Chapter XVI
Facilitating E-Learning with Social Software: Attitudes and Usage from the Student’s Point of View

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ABSTRACT

This article explores how social software tools can offer support for innovative learning methods and instructional design in general, and those related to self-organized learning in an academic context in particular. In the first section, the theoretical basis for the integration of wikis, discussion forums, and Weblogs in the context of learning are discussed. The second part presents the results of an empirical survey conducted by the authors and explores the usage of typical social software tools that support learning from a student’s perspective. The article concludes that social software tools have the potential to be a fitting technology in a teaching and learning environment.

INTRODUCTION

One major task of higher education is to train students for the requirements of their future work by applying and adapting their knowledge to specific workplace-related requirements and settings. Due to the ongoing pressure on enterprises to cut
costs, the periods of vocational adjustment in a company will become shorter and shorter.

On the one hand, the rising pressure of innovation and fast-paced development in the economy results in increased demand for continuous employee training. On the other, growing global competition forces enterprises to use available resources very economically so that employee training is considered to be necessary and desired even though it is conducted under considerable time and cost pressure (Köllinger, 2002).

According to these goals, the settings of the education must be changed adequately: “While most of higher education still ascribes to traditional models of instruction and learning, the workplace is characterized by rapid changes and emergent demands that require individuals to learn and adapt in situ and on the job without the guidance of educational authorities” (Sharma & Fiedler, 2004, p. 543).

In the field of higher education, it has become an important goal to develop “digital literacy” and educate learners as competent users and participants in a knowledge-based society (Kerres, 2007), but it can be assumed that there is a new generation of students, the “digital natives,” who are accustomed to digital and Internet technology (Prensky, 2001a, 2001b).

Oblinger and Oblinger (2005) characterize next-generation students (called “n-gen,” for Net generation) as digitally literate, highly Internet savvy, connected via networked media, used to immediate responses, preferring experiential learning, highly social, preferring to work in teams, craving interactivity in image-rich environments, and having a preference for structure rather than ambiguity.

According to a study conducted by Lenhart and Madden (2005), half of all teens in the USA may be considered “content creators” by using applications that provide easy-to-use templates to create personal Web spaces.

Classical face-to-face learning is seen as rigid and synchronous, and it promotes one-way (teacher-to-student) communication. Thus, it is not surprising that more and more students are opting for Web-based education as a more flexible and asynchronous mode (Aggarwal & Legon, 2006).

The higher education system should provide answers to this new generation of students who enter the system with different backgrounds and skills. They are highly influenced by social networking experiences and are able to create and publish on the Internet (Resnick, 2002).

Educators and teachers therefore have to consider the implications of these developments for the future design of their courses and lectures.

In 2002, a new term, “social software,” entered the stage to refer to a new generation of Internet applications. One focus of this new generation is the collaboration of people in sharing information in new ways such as through social networking sites, wikis, communication tools, and folksonomies (Richter & Koch, 2007).

Wikis, Weblogs, and discussion forums will play a central role in the new context, so the areas of application and possibilities will enlarge enormously. It can be assumed that this will also have considerable influence on learning and the usage of these instruments as learning tools.

This article presents the results of an empirical survey in order to highlight the benefits of the above-mentioned Web-based social software tools from the student’s point of view; 268 first-semester students, all in the first term of their studies at Austrian universities from different study programs, took part in this survey. The students were asked to use one or more of these tools as a learning tool. Participation in this survey was voluntary.

The presentation of the results of this survey is divided into three parts: first, the use of the tools by the students (before they started their studies); second, the experiences the students had made with the tools during the study; and third, the potential future usage.
The article concludes with a discussion of the results of this survey in contrast with other empirical studies already published. Also, the limitations of this survey and ideas for further research are pointed out.

THEORETICAL FRAMEWORK

This part refers to the necessary theoretical background required for the following empirical study, especially the areas of social software and learning.

Social Software

The term social software emerged and came into use in 2002 and is generally attributed to Clay Shirky (2003). Shirky, a writer and teacher on the social implications of Internet technology, defines social software simply as “software that supports group interaction.”

