widely available, sharable platforms (McAfee, 2006). However, these systems provide communication tools (e.g. emails and instant messaging) normally connecting between limited groups on the one hand, and widely-spread centrally-created information (e.g. intranet and corporate website) on the other hand. Web 2.0 technologies and principles present new digital platforms enabling generation and sharing of knowledge in a distributed manner (McAfee, 2006).

While Web 2.0 applications are known to have potential benefits within organizations, their adoption is still rather limited (Lynch, 2008). The main documented reasons for this include human-related barriers and managerial aspects (Neus, 2001; Szybalski, 2005; Cosley et al., 2005). Thus, bringing Web 2.0 to its full potential requires exposing managers to the merits of Web 2.0 and how utilizing them can benefit their business, as well as bringing to their awareness the difficulties and barriers impeding the Web 2.0 adoption. This requirement establishes our research question: What educational settings are required for engaging managers in Web 2.0 application and how do they evolve the

mangers' perceptions and understanding of Web 2.0 benefits and barriers within organizations?

Following this question, the goals of this research are to (1) suggest a teaching method for the introduction of Web 2.0 concepts to managers, including experiencing these platforms and understanding their potential and barriers; and (2) examine these mangers' initial and evolving perceptions and skills with regard to Web 2.0 concepts throughout the learning process. The research was conducted in a framework of a KM course within an MBA program. The teaching method was developed based on the principles of the constructivist approach that advocates learning by engaging in an independent activity, in which new knowledge is gradually constructed upon their already existing knowledge (Papert, 1980). The research data is based on the students' activities and reflections that were documented throughout the course and qualitatively analyzed.

The paper is organized as follows: Section 2 presents the Web 2.0 principles and adoption within organizations, and the constructivist approach that served as our pedagogical base-line for developing the teaching method; Section 3 describes the research method; in Section 4 we present the research findings and discuss them in Section 5; finally, Section 6 concludes and suggests future research.

2. RELATED WORK

Web 2.0 concepts encompass major technological developments that characterize current Web applications (Anderson, 2007; Ullrich et al., 2008). There is a debate whether these technologies created a social revolution or if it is a natural evolution of the technology, since, according to the evolutionary favors, the concepts of Web 2.0 actually exist from the early period of the Web (Anderson, 2007). Nevertheless, there is no debate that the Web 2.0 technologies offer new opportunities for many areas, for example education and learning, software development, social networking and business. In this section we present the main ideas behind Web 2.0 technologies and their potential in organizational context, look into the current situation of Web 2.0 adoption within organizations, and set the theoretical ground for the teaching method of the MBA KM course.

2.1 Web 2.0 Concepts and Their Organizational Aspects

The principles of Web 2.0 are not new. The inventor of the Web, Tim Berners-Lee, explains that Web 2.0 works on the same ideas as the initial Web for connecting people (Anderson, 2007), and his original vision of the Web was the one of a "read-write-Web", where everyone could add and edit Web pages (Berners-Lee, 1999). However, taken together, the 'big ideas of Web 2.0' have reached a critical mass that transforms the way of publishing and information exchange so distinctively that the term Web 2.0 is warranted (Ullrich et al., 2008).

Anderson (2007) outlines the 'big ideas' behind Web 2.0. These core ideas include:

1. **Individual production and User Generated Content (UGC)**

Today's content generation tools, e.g. recoding with video cameras and uploading, are easy and accessible to users. Users can easily upload a video or photo from their digital camera and into their own media space, tag it with keywords and make the content available on the web. Individuals can set up and write blogs and work together to create information through the use of wikis. These tools have lowered the barrier to user entry and self-publishing.

2. **Harness the power of the crowd**

The power of the crowds is based on the concept 'wisdom of the crowd' coined by James Surowiecki, suggesting that problems can be solved more effectively by groups operating according to specific conditions, than even the most intelligent individual member of that group. This concept has been very influential on Web 2.0.

One of the key elements in the power of the crowd is crowdsourcing, which builds on the popularity of multimedia sharing websites such as Flickr and YouTube to create a second generation of websites, where UGC is made available for re-use. Another element is the Folksonomies: people using their own vocabulary in order to add explicit meaning to the information or object they consume.

3. **Data on an epic scale**

In the information age we generate and make use of ever-increasing amounts of data. This may cause a data overload and difficulties in retrieving the desired information. Many Web 2.0 companies claim to offer a way out of this, filtering the data to something more reasonable for the user to work with. Much of the data is collected indirectly from users and aggregated as a side effect of the ordinary use of major Internet services and applications such as Google, Amazon and Ebay. In a sense these services are 'learning' every time they are used. For example, Amazon records book buying choices, then mines and shifts this data to help provide targeted recommendations.

4. **Architecture of participation**

The key to understanding architecture of participation is to give equal weight to both, meaning that the way a service is actually designed can improve and facilitate mass user participation (i.e. low barriers to use). The architecture of participation occurs when, through normal use of an application or service, the service itself automatically gets better.

5. **Network effect**

The 'network effect' is a general economic term used to describe the increase in value to the existing users of a service, in which there is some form of interaction with others, as more and more people start to use it (Liebowitz and Margolis, 1994). One of the implications of the network effect and subsequent lock-in to technology products is that an inferior product can sometimes be widely, or even universally, adopted. Although economists provide much nuanced argument as to the details of this effect (Liebowitz and Margolis, 1994), it is a powerful driver within technology marketing as it is believed that a new product is

more likely to be successful in the long-term if it gains traction and momentum through early adoption.

In Web 2.0, new software services are being made available which, due to their social nature, rely a great deal on the network effect for their adoption; the motivation for joining MySpace, for example, is to have access to as many other young people as possible in order to find new friends with shared interests. Educationalists should bear this in mind when reviewing new or proposed Web 2.0 services and their potential role in educational settings.

6. Openness

The Web has always had a strong tradition of working in an open fashion and this is also a powerful force in Web 2.0: working with open standards, using open source software, making use of free data, re-using data and working in a spirit of open innovation. The apparent drive towards openness has to be tempered by the 'epic scale of data' that is being collected and aggregated, in non-standard ways, by commercial companies. There needs to be continual focus on open data exchange and the adoption of open standards.

McAfee (2006) discusses applying Web 2.0 applications within organizations, entitled Enterprise 2.0. He analyzes the main principles of the Web 2.0 in the context of their contribution to organizations. The original Web environments enable communication of two types – channels and platforms. Channels, such as emails, enhance person to person communication and are characterized by a rather low distribution. Platforms, such as intranets, enable wide distribution but are characterized by centralized generated content. Web 2.0, according to McAfee (2006), integrates and enhances these capabilities by providing new digital platforms for generating, sharing and refining information for enabling decentralized and collaborative work.