Another definition of social software can be found in Coates (2005), who refers to social software as “software that supports, extends, or derives added value from human social behaviour.”

Users are no longer mere readers, audiences, or consumers. They have the ability to become active producers of content. Users can act in user and producer positions and they can rapidly change the position.

Nowadays the term social software is closely related to “Web 2.0.” The term Web 2.0 was introduced by Tim O’Reilly (2005), who suggested the following definition:

Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an “architecture of participation,” and going beyond the page metaphor of Web 1.0 to deliver rich user experiences.

Web 2.0 technologies such as blogs, wikis, podcasts, and RSS feeds or discussion forums have been dubbed social software because they are perceived as being especially connected and allow users to develop Web content collaboratively and publicly (Alexander, 2006).

Until now, the Internet (Web 1.0) has one big disadvantage: It is easy to get information in it, but it is quite complicated and inconvenient to act as an author and take part in the development of content. Web 2.0 should enable all Internet users to actively take part in the further development of the Internet. Everyone should be able to contribute easily. The focus of Web 2.0 is on the behaviour of the user. It should empower people to communicate, collaborate, contribute, and participate.

This growing phenomenon is very interesting and ought to be examined carefully in order to understand how the Web is evolving and how this continuously regenerative cycle of performance and technological innovation empowers “learning by sharing” (Thijssen & Vernooij, 2002).

Based on the key principle of the architecture of participation, social software can be seen as part of Web 2.0. Wikis, Weblogs, and discussion forums are tools that are seen as social software applications and were selected for further research and the empirical study presented below.

Related Empirical Research

Institutions in the field of higher education have made efforts to introduce various IT-supported learning tools in the daily routine of students and lecturers (Aggarwal & Legon, 2006; Dooley & Wickersham, 2007; Duffy & Bruns, 2006; Evans & Sadler-Smith, 2006; McGill, Nicol, Littlejohn, Grierion, Juster, & Ion, 2005).

Published results of the usage of Weblogs in the Prolearn project (http://www.prolearn-project.
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org) have shown that a large majority of respondents considers personalization and adaptation of the learning environment as important and crucial factors. Learning should be individualized to become more effective and efficient. Personalization is a key element of the learning process, and specific problems need specific solutions as students differ greatly in their backgrounds and capabilities.

Learning materials are typically too general in order to cover a very wide range of purposes and personal learning needs. Compared to classical learning, personalization can be the most important added value that e-learning can offer. With it, education can be optimised and adjusted to various working conditions and needs because students have different goals, interests, motivation levels, learning skills, and endurance (Klamma et al., 2006).

Chao (2007) explored the potential uses of wikis in the field of software engineering (38 participants), especially for software project team collaboration and communication. Overall, 25 students agreed and 1 student disagreed (2 were neutral) that the wiki is a good tool for project collaboration. Concerning the applications of wikis, more than 23 students found that a wiki is a good tool for maintaining a group diary, managing user stories (project requirements), and project tracking and reporting. While a majority of students found that a wiki is a good tool for updating a project plan, managing acceptance tests, tracking defects, and developing user documents, there were also a significant number of students who disagreed.

First results using wikis for collaborative writing (about 40 participants) also reported similar results. In this study, students used wikis to write articles partly together with the lecturer.

After early problems with using the software and writing contributions in the wiki, students were able to write articles by themselves or in teams. The motivation among students was on different levels, so the lecturer had to increase it during lessons. Other students, however, were highly motivated and were creating the content and adding them to the wikis (Bendel, 2007).

Constructivism and Learning: Presentation of the Learning Model

A constructivist point of view focuses on the learning process by looking at the construction of knowledge by an individual. As a consequence, there is a recommendation to align learning environments, especially in the academic context, and associated complex learning objectives with constructivist learning principles (Du & Wagner, 2005; Jonassen, Mayes, & McAleese, 1993; Tangney, FitzGibbon, Savage, Mehan, & Holmes, 2001). Learning is not seen as the transmission of content and knowledge to a passive learner. Constructivism views learning as an active and constructive process that is based on the current understanding of the learner. Learning is embedded in a social context and a certain situation (Schulmeister, 2005).

The constructivist approach shifts learning from instruction and design centered to learner-centered learning and teaching. The role of the educator changes from directing the learner toward supporting and coaching the learner.

Baumgartner (2004) has suggested three different prototypical modes of learning and teaching. These three different modes of learning and teaching can be neutral or specific so they can be applied across all subject domains. Therefore, each teaching model can be used to teach, for example, sociology subjects as well as to teach technical sciences. Learning can be portrayed as an iterative process that can subsequently be subdivided into different phases, which are summarized in Figure 1.

In particular, these three different prototypical modes for learning encompass the following.
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Figure 1. Prototypical modes of learning and teaching (Baumgartner, 2004)

Learning and Teaching I: Transferring Knowledge

At the starting point, the learner needs to be provided with abstract knowledge to lay the theoretical foundations and to understand relevant signposts, road markings, and orientation points. This kind of factual knowledge is static and has little value by itself in real and complex situations. It merely serves as a shortcut to prevent pitfalls and to help to organize the student’s learning experiences.

The knowledge of the student is based on knowledge possessed by the teacher. Students have to learn what teachers ask them to learn. The teacher has the responsibility to make the knowledge transfer as easy as possible.

Learning and Teaching II: Acquiring, Compiling, and Gathering Knowledge

In this section of the individual learning career, the student actually applies the abstract knowledge and gathers his or her own experiences. In order to limit the action and reflection possibilities, the learner interacts within a somewhat restricted, artificial environment, which is reduced in complexity and easy to control by the teacher. To provide feedback, the learning environment is designed to include relevant devices where students can deposit their interim products and teachers can inspect them.

The emphasis in this model lies on the learning process of the student. Teachers try to help the students overcome wrong assumptions and wrong learning attitudes, and assist in the reflection process of the subject domain.

Learning and Teaching III: Developing, Inventing, and Constructing Knowledge

Teacher and learner work together to master problems. This model includes problem generation and/or invention. The environment is constructed in such a way that it represents, at least in certain aspects, reality or reality in a constrained form.
This model includes two-way communication on equal terms, using either linguistic representations or other adequate kinds of language.

Teaching III has strong links to constructivism. From a constructivist point of view, learning is considered as an active process in which people construct their knowledge by relating it to their previous experiences in complex and real situations in life. In their practical lives, people are confronted with unique, unpredictable situations whose inherent problems are not readily observable (Baumgartner, 2004).

Students should be enabled to invent new things, and produce or generate new knowledge. Consequently, learning and teaching at universities in most cases can be assigned to the requirements presented in Learning and Teaching II and III. In order to achieve this goal, a special learning environment must be provided.

Consequences for IT-Supported Learning and Teaching

Computer software can be used for all three models, ranging from programmed instruction (Learning/Teaching I) to problem-solving software (Learning/Teaching II), to complex simulations and/or so-called micro worlds (Learning/Teaching III). It is said that the inherent nature of the Internet brings the real world into the classrooms, and with its hyperlink structure it clearly advocates the model of Teaching III (Baumgartner, 2004).

The use of the Internet, especially through its social software, gains importance because it can contribute to exceed the limits of classical teaching models. By adapting learning and teaching models to the new technical possibilities, the roles of learner and teacher are becoming more indistinct because the learner can take a central part in the design and arrangement of the learning process (Kerres, 2006).

Systems that support learners with respect to the Learning Model III are called personal learning environments (PLEs). PLEs are mostly Web-based applications and are based on learning management systems (LMSs; Seufert, 2007).

PLEs are personal and open learning environments, and they are suitable for cross-linking content and people. Learners can use PLEs to manage individual learning progress. They are ideally available for lifelong learning and are supported by the following processes.

- setting up individual learning goals
- planning and controlling one’s own learning concerning the content as well as the learning process
- combining formal and informal learning activities
- communicating with peers during the learning process
- establishing social networks or communities of practice
- using Web-based services, for example, syndication
- verifying the learning process with respect to the learning goals

Unlike an LMS, which is usually related to one special institution or to one special course, a PLE is focused on the individual learner. A PLE should combine a broad mixture of different resources and subsystems in a “personally-managed space” (Attwell, 2006).