McAfee (2006) coined the acronym SLATES to indicate the six components of Enterprise 2.0: Search – discoverability of information; Links – between web pages for interconnections between enterprise content and enhancing search capabilities; Authorship – enabling accessing and writing for a broad audience; Tags – enhancing categorization of content by various employees and keeping track of useful web pages; Extensions – extend knowledge by mining patterns and user activity; and, Signals – alert users about new content and updates regarding their interests.

Briggs (2009) states that Web 2.0 fosters social norms that allow large groups of geographically scattered people to self organize and co-create value. In the new Web 2.0 business models, the traditional centralized value chain has evolved from product orientation towards system orientation. In the new value chain, the value resides in relations around the product outside the business and includes the customers as an inherent part of the chain.

However, the benefits of the Enterprise 2.0 can only be realized when put into proper use. McAfee (2006) warns that the use of Enterprise 2.0 technologies is not automatic and depends greatly on decisions made and actions taken by managers. Mainly, establishing a receptive culture that stimulates using the new tools, however, refraining from intervening too often; providing a common platform rather than distributed unconnected ones; enabling gradually evolving norms and culture evolution in an informal rollout rather than imposing explicit policies; and, providing managerial support and encouragement by serving as role models as users of the new platforms.

2.2 Web 2.0 Adoption within Organizations

A recent survey (Lynch, 2008) about Web 2.0 applications like social networks, blogs an wikis, among 400 companies, found that despite the fact that 44% of businesses understood the importance and value of these applications (Lynch, 2007) almost three-fourths (74%) acknowledged having only a "vague familiarity" with the technology. In fact, 41% claimed they had "no clear understanding" of "Enterprise 2.0" at all. Lynch (2008) also reports that 45% of the companies are using these tools in an ad-hoc manner, mainly adopting one of the tools, e.g. blog or wiki, apart from the rest of the organization, without integrating them with other existing infrastructure. Only 26% of the surveyed companies have taken a strategic approach to implement Web 2.0 technologies. The reason, as reported by 42% of the companies, is the difficulty to understand the Web 2.0 tools' business value. In addition, Lynch (2008) claims that traditional ROI methods that focus on dollar amounts are less applicable to Web 2.0 tools, which mainly encourage horizontal collaboration across the enterprise. The importance is to measure how these tools enhance functionalities and efficiency of business processes. Another problem that relates to the organizational adoption of Web 2.0 tools is the various stakeholders that are in charge of buying Web 2.0 applications (IT, management, or users). On the positive side, approximately 72% of the respondents believed that Web 2.0 tools could significantly improve collaboration. However, regarding the employees' willingness to work with these tools, the response was that it depends on the leaders.

Previous studies discussed the main barriers for successful adoption and use of wikis in collaborative KM. These barriers fall into four main categories: social, conceptual, technical and cultural.

The social barriers have to do with the wiki being less social as compared to discussion boards or emails, which are more conversational-oriented. Moreover, wikis are not social networks by their own, only when they fit into social networking platform (Neus, 2001, Szybalski, 2005). In this regard, Cosley et al. (2005) state that the biggest challenge is encouraging people to contribute quality work and trust each other to do the same, while creating member-sustained community as social network. Otherwise, the wiki will suffer from disuse or poor quality output (Fichter, 2005).

The conceptual barriers relate to the traditional view of knowledge structural hierarchy, which can only be created by an elite group of experts. This contradicts the wiki-oriented knowledge creation that is characterized with openness, where knowledge is created by self-managed and loosely organized group that collaboratively create high quality information (Skiba, 2005).

The technical barriers relate to destruction of knowledge, like vandalism or deletion, and fears of chaos that can cause resistance to adopt wiki environments within the business context (Udell, 2004; Raitman et al., 2005). Some claim that the unstructured nature of wiki can cause

knowledge retrieving and organizing problems (Kaser, 2005). Moreover, the wiki simplification, as compared to other rich web-based media, is considered by several users as a disadvantage (Raitman et al., 2005).

The cultural barriers address personal and organizational barriers. Personal barriers include the unwillingness to openly share knowledge, invite critique, and engage in dialog and negotiation with others while building content. According to Bolloju and Wagner (2005), the wiki's success depends on how an organization will value, promote and foster such an active and open exchange of ideas, based on individual contributions, especially, since wikis require users to contribute their knowledge, giving-up ownership and control of that content. In addition, many potential users view contributions to wikis as a waste of time, and thus refuse to participate (Barton, 2005). Organizational culture barriers include hierarchical, bureaucratic organizations where there is no management support for collaboration and sharing, lack of common goals across the organization, distrust between individuals and organizational units, and lack of "perceived benefits" or rewards to encourage collaboration (Hall, 1999). According to Dickerson (2004), even in open cultured organizations wikis are never adopted because the decision-makers, CIOs and CTOs, are reluctant to hand over control or adopt what they view as a chaotic system.

2.3 Constructivist Teaching Approach

The constructivist approach for teaching and learning is based on the constructivism cognitive theory that deals with the nature of learning processes. According to the constructivist learning approach, knowledge cannot be transmitted but has to be constructed by the individual. The students learn through personal experience rather than only by lectures or explanations (Skemp, 1971; Papert, 1980). The learners construct new knowledge while engaging in an independent activity in which new knowledge is gradually constructed upon their already existing knowledge (Papert, 1980). The learning process consists of an ongoing process where in every stage the mental models of the learners, which exhibit their existing knowledge construction, are refined and restructured (Leron, 1994). Leron and Hazzan (1997) term this process as "learning by successive refinement".

The constructivist teaching principles foster communication processes between teachers and learners, during which the learners build their mental models regarding the subject matter (Confrey, 1990). The control over the learning process shifts from the teacher to the learner, with the latter playing an active role in the learning process. Learning takes place in context and in collaboration and provides opportunities to solve realistic and meaningful problems. In contrast, the teachers focus mainly on preparatory activities and provide support in case assistance is needed. Consequently, the teacher is an initiator of, and an adviser in, the learning process (Ullrich et al., 2008). The teacher should encourage students to reflect upon their learning process for understanding whether the students have misconceptions with regard to the learning subjects, and adjust the learning process accordingly. The constructionism theory extends the constructivism theory further, advocating

for the need to build, inherently within the learning process, a real external product that resembles the learning subject in conjunction with developing an internal mental model (Papert 1991, 1996).

Constructivism sees learning as an activity that takes place in a social context (Vygotsky. 1978). Resnik (1996) discusses the term "distributed constructionism", which characterizes a learning process where the product of learning is built within a distributed community. In this network-based environment, students take control over the learning by searching relevant information and learn through construction activities embedded within their community. The rationale behind this approach is that the students can enhance their learning by being exposed to "distributed cognition" (Salomon, 1994), hence getting involved in interactions with the surrounding environment, both with people and artifacts. Wegner (2000) further elaborates on communities of practice where knowledge is evolving within a social learning system, where individuals experience their own learning in interplay with the socially defined competence.

Web 2.0 principles are in line with modern educational theories such as constructivism, connectionism, and communities of practice and thus make Web 2.0 applications very attractive for teachers and learners (Ullrich et al., 2008). Wikis, blogs, and social bookmarking are now commonly used in learning (Alexander, 2006). Ullrich et al. (2008) summarize the main principles of Web 2.0 and their implications on technology-enhanced learning, generally indicating that the Web 2.0 is characterized by social learning and active participation, as advocated by constructivism. Moreover, they have empirically shown that Web 2.0 services indeed stimulate and facilitate active participation.

In our research, we implemented the constructivist approach for introducing Web 2.0 concepts to MBA students by engaging them in Web 2.0 hands-on activities as well as requiring them to design organizational KM solutions as their final learning artifacts. All these learning activities were carried out through collaborative environments that enabled the students to share knowledge and observe the learning artifacts, hence experiencing "distributed cognition".

3. METHOD

The work presented in this paper is a case study based on a Knowledge Management (KM) course in the MBA program for graduate students. The course's duration was seven weeks, with three hours each week. Its objective was learning KM issues while experiencing the Web 2.0 environments, applying the constructivist approach.

The participants of the study included 23 MBA students who took the KM course. These students are employed in various organizations and managerial roles in diverse areas, with the following distribution: computers – software and hardware (7); life sciences (4); project management (3); law (2); mechanical engineering (1); marketing (1); logistics (1); translation (1); civil engineering (1); physics (1). Since the students are in managerial positions, they are expected to be familiar and utilize organizational Information Systems (IS) including Web 2.0 applications.

The teaching method employed the principles of the constructivist approach, blending face to face class meetings and virtual discussions. The virtual environment consisted of a social networking site, based on the free Ning platform (www.ning.com). The Ning platform is considered a Web 2.0 environment as it allows user generation of social networks and content, utilizing Web 2.0 tools such as blogs, forums and tags. The Ning platform itself does not include wiki but rather allows links to wiki platforms.

The first assignment given to the students was to present themselves in the Ning environment, enabling better acquaintance and sharing private experiences between them. This assignment included written instructions how to use this environment. Throughout the semester the students were required to participate in the social website, including managing a personal profile, writing in personal blogs, posting messages to open discussion forums, react to their colleagues' posts in forums and blogs, and opening discussions regarding issues that concern the whole class (e.g., administrative, learning, general). These activities were evaluated as part of the students' final grade. In addition, the students were assigned to present Web 2.0 related scientific papers, followed by managing virtual discussions in the site's forums, and personally reflect on these discussions in their blogs.

Their final assignment was designing a KM solution in a real organization, which was gradually conducted during the semester within the wiki platform. For this assignment, the students were divided to teams of 2-3 students. The teams were required to analyze KM related problems and requirements in an organization, usually where one of the team members works, and suggest, based on the course content, a KM solution for the encountered problems. The KM solution was expected to address the whole spectrum of KM, hence encompassing culture, processes and information technology infrastructure aspects.

Data was gathered using the following tools:
1. Start-course survey (see Appendix 1) for eliciting perceptions of, and attitudes toward, Web 2.0 concepts and applications in the context of both work and leisure (22 filled questionnaires).
2. Social network website, including forum discussions and blogs' reflections, which were documented and analyzed (students' posts included all together 188 discussion posts and 33 blog posts).
3. Wiki environment, where the teams collaboratively constructed and shared their projects.
4. Final assignments – the submitted organizational KM solution (10 projects).

The analysis method was based on the qualitative grounded theory approach, aiming at studying social and cultural phenomenon without formulating the hypotheses in advance (Strauss and Corbin, 1990; Orlikowski, 1993; Denzin and Lincoln, 1994). In this approach, the research data is inductively coded, with open and axial coding mechanisms, until reaching data analysis saturation (Strauss and Corbin, 1990). Open coding refers to the analytical process of identifying concepts, ideas, and meanings from the collected research data, aiming at discovery, naming, and categorizing phenomena according to their properties, dimensions, and incidences. Axial coding refers to the establishing of core categories and sub-categories from the categories revealed in the open coding stage.

First we aggregated the answers in the start-course survey for revealing the students' Web 2.0 awareness and competence. Next, we conducted the aforementioned inductive analysis of the students' posts on the course's social networking website and of the Web 2.0 related issues in th9e students' final assignments, exploring the learning processes and the knowledge construction of Web 2.0 concepts and skills. In particular, we focused on examining whether the students incorporated the Web 2.0 ideas within their final KM solution task, and how they perceived Web 2.0 environments after gaining experience with them during the course. Thus, the categories emerging from the analysis referred to Web2.0 usage related phenomena and are presented in the next section.

4. FINDINGS

In this section we present and discuss the data collected and analyzed. In Section 4.1, the aggregated results of the survey are presented for revealing the students' initial awareness and competence with regard to Web 2.0 environments; in Section 4.2, the inductive analysis and the qualitative interpretation of the students' posts on the social networking website, focusing on Web 2.0 issues, is presented; and finally, in Section 4.3 we discuss the KM course's final assignment with insights gained from the students' KM solutions and reflections regarding Web 2.0 concepts. Based on the students' references to Web 2.0 issues, both from the social networking website and their final assignments, we analyze their perceptions and attitudes to the potential contribution of Web 2.0 applications within their work environment and illustrate their evolution over time.

4.1 Start-course Survey
The purpose of the start-course survey was to find out students' usage patterns in the Internet environment, both at leisure and at the work context, and students' awareness and understanding of Web 2.0 concepts in general. The questionnaire included 13 questions; 7 questions related to the usage of the Internet and Web 2.0 environment at leisure, while 6 questions referred to their usage at work (see Appendix 1).

Figures 1 and 2 present the distribution of the answers to the first question: "Which Internet applications do you use?" at leisure and at work respectively. At leisure, 92 answers were aggregated from all students, while at work 51 answers were provided. The majority of the students use the Internet at leisure for communication in various ways (e.g., emails, instant messaging), search for information, entertainment (e.g., downloading music or movies) and reading news. With regard to work, the majority of the students use the Internet for communication in various ways (e.g., emails, instant messaging), search for information, read information and documentation.