In the previous decade, learning management systems were developed that moved toward enterprise-level applications, “but the wealth of new, user-friendly, tools in the Web 2.0 environment suggests that the all-in-one monolithic e-learning systems may be entering a phase of obsolescence by the ongoing development of the web” (Craig, 2007).

Social software applications have the potential to cope with these requirements (Brahm, 2007).
DESCRIPTION AND CLASSIFICATION OF SOCIAL SOFTWARE TOOLS

In the following section, three social software tools—Weblogs, discussion forums, and wikis—are described in more detail and the tools are compared. Students were able to select these tools during the empirical study.

Weblog

A Weblog, a compound of Web and logbook, usually just called “blog,” is a Web site that contains new articles or contributions in a primarily chronological order, listing the latest entry on top.

Primarily, a Weblog is a discussion-oriented instrument especially emphasizing two functions: RSS feeds and trackback. RSS feeds, also called RSS files, can be read and processed for further use by other programs. The most common programs are RSS readers or RSS aggregators that check RSS-enabled Web sites on behalf of the user to read or display any updated contribution that can be found. The user can subscribe to several RSS feeds. Thus, the information of different Web sites can be retrieved and combined. Preferably, news or other Weblogs are subscribed to.

Trackback is a service function that notifies the author of an entry in a Weblog if a reference to this contribution has been made in another Weblog. By this mechanism, a blogger (person who writes contributions in a Weblog) is immediately informed of any reactions to his or her contribution on other Weblogs (Hammond, Hannay, & Lund, 2004).

Forum

A discussion forum or Web forum is a service function providing discussion possibilities on the Internet. Usually, Web forums are designed for the discussion of special topics. The forum is furthermore subdivided into subforums or subtopics. Contributions to the discussion can be made and other people may read and/or respond to them. Several contributions to a single topic are called a thread.

The application areas of the two instruments, Weblogs and forums, are quite similar. The most essential differences between Weblogs and discussion forums can be described as follows:

• A forum is usually located on one platform while many bloggers develop their own, individual environments. They connect their Weblogs via RSS feeds and trackback functions.
• Through the integration of RSS files and trackback functions, a discussion process can be initiated and continued, crossing the boundaries of the bloggers’ own Weblogs without authors having to observe other Weblogs.
• Weblogs tend to be more people centered whereas forums are more topic focused. Through the use of Weblogs, learner-specific learning environments can be constructed without interfering with the learning environments of others (Baumgartner, 2004).

Wiki

A WikiWikiWeb, shortly called wiki, is a hypertext system for storing and processing information. Every single site of this collection of linked Web pages can be viewed through a Web browser. Furthermore, every site can also be edited by any person. The separation between authors and readers who write their own text, and change and delete it is obsolete as also third parties can carry out these functions (Augar, Raitman, & Zhou, 2004).
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Learning Activities Supported by Social Software

The integration of different social software tools offers support in the following learning activities:

- **Learning from different perspectives:** The integration supports the exchange of ideas as well as finding like-minded people. Furthermore, social software tools simplify the process of establishing connections between people of the same or similar interests. Simultaneously, its open and expandable philosophy supports going beyond the thinking in groups (of a common interest) by supporting diversity and bringing together different perspectives and backgrounds (Efimova & Fiedler, 2004; Schulmeister, 2004).

- **Synergies of self-organized and joint learning:** Social Software tools provide a personal learning area for their authors. However, this does not force a general learning flow or learning style. Learners are not alone and can profit from the feedback of a community in order to examine and enhance the development of their own ideas (Böttger & Röll, 2004; Efimova & Fiedler, 2004; Fiedler, 2004).

- **Digital apprenticeship:** Through reading other wikis, forums, or Weblogs regularly, beginners are enabled to learn from experts. At the same time, they can actively participate in discussions beyond geographic or thematic borders (Efimova & Fiedler, 2004; Fiedler, 2004).