The survey analysis, summarized in Table 1, indicates that our MBA students are either partially or not familiar with the verity of the Web 2.0 concepts and tools, and even more so in the context of the working environment. While about half of them use different, though limited, Web 2.0

applications at leisure, they hardly use any of these in their work. This is consistent with research works documented in the literature (see Section 3.2) indicating the difficulties in the adoption of Web 2.0 within organizations.

4.2 Social Networking Website Observations

The Ning social networking website served as the collaboration infrastructure of the KM course in addition to the regular class meetings. At the beginning of the course, the students had to build a personal page on the site, presenting personal details they choose to share with the other students. Most of the students uploaded their pictures, presented their professional background and also provided details that relate to their families, hobbies and travel experiences including pictures and videos. Part of the students even uploaded their favorite music.

Throughout the course the students were given assignments to be executed on the Ning platform, mainly writing in their private blogs, post answers to discussion forums, handling forums where they uploaded their presentations concerning articles they had read, and discussing topics that relate to these articles. In addition, they were required to respond to their class colleagues in the forums and blogs. The social networking website served as a medium for asking questions, presenting thoughts and suggestions and open discussions about any subject they found interest in, even if it wasn't related to the course material.

Issue	Leisure	Work
Internet applications usage	Communication, information search, entertainment and reading news. (See Figure 1 for applications' usage distribution).	Communication, information search, and reading work-related information and documentation. (See Figure 2 for applications' usage distribution).
Familiarity with Web 2.0	Not familiar – 13 students. Partly familiar – 6 (4 - a technology which enables writing and sharing content; 1- a platform to publish knowledge; 1- allows to build social networking). Misconception – 2 (a new way for building sites). One student wrote the subject is familiar, but couldn't explain it.	
Involvement in social networking website	Don't belong - 7 students. Belong to Facebook or/and LinkedIn social networks - 15.	Don't belong - 21 students. One student belongs to a social network (health care).
Using collaborative environments	Not using - 14 students. Using Wikipedia/messenger/ GoogleDocs and/or wikis – 8.	Not using - 18 students Reading&writing – 2. Read-only – 1.
Manage a private blog	Don't mange blogs - 18 students. Manage – 3 (2 in Facebook). One student has a blog which is not active.	All students do not use any blog at work.
Post messages in others' blogs	Never - 15 students. 7 students posted a message in others' blogs, most of them regarding news.	Never - 21 students. One student reported writing a message in a job seeking site.
Usage of Tagging, Flicker, del.icio.us	Never - 19 students. 2 students indicated using, without elaborating what they use.	
Usage of a learning Internet site	Never - 14 students. Used a learning site for work or educational purposes - 8.	

Table 1. Start-Course Survey Summary
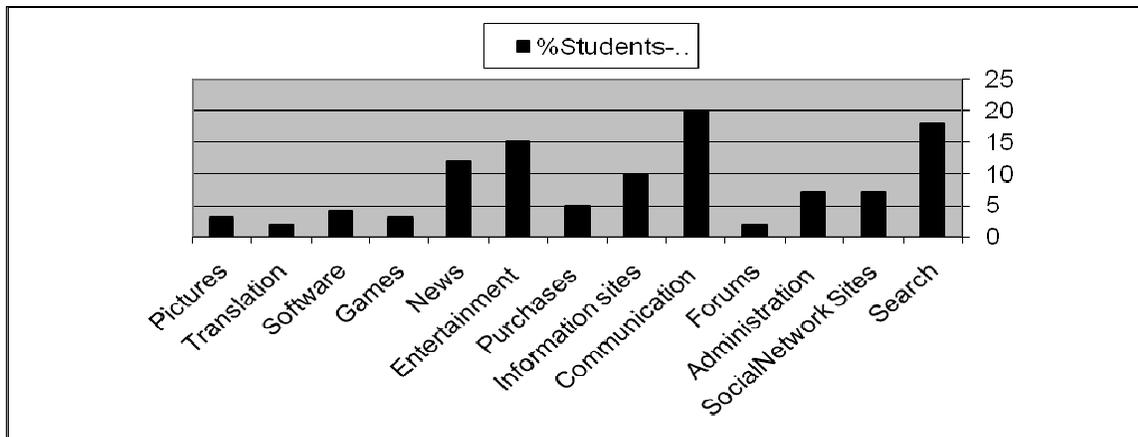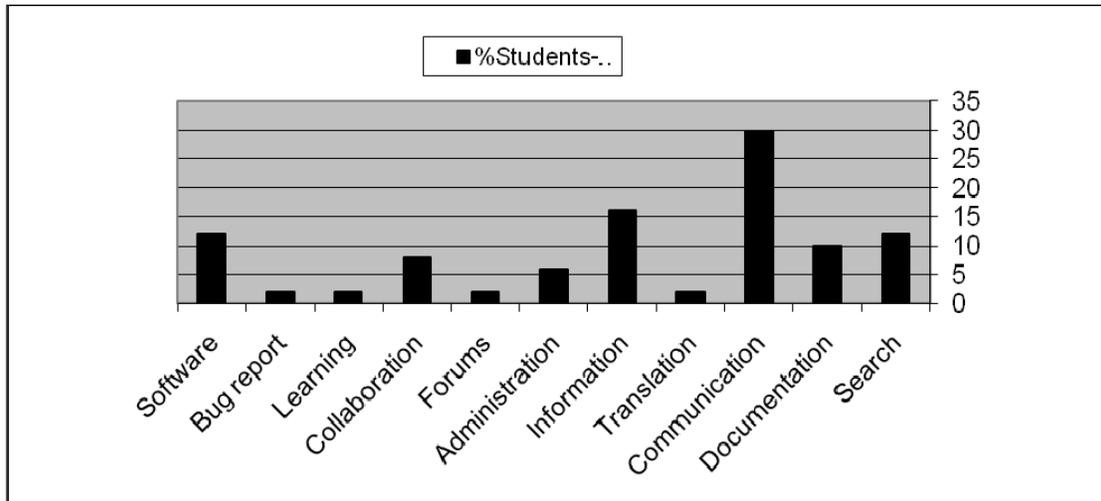

Figure 1. Internet Usage Distribution at Leisure

Figure 2. Internet Usage Distribution at Work

4.2.1 Discussion forums: One of the course assignments was reading a professional article, presenting its main issues in a twenty minutes lecture in class and at the end raising a related topic for discussion, later managed by the presenters through a forum on the social networking website. The Web 2.0 served as the major course subject for choosing articles; thus, the professional discussions' forums dealt with Web 2.0 related issues. Altogether 28 forums were opened, covering: course logistics issues (14) which were managed by the lecturer; and Web 2.0 related issues (14) which were managed by the students.