- **Support for the development of the ability to learn (learning to learn):** Through the publication of one’s own thoughts and reflections, content is made available for assessment as well as for further development, thereby improving self-observation and self-reflection skills. The knowledge change of the learner will be improved (Baumgartner, 2005).

- **Support for reflexive writing:** The simple but efficient and rather robust encoding standard usually used in social software allows for the explicit modeling of content flows, feedback loops, and monitoring procedures of various kinds, thus supporting an ongoing iterative process of explication and reflection (Fiedler, 2004).

Integration of Social Software Tools and the Learning and Teaching Modes

Baumgartner (2004) has integrated different types of content management systems in relation to the most suitable learning and teaching mode. He clearly states that the boundaries are overlapping and that every tool, in one way or another, could be used for every teaching model. Figure 2 presents the integration of the social software tools and the learning and teaching modes.

Weblogs and forums can be defined as discussion-oriented tools because the discourse and exchange of ideas related to a certain topic is the preeminent aim. Weblogs offer the possibility to support all three phases of the learning process. However, the main focus can be assigned to Modes II and III.

Based on the multitude of interaction possibilities, wikis can be attached to Teaching III (Baumgartner, 2004). Additional functions were added to Weblog tools that go beyond the scope of the central use of Weblogs; for example, longer articles can also be stored. Through the creation of directories, a structured collection of links can be implemented.

Through the additional linking of Weblogs, wikis, and forums, there is the possibility to develop a personal knowledge collection (Kantel, 2003).
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Figure 2. Prototypical modes and social software tool

EMPIRICAL SURVEY

The purpose of this survey was to determine if the integration of Web-based social software tools (wikis, discussion forums, and Weblogs) are suitable to foster learning from the student’s point of view.

Aim of the Survey and Methodology

Scrutinizing the possibilities and constraints of social software tools (wikis, discussion forums, and Weblogs) as personal learning environments, students at Austrian universities were asked to use one or more of the offered tools for their research, homework, and documentation purposes. In most cases, the collaboration of students was required to perform the assigned tasks.

The students were asked to use the tools for one course only during the winter term of 2006. Furthermore, there was no obligation for the students to use a tool at all; they were just encouraged to do so. Students were also offered the possibility to use two or three tools; the selection was up to the students.

The courses were organized as blended-learning courses so they included on-campus lessons and off-campus work in which the students could work face-to-face or using the social software tools.

More than 90% of the students attending the courses took part in this survey. In order to give the participants an impression of the functionality and usage of the tools, short presentations of the tools were made by an instructor before the students made their choice.

At the end of the testing phase—after 4 weeks of using the tools—selected students reported their experiences with the tools used. Students who had decided not to use the tools in the first place got an impression about the usage, advantages, and disadvantages of the tools from their fellow students. Following these short presentations, a questionnaire was completed that provided the basic findings for further inspection and research.

A total of 268 first-semester students of different Austrian universities in five selected courses
took part in this survey. The majority of the participants were between 18 and 20 years old. The portion of female students was about 17%.

According to a survey conducted by Seybert (2007) concerning gender differences in computer and Internet usage by young people (aged between 16 and 24), there is no gap between men and women in Austria. The proportion of women and men (in the relevant age class) that use a computer (almost) once a day is 72% the same. A study by Otto, Kutscher, Klein, and Iske (2005) indicates that there is a positive correlation between a formal educational background and the usage of the Internet in Germany: “Beside socio-cultural resources like family background, peer structures and social support in general, the formal educational background turns out to be the main factor for explaining differences in internet usage” (p. 219). As a consequence, for the analysis of the results of this survey, no distinction between male and female students was made.

Table 1 presents the distribution of the participants concerning the degree programs the students are attending.

For the further analysis of the results, no distinction according to degree programs will be made.

The questionnaire asked each participant questions about her or his subjective impression of the application of the tools. It included 5-point Likert scales for rating constructs such as eligibility, perceived quality, or enjoyment.

The study was conducted to find answers about the:

- usage of social software before the study started,
- selection of the offered tools,
- perceived quality of the contributions and the support for learning,
- applicability of the instruments to support communication and community building,
- correlation of the usage for private and educational purposes of the tools,
- fun factor in using the instruments, and
- potential future usage.