Table 2 presents examples of the students' posts mapped to the Web 2.0 'big ideas' (Anderson, 2007), with their adjacent questions raised by the students and examples of the discussions' posts. Specifically, the participants' dilemmas and opinions regarding different aspects of Web 2.0, its strengths and weaknesses, are illustrated. Applying the constructivist approach, the students raised questions and discussed in-depth different aspects of Web 2.0 that relate to its 'big ideas', reflecting their perceptions' evolution during the discussions. They realize different aspects embedded within Web 2.0 environments, such as the power of the crowd within social networking, which they had hardly utilized and understood prior to the course.

4.2.2 Blogs: The students were required to handle private blogs for posting reflections regarding the course assignments and comparing the social networking website to the standard courses' sites they have been using in other academic courses. These postings are part of the course requirements, but the students are allowed to post self-interest text as well. Analyzing the blogs' posts indicates personal barriers that the students had to overcome. However, the students noted that they would like to have blogs and options enabled by the social networking site in their future learning platforms. These two phenomena are demonstrated below.

Overcoming personal barriers: "First blog, what do we write in a first blog? Not a simple question."
  "Hello my dear diary, I didn't use this sentence for a long time now. In WWW it is much harder, but I'll get over it."

Blog as a shareable platform: "Hi everyone, I do not really know most of the class members, just hello during the past year and a half. I did start a blog a few times, but I just abandoned it at some point - lost interest. So, just got back from a company dinner, where my department was commended for its fruitful results in year 2007 [...] For all of you that do not know I work in the purchasing department [...] I just got back from ~2.5 weeks in China. I toured Beijing [...] I have lots to share about my experiences there [...] I will try add some spice to my stories."

Blog as a required feature: "Ning is better than Moodle [a teaching application used in this university] because an individual can contribute content more easily, and share it with others. However, Moodle is not aimed at sharing by individuals. Moodle is better than Ning because it is seamlessly integrated with grades system, courses catalog, and other systems. However, Ning is not aimed at integrating with any particular catalog. So, in my opinion, having blogging capabilities in Moodle could be useful, as well as having the ability to design a community in a more structured way (e.g., by providing customization capabilities for community initiator)."

4.3 Final Assignment
In the final assignment the students were required to perform an organizational KM analysis in order to identify KM problems and opportunities. The students utilized a KM audit process, based on the CommonKADS Methodology (Schreiber et al., 2000), and suggested a KM solution for one of the business processes that was related to the identified problems. The KM course emphasized the requirement of embedding a KM solution within the business process and not as a stand-alone activity. The final assignment delivery was scheduled for after the course, but the students were asked to submit several parts of the assignment throughout the course. For this purpose they used the collaborative environments of the course: the social networking and wiki sites, mainly for getting feedbacks and facilitating knowledge sharing among the students.

Web 2.0 aspect	Discussion Question	Examples of student's posts
Web 2.0 Ethical Aspects ('big ideas'- user generated content; power of the crowd; openness)	"How should the legal authorities handle publishing evil gossip on Web 2.0 platform? Who is responsible, the publishers or the site managers?"	"One possible solution is passing the responsibility on to the people who are hurt by the content, and creating some mechanism that will enable someone who feels offended by such content to contact the site owner and retrieve the offender's identity. Of course, this is going to be a tedious task and it might be open to exploitation (people will use the mechanism to retrieve surfer's identity unlawfully). However, considering the huge amounts of info and content in a sharing site, it would be nearly impossible for a content manager to do this task alone. Another option is a Web 2.0 solution to a Web 2.0 problem - let the surfers decide. Today there is a simple mechanism that enables users to recommend their favorite responses. Perhaps it's possible to let the users judge for themselves which post they find offensive and which post is truthful in their opinion."
Web 2.0 Next Generations ('big ideas'- Data on an epic scale)	"Web 3.0 - or the Semantic Web – please comment"	"I think that the limitation regarding the definition of Web 2.0 does not apply here so much- the Semantic Web is a more clearly defined issue, turning content into database format. The thing I think that is missing in the current Web 3.0 plans is some kind of thought regarding non-semantic content - pictures, music and video. Currently, this content is only searchable thanks to tagging it with semantic tags - the name of a song, the description of a photo. But I think that the experience of surfing would really be enhanced when search engines will be able to recognize non-semantic objects."
Web 2.0 Practical Aspects ('big ideas'- power of the crowd; openness)	"Would you recommend organizations to use Web 2.0 for communicating with their customers? Is it worthy to open organizational decision-making to the public? Will using Web 2.0 create a competitive advantage?"	"The idea of open decision-making processes to the public is right and required. The days where the 'big brother' dictates the customers what is right or wrong is over; the customer is the one that dictates. Organization that won't listen to the customers will stay behind."
Web 2.0 General Concepts ('big ideas'- power of the crowd; user generated content)	"Do you really believe in the existence of the wisdom of the crowds?"	"I checked the entry, the wisdom of the crowds, in Wikipedia and this is what I got: 'This article is written like an advertisement. Please help rewrite this article from a neutral point of view', so maybe we do need wisdom of the crowds for this...I guess this theory is correct in the 'right' circumstances, like you presented in the presentation: 1. It needs to be diverse, so that people will bring different pieces of information to the table. 2. It needs to be decentralized, so that no one at the top will dictate the crowd's answer. 3. It needs a way of summarizing people's opinions into one collective verdict. 4. The people in the crowd need to be independent, so that they pay attention mostly to their own information, and not worry about what everyone around them thinks."
Web 2.0 Management Issues ('big ideas'- user generated content; power of the crowd; openness; architecture of participation)	"You are a project manager in an organization that utilizes Web 2.0 tools for project management. One of the workers published a blog where the management of the last project is described, and you are presented in an unprofessional light and the writer even implies about improper motives. How would you react?"	"I think you have to commend the employee who is not afraid of retaliations against him by publishing his opinions on his boss, regardless whether the result does or does not compliment the project leader. It is important to be able to work in a company where this kind of feedback is allowed and welcomed. If the feedbacks aren't true I am sure there will be responses from other team members who worked under the project leader coming to his defense. This is the WWW... and information and opinions are welcome in the Enterprise 2.0 tool..."
Web 2.0 Threats ('big ideas'- openness)	"Considering the different benefits and the various threats of Web 2.0 in a business environ-ment, would you recommend embracing Web 2.0 in your company? Which technologies?"	"I think there is no way to extract only the benefits from Web 2.0. The security threats, as presented, can't justify inserting such a Trojan horse into the organization."

Table 2. Illustration of Web 2.0 Aspects Discussions in the Forums

Category	Example
Identifying organizational Web 2.0 IS	"There exists an organizational wiki system for handling technical information". [W1.P3.S1]
Collaboration aspects	"The workers are not aware of the knowledge collaboration needs, and they are not skilled for that." [W1.P5.S1]
Adopting new IS	"Direct experiencing is needed, 'hands-on', for evaluating the benefits and innovation of a new system." [W1.P13.S1]
Embedding Web 2.0 within business processes	"Each project should have wiki pages which describe the project environment and handle its technical assignments." [W2.P21.S1]
Realizing Web 2.0 difficulties and opportunities	"[…] these employees work in the field and have no computers available, therefore forums and wiki won't work. […] on the other hand the RSS, which can send online updates also to cell phones, might be considered." [W5.P18.S1]
Social networking website good experiencing	"All three of us have no experience using social networking websites, and we even considered it as a waste of time. After experiencing it in the course, we think that in specific subjects […] it is possible to gain value from the direct communication and reading others' feedbacks." [W2.P31.S2]
Social networking website bad experiencing	"The Ning social networking website is limited with the applications it provides, compared to Facebook and LinkedIn." [W1.P17.S3]

Table 3. Web 2.0 Related Categories

The first mission in the assignment involved interviewing a major stakeholder in the organization for realizing current and required business and KM processes. The students uploaded the interviews to the wiki site, where they could share knowledge and react. Since the students had no previous experience in conducting KM analysis, they could upload additional parts of their organizational KM analysis during the course for the lecturer's approval. No grades were given for the intermediate uploads.

Ten final students' works were submitted and inductively analyzed, focusing on Web 2.0 aspects, including marking, coding and categorizing the Web 2.0 related segments (statements composed of one or more sentences). The emergent categories were iteratively refined until category saturation was achieved. The categories are presented and illustrated in Table 3. Each work submitted by the students was enumerated and the marked segments were given a label consisting of the work number (W), the page number (P) where it was found, and the segment number (S) within this page. For example [W1.P1.S1] indicates that the example is the 1st segment taken from page 1 of work number 1. All the final works related to Web 2.0 applications within their proposed KM solutions, and embedded these applications within the business processes whenever it was appropriate. Altogether 125 segments that relate to Web 2.0 aspects were found, and their categories distribution is presented in Figure 3.

The students considered barriers, both personal and organizational, that should be overcome for successfully embedding Web 2.0 within business processes. While conducting the interviews, the students refer to Web 2.0, asking about current IS and realizing that most of the organizations don't utilize the collaboration potential of their existing infrastructure. The students embedded not only the Web 2.0 applications that they had experienced, but also other related applications, e.g. folksonomy.

The overall students' feedbacks from experiencing the Web 2.0 applications were positive. However, several students complained about the duty to participate in the social networking website and writing in wiki, unlike the freedom of choice that characterizes the Internet. In addition, they pointed out that sometimes they got confused between the official course website and the course social networking website when searching for the lectures' presentations and syllabus. They suggested improving the utilization of the collaboration tools by giving assignments that will require collaborative work on the tools themselves, such as updating others' wiki pages, as was required in the forums' assignments.

5. DISCUSSION

The findings presented above illustrate the development of MBA students understanding of the Web 2.0 potential during a KM course, while applying a constructivist teaching approach. Initially, most students were hardly aware of what Web 2.0 concepts are and what its potential within organizational context is. During the course, the students learned and experienced Web 2.0 applications. The Web 2.0 hands-on experience included: participating in a social networking website; self reading and presenting in class Web 2.0 related articles followed by managing discussions in the social networking website; handling personal blogs; and sharing final assignments on a wiki site. Their final assignments indicate that the students have improved their awareness and understanding regarding the potential of the Web 2.0 concepts within real organizations' KM solutions.

The analysis of the data indicates that during the course the MBA students, consisting of managers from various fields, internalized important aspects regarding embedding Web 2.0 applications in organizations. These included technological aspects, mainly security threats, and human related issues, such as personal and organizational barriers, incentives for sharing, and managerial aspects.

The main challenge observed in this study was motivating students to participate and communicate via the virtual environment in addition to their face to face interactions in class. This can be done by designing creative assignments that require collaborative work within the virtual environment and rewarding students for their active participation.

6. CONCLUSIONS AND FUTURE WORK

Our study focused on exploring how MBA students, through constructivist learning, became aware of the Web 2.0 benefits, in particular within organizational context. The contribution of this research is two-fold. First, we have

developed an educational setting for teaching MBA students the usage and applications of Web2.0 within organizations. Second, the study has shown that learning while experiencing Web 2.0 tools enables students to realize the benefits and barriers of Web 2.0 utilization. A special emphasis was given to understanding the human aspects and how they may influence Web 2.0 absorption in organizations.
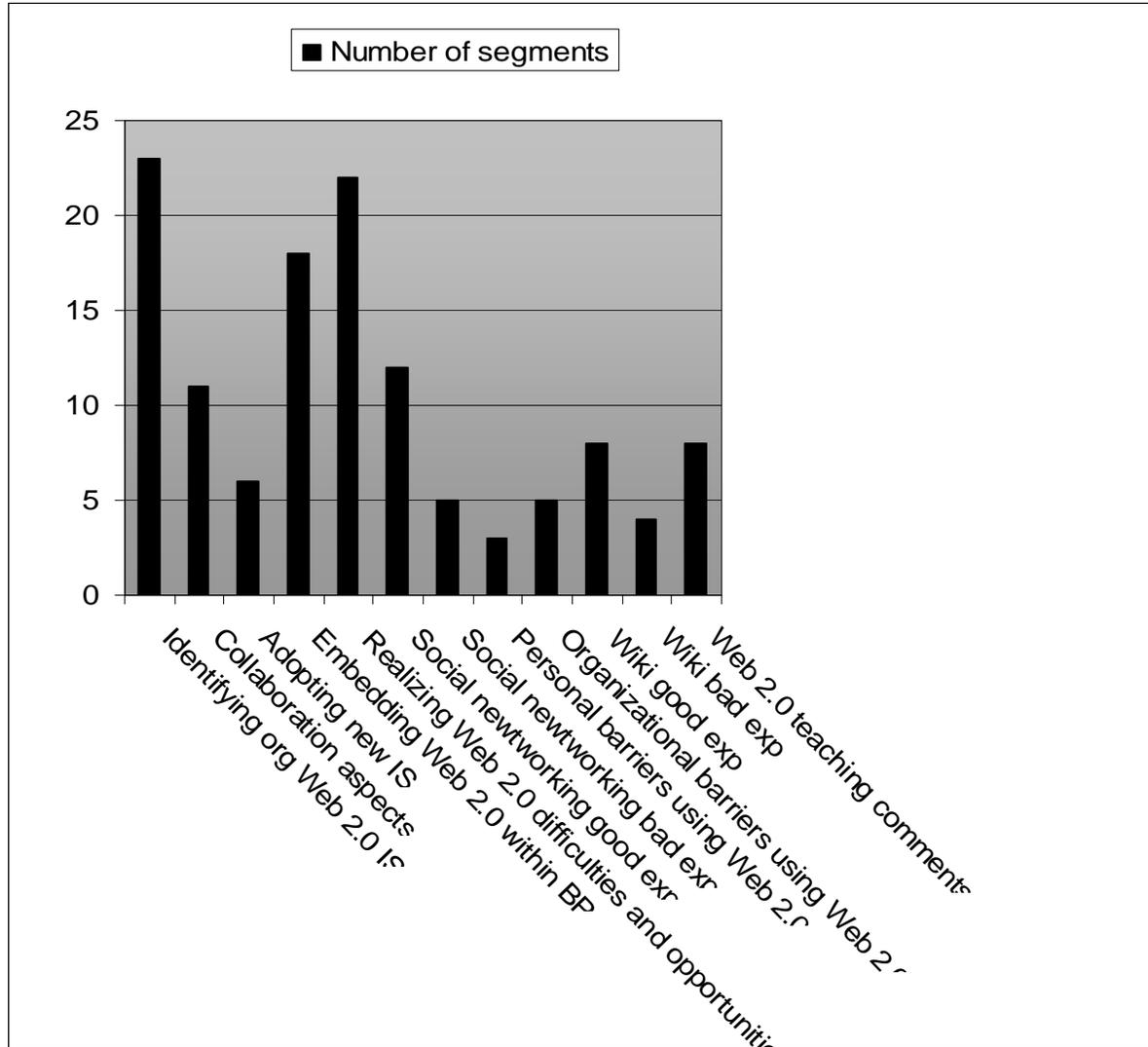
Figure 3. Final Work Categories' Distribution