The results of the study are presented in three parts:

- Part 1: Analysis of the usage of wikis, discussion forums, and Weblogs of the students before the study was started
- Part 2: Experiences made with the tools during the study
- Part 3: Potential future usage of the tools

### Part 1: Tool Selection and Prestudy Usage

Due to the fact that the students could select the tools on their own, the Table 2 shows the results of this selection process.

According to Table 2, the combination of wikis and discussion forums is the most selected combination of tools (42.9%), followed by wikis only (23.1%) and discussion forums only (22.4%). In the end, only five students (1.9%) did not take part in the study; they did not select a tool, although they first had the intention to do so. Only one student used Weblogs only. Generally, Weblogs were not used very intensively by the participants.
Table 3 shows the usage of the tools by the participants before they took part in the study. It indicates that wikis (76%) and discussion forums (78%) are currently the most widely used tools. Weblogs are only used by 11% of the asked students. The results clearly show that the Weblog hype had not yet reached the surveyed students. Due to the fact that only about 11% of the students are currently using Weblogs, the results for this instrument are not published for the first part of the analysis. When it comes to the potential future usage of the instruments, Weblogs are taken into consideration again.

The following section presents the results for statements used in analyzing the usage in more detail.

Tables 4 and 5 present the current usage of the tools for private and educational purposes. First, the statement “I often use wikis or forums for private purposes” was presented.

<table>
<thead>
<tr>
<th>Only one tool selected</th>
<th>Percent</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wikis only</td>
<td>23.1%</td>
<td>62</td>
</tr>
<tr>
<td>Discussion forums only</td>
<td>22.4%</td>
<td>60</td>
</tr>
<tr>
<td>Weblogs only</td>
<td>0.4%</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>More than one tool selected</th>
<th>Percent</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wikis and discussion forums</td>
<td>42.9%</td>
<td>115</td>
</tr>
<tr>
<td>Wikis and Weblogs</td>
<td>1.9%</td>
<td>5</td>
</tr>
<tr>
<td>Discussion forums and Weblogs</td>
<td>0.7%</td>
<td>2</td>
</tr>
<tr>
<td>Wikis, discussion forums, and Weblogs</td>
<td>6.7%</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No tool selected</th>
<th>Percent</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>No tool selected</td>
<td>1.9%</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3. Students already using the tools

<table>
<thead>
<tr>
<th>Wiki</th>
<th>Forum</th>
<th>Weblog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>76%</td>
<td>78%</td>
</tr>
<tr>
<td>No</td>
<td>24%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Table 4. Usage for private purposes

<table>
<thead>
<tr>
<th>Wiki</th>
<th>Forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>I totally agree</td>
<td>33%</td>
</tr>
<tr>
<td>I generally agree</td>
<td>35%</td>
</tr>
<tr>
<td>Neither...nor (neutral)</td>
<td>9%</td>
</tr>
<tr>
<td>I slightly disagree</td>
<td>16%</td>
</tr>
<tr>
<td>I disagree</td>
<td>8%</td>
</tr>
</tbody>
</table>
Table 5. Usage for educational purposes

<table>
<thead>
<tr>
<th></th>
<th>Wiki</th>
<th>Forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>I totally agree</td>
<td>57%</td>
<td>22%</td>
</tr>
<tr>
<td>I generally agree</td>
<td>33%</td>
<td>29%</td>
</tr>
<tr>
<td>Neither...nor</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td>(neutral)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I slightly disagree</td>
<td>8%</td>
<td>24%</td>
</tr>
<tr>
<td>I disagree</td>
<td>1%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Table 5 presents the results for the statement “I often use wikis or forums for educational purposes.”

A huge majority (90%) stated that they use wikis for educational purposes and about two thirds (68%) used wikis for private purposes. Wikis are therefore more intensively used for educational purposes than for private purposes, whereas the usage of forums is exactly the opposite: They are more used for private purposes than for education.