Moreover, the students designed a KM solution, embedding Web 2.0 for real organizational setting. However, while demonstrating a good theoretical understanding and positive attitude regarding Web 2.0, these were not practically examined in real-life situations, thus constituting the research limitation.

This study was conducted using a qualitative method, in order to explore and understand a phenomenon and its different aspects, rather than statistically corroborating a hypothesis or a theory (Bassey, 1999). Nevertheless, using qualitative methods limits the generality of its findings. Following this research, a quantitative study may corroborate and quantify the effectiveness of the teaching method on a large scale.

Future work may also examine applying this teaching approach for managers within organizations aiming to adopt Web 2.0, and follow how these managers practically implement their evolved perceptions and skills. Another direction for future work is examining teaching Web 2.0 concepts and applications within specific business domains, for example, software development or customer support.

We believe that education of both undergraduate and graduate students in areas of Software Development, Information Systems and Management should include utilizing Web 2.0 tools within their curriculum. These students, when entering their future work place, will be already accustomed to share knowledge and utilize collaboration environments, making it natural for them to work with these tools in organizational contexts. The study presented here may serve as a basis for such future courses.

7. REFERENCES

Alexander, B. (2006), "Web 2.0: A new wave of innovation for teaching and learning?" <u>EDUCAUSE Review</u>, Vol. 41, No.2 pp. 32-44.

Anderson, P. (2007), "What is Web 2.0? Ideas, technologies and implications for education". Technical report, JISC Technology and Standards Watch, pp. 1-63.

Barton, M. (2005), "The future of rational-critical debate in online public spheres", <u>Computers and Composition</u>, Vol. 22, pp. 177-190.

Bassey, M. (1999), Case Study Research in Educational Settings, UK: Open University Press, Ch. 7, pp.65-91.

Berners-Lee, T. (1999), Weaving the Web. Orion Books.

Bolloju, N. and Wagner, C. (2005), "Supporting knowledge management in organizations with conversational technologies: Discussion forums, weblogs, and wikis", <u>Journal of Database Management</u>, Vol. 16, No. 2, pp. i-viii.

Briggs, C. (2009), Web 2.0 Business Models as Decentralized Value Creation Systems. In Lytras, M. D., Damiani, E., Ordonez de Pablos, P. (Editors) (2009). Web 2.0 business Model, Springer. Ch. 3, pp. 37-52.

Confrey, J. (1990), What constructivisim implies for teaching. In Davis, R.B., Maher, C.A. and Noddings, N. (Eds.), Constructivist views on the teaching and learning of mathematics (JRME, monograph No. 4). Ch. 8, pp. 107-122.

Cosley, D., Frankowski, D., Kiesler, S., Terveen, L., and Riedl, J. (2005), "How oversight improves member-maintained communities", CHI 2005 conference on human factors in computing systems, Portland, OR.

Denzin, N. and Lincoln, Y. (1994), Handbook of Qualitative Research, Thousand Oaks: Sage.

Dickerson, C. (2004), "Wiki goes to work", <u>InfoWorld</u>, Vol. 26, No. 46, pp. 28-28.

Fichter, D. (2005), "The many forms of E-collaboration: Blogs, wikis, portals, groupware, discussion boards, and instant messaging", <u>Online</u> (Weston, Conn.), Vol. 29, No. 4, pp. 48-50.

Hall, T. (1999), Intelligence community collaboration baseline study, Final Report. http://collaboration.mitre.org/prail/IC_Collaboration_Baseline _Study_Final_Report/toc.htm Retrieved on 20/9/09.

Kaser, D. (2005), Structured content versus free form: Where the experts disagree. <u>Information Today</u>, Vol. 22, No. 6, pp. 35-35.

Kirchner, K., Razmerita, L. and Sidzoma. F. (2009), New forms of interaction and knowledge sharing on Web 2.0. In Lytras, M. D., Damiani, E., Ordonez de Pablos, P. (Editors) (2009). Web 2.0 business Model, Springer. Ch. 2, pp. 21-36.

Liebowitz, S. J. and Margolis, S. (1994), "Network Externality: An Uncommon Tragedy", <u>Journal of Economic Perspectives</u>, Vol. 8, No. 2, pp. 133-150.

Leron, U. (1994), "Can we follow what we preach: Teaching according to constructivist principles." In Martyn Quigley (Ed.), Proceedings of the 18th Annual Canadian Mathematics Education Study Group Meeting, St. Catharines, Ontario:Brock University Press, pp. 141-145.

Leron, U. and Hazzan, O. (1997), "Computers and Applied Constructivism. Computers and Applied Constructivism". In D. Tinsley and D. Johnson (Eds.): Information and Communication Technologies in School Mathematics, Chapman and Hall, Ch 23, pp. 195-203.

Lynch, C. G. (2008), "Enterprise 2.0 apps seen as useful but confusing to business", InfoWorld http://www.infoworld.com /article/08/05/22/Enterprise-2-apps-seen-as-useful-but-confusing-to-business_1.html

Lynch, C. G. (2007), "Forrester Report: CIOs See Value in Web 2.0", http://www.cio.com/article/138450/Forrester_Report_ CIOs_See_Value_in_Web_2.0.

Lytras, M. D., Damiani, E., and Ordonez de Pablos, P. (Editors) (2009), Web 2.0 business Model. Springer.

McAfee, A. P. (2006), "Enterprise 2.0: The Dawn of Emergent Collaboration", <u>MITSloan Management Review</u>, Vol. 47, No. 3, pp. 20-28.

Neus, A. (2001), "Managing information quality in virtual communities of practice", Proceedings of the 6th international conference on information quality at MIT. Boston, MA: Sloan School of Management.

Orlikowski, W.J. (1993), "CASE tools as organizational change: Investigating incremental and radical changes in systems development". <u>MIS Quarterly</u> Vol. 17, No. 3, pp. 309–340.

Papert, S. (1980), Mindstorms, Children, Computers, and Powerful Ideas. New York: Basic Books, Inc. Publishers.

Papert, S. (1991), "Situating Constructionism". In Harel, I. and Papert, S (Eds.): Constructionism, Ablex Publishing Co., Norwood, NJ, pp.1-11.

Papert, S. (1996), "A Word for Learning". In Kafai, Y. and Resnick, M. (Eds.) Constructionism In Practice. Lawrence Erlbaum Associates, Publishers, Mahwah, New Jersey.

Raitman, R., Augar, N., and Zhou, W. (2005), "Employing wikis for online collaboration in the E-learning environment: Case study". Third International Conference on Information Technology and Applications (ICITA'05), pp. 142-146.

Resnick, M. (1996), "Distributed Constructionism." Proceedings of the International Conference on the Learning Sciences Association for the Advancement of Computing in Education, pp. 280-284.

Salomon, G., (Ed.) (1994), Distributed Cognition. Cambridge, UK: Cambridge University Press.

Schreiber, G., Akkermans, H., Anjewierden, A., de Hoog, R., Shadbolt, N., van de Velde, W., and Wielinga, B. (2000), Knowledge Engineering and Management - the CommonKADS Methodology. Cambridge Massachusetts. MIT Press.

Skemp, R.R. (1971), The Psychology of Learning Mathematics. NY: Penguin Books.

Skiba, D. J. (2005), "Do your students wiki?" <u>Nursing Education Perspectives</u>, Vol. 26, No. 2, pp. 120-121.

Strauss, A. and Corbin, J. (1990), Basics of Qualitative Research – Techniques and Procedures for Developing Grounded Theory, 1st Edition, California: Sage.

Szybalski, A. (2005), "Why it's not a wiki world (yet)". Retrieved 11/4, 2005 from http://www.stanford.edu/~andyszy/ papers/wiki_world.pdf.

Udell, J. (2004), "The wiki way". <u>InfoWorld</u>, Vol. 26, No. 42, pp. 34-34.

Ullrich, C., Borau, K., Luo, H., Tan, X., Shen, L., and Shen, R. (2008), "Why Web 2.0 is Good for Learning and for Research: Principles and Prototypes". WWW 2008, April 21–25, China, pp. 705-714.

Vygotsky, L. S. (1978), Mind in society. Harvard University Press, Cambridge, MA.

Wegner, E. (2000), "Communities of Practice and Social Learning Systems" in Organization Vol. 7, No. 2, pp. 225-246.

AUTHOR BIOGRAPHIES

Meira Levy is a post-doctoral fellow at the Ben-Gurion Univerity of the Negev and an adjunct lecturer and researcher at the University of Haifa. She holds a Ph.D. from the Department of Education in Technology and Science of the Technion – Israel Institute of Technology. She holds a Master degree from the Faculty of Industrial Engineering and Management and her Bachelor degree is from the Faculty of Computer-Science, both of the Technion. Meira has over 20 years of experience in the high-tech industry in development and management positions. Her research interests combine her professional background with her research in the cognitive science discipline: knowledge engineering and management, both from human and technological perspectives, including: KM audit and requirements analysis methodologies; modeling and design of knowledge systems; embedding KM frameworks within business processes (e.g. decision making); identifying KM culture barriers; and distance learning in general, and in computer science in particular.

Irit Hadar is a faculty member at the Department of Management Information Systems at the University of Haifa. She is the head of the Software Architecture Laboratory at CRI (Caesarea Rothschild Institute for Interdisciplinary Applications of Computer Science). She holds a Ph.D. from the Department of Education in Technology and Science of the Technion – Israel Institute of Technology. Her main research area is cognitive aspects of software architecture, design and analysis, including modeling and its influence on perceptions and decision making. In the context of knowledge management research she looks into the cognitive processes which underlie thinking mechanisms (e.g. knowledge creation and assimilation) and decision making (e.g. with regard to knowledge sharing).

APPENDIX 1
THE SURVEY QUESTIONNAIRE

<u>Web Usage Questionnaire</u>[1]

Gender: F/M Age: _____ Occupation: _____

1. What Internet applications do you use at home? What is your opinion regarding these applications?

2. Are you familiar with Web 2.0 concepts? If so, please explain what is Web 2.0.

3. Do you belong to any social network? If so, why did you choose to join them?

4. Do you use collaborative environments (e.g. wiki, Google docs). If so, which environment do you use and why? For what purposes?

5. Do you manage a blog or a personal site? If so, please elaborate which blog/site and for what purposes.

6. Did you ever post a message as a comment in someone else's site/blog? If so, for what purposes?

7. Did you ever use Tagging/Flicker/del.icio.us?

8. What Internet applications do you use at work? What is your opinion regarding these applications?

9. Do you belong to any social network at work? If so, why did you choose to join this network?

10. Do you use collaborative environments (e.g. wiki, Google docs) at work? If so, which environment do you use and why? For what purposes?

11. Do you manage at work, blog? a personal site? If so, please elaborate which blog/site and for what purposes.

12. Did you ever post a message as a comment in someone else's site/blog in the work? If so, for what purposes?

13. Did you ever use a learning site for learning purposes, besides material downloading (lectures, exercises)? If so, which site? for what? what is your overall impression from the site?

---

[1] The questionnaire is anonymous and for research purposes only.

Information Systems & Computing
Academic Professionals

STATEMENT OF PEER REVIEW INTEGRITY

All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.