The responses of the students concerning these statements were that wikis are foremost considered as a source of serious information, whereas forums are ideal for getting hints or clues to problems because of their privacy. Questions about computer problems, computer games, leisure activities, and so forth were mentioned. A repetition of this image can be identified when the disagreement with the statement is analyzed; 29% of the students do not or rarely use forums for private purposes compared to 36% for education.

**Part 2: Experiences Made During the Study**

This section presents the results of the study concerning experiences with the usage of the tools during the study.

**Quality and Support for Learning**

The following refers to statements concerning the quality of the contributions of wikis and discussion forums and their support for learning.

The results of the statement “The quality of contributions in wikis or forums is in general good” are presented in Table 6. The contributions of wikis are evaluated to be much better than those of forums.

The surveyed pupils had the opportunity to give reasons for their assessment concerning the quality of contributions via additional qualitative feedback. The following summarizes the addressed reasons.

One reason for the excelling grade for the quality of wikis is the “Wikipedian community.” The term wiki is often seen as a synonym for the free online encyclopedia Wikipedia (http://www.wikipedia.org). Wikipedia is widely used for a great variety of tasks, including research on all topics needed for educational and private purposes.

In contrast to the good evaluation of the contributions of wikis, the open architecture of wikis was also mentioned. In most cases, this open architecture allows everyone to edit entries, which results in the uncertainty of whether the knowledge presented is correct or not. The quality of contributions in discussion forums was rated rather mediocre. Forums are primarily used for technical problems, especially computer-related problems; to get in contact with experts on certain topics, and to get information on online games.

The next statement, “The usage of wikis or forums leads to misunderstandings and confusion,” is about the clarity of the contributions.

Only a minority think that the contributions are not clear and may lead to misunderstandings. In this case, wikis are also rated better than forums.

The next statements addressed the support of these instruments for learning. Table 8 summarizes the results for the statement “When reading
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Table 6. Perceived quality of contribution

<table>
<thead>
<tr>
<th></th>
<th>Wiki</th>
<th>Forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>I totally agree</td>
<td>38%</td>
<td>10%</td>
</tr>
<tr>
<td>I generally agree</td>
<td>52%</td>
<td>31%</td>
</tr>
<tr>
<td>Neither...nor (neutral)</td>
<td>10%</td>
<td>41%</td>
</tr>
<tr>
<td>I slightly disagree</td>
<td>2%</td>
<td>15%</td>
</tr>
<tr>
<td>I disagree</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Table 7. Clarity of contributions

<table>
<thead>
<tr>
<th></th>
<th>Wiki</th>
<th>Forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>I totally agree</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>I generally agree</td>
<td>6%</td>
<td>18%</td>
</tr>
<tr>
<td>Neither...nor (neutral)</td>
<td>29%</td>
<td>37%</td>
</tr>
<tr>
<td>I slightly disagree</td>
<td>34%</td>
<td>27%</td>
</tr>
<tr>
<td>I disagree</td>
<td>29%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Table 8. Reading contributions helps to acquire contents

<table>
<thead>
<tr>
<th></th>
<th>Wiki</th>
<th>Forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>I totally agree</td>
<td>23%</td>
<td>8%</td>
</tr>
<tr>
<td>I generally agree</td>
<td>36%</td>
<td>21%</td>
</tr>
<tr>
<td>Neither...nor (neutral)</td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td>I slightly disagree</td>
<td>5%</td>
<td>25%</td>
</tr>
<tr>
<td>I disagree</td>
<td>3%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Table 9. Writing contributions helps to acquire contents

<table>
<thead>
<tr>
<th></th>
<th>Wiki</th>
<th>Forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>I totally agree</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>I generally agree</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td>Neither...nor (neutral)</td>
<td>45%</td>
<td>34%</td>
</tr>
<tr>
<td>I slightly disagree</td>
<td>14%</td>
<td>22%</td>
</tr>
<tr>
<td>I disagree</td>
<td>19%</td>
<td>17%</td>
</tr>
</tbody>
</table>

collections in wikis or forums, it is easier for me to acquire the learning contents.”

More than half of the students express that reading contributions in wikis is helpful for learning, whereas only about 8% think that it is not helpful. Compared to forums, wikis were again much better evaluated, especially considering the big difference from the negative evaluations of forums.

Table 9 presents the learning support achieved by writing contributions. (“When writing contributions in wikis or forums, it is easier for me to acquire the learning contents.”)

A different picture emerges in the statistics when comparing the evaluation of how writing an article or post supports the learning process. Here, forums take the lead when it comes to positive assessment. In both cases, there was a large number stating that writing is neither positive nor negative. The majority of the students read rather than wrote, while more students wrote in forums than in wikis.

Applicability for Communication and Community Building

The statement was formulated as follows: “Wikis or forums are appropriate to support communication.”
The results clearly demonstrate that discussion forums are made for communication whereas wikis are rather seen as a kind of reference book or encyclopedia, as already mentioned above.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
 & Wiki & Forum \\
\hline
I totally agree & 9\% & 39\% \\
I generally agree & 33\% & 37\% \\
Neither...nor (neutral) & 29\% & 17\% \\
I slightly disagree & 15\% & 4\% \\
I disagree & 15\% & 3\% \\
\hline
\end{tabular}
\caption{Applicability for communication}
\end{table}

The results of the next statement, “Wikis or forums support the setup of communities,” can be seen in Table 11.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
 & Wiki & Forum \\
\hline
I totally agree & 10\% & 28\% \\
I generally agree & 25\% & 32\% \\
Neither...nor (neutral) & 39\% & 23\% \\
I slightly disagree & 15\% & 11\% \\
I disagree & 10\% & 6\% \\
\hline
\end{tabular}
\caption{Support for community building}
\end{table}

Opinions about the applicability of wikis to establish a community is split. About 35\% say that wikis are supportive of building a community compared to 25\% who said that wikis do not support community building. The support of forums to build a community is rated much better: 50\% indicated that forums are well suited to build a community. These results were to be expected because they confirm the nature of the instruments.

\section*{Fun Factor in Using the Instruments}

In surveying whether students gain pleasure (“I enjoy using wikis or forums”), wikis again came out on top.

A majority enjoy using wikis (62\%) and forums (56\%). Considering the percentage of students who said that there is no (“I disagree”) or little (“I slightly disagree”) fun when using these instruments, wikis (6\%) are much better rated than forums (18\%).

\section*{Part 3: Potential Future Usage of the Tools}

The third section of the empirical study deals with the potential usage by students who had not used the instruments before the study. Students gained knowledge and experiences by using the tools during the study by themselves or on the basis of the reported experiences made by their fellow students.

The first statement, “I will use wikis, forums, or Weblogs for educational purposes in the future,” yielded the results in Table 13.

According to this study, wikis will have a bright future and will be used often for educational purposes, whereas forums will be used less often. About 54\% of the surveyed students had the intention of using wikis more or less often in the future. About 16\% did not think that they will use wikis often in the future and 30\% are not yet sure if they will use this instrument.

The results for forums and Weblogs indicate no clear trend, but forums were rated slightly higher than Weblogs; 39\% of the students stated that they can imagine using forums in the future for their education compared to 36\% for Weblogs. At the other end of the scale, 45\% did not have the intention to use forums (40\% for Weblogs).
The statement “I will use wikis, forums, or Weblogs for private purposes in the future” leads to similar results. From this point of view, wikis are again the leading instrument, followed by forums and then Weblogs.

It must be said that the responses to this set of statements represented feelings, attitudes, and opinions about instruments that had not yet been used by the asked participants. The purpose of posing these statements was to gain insight into the mind-set in regard to these instruments.

The results clearly show that wikis are currently the most often used instrument and furthermore have the greatest potential as a tool for learning and knowledge management in the field of learning; these findings are in line with other empirical studies (Bendel, 2007; Chao, 2007).

Other studies (McGill et al., 2005; Nicol & MacLeod, 2004) report that a shared workspace helps to support collaborative learning; the possibility of being able to access and contribute to the development of resources at any time and from any location was especially appreciated by the students.

The survey at hand made a distinction between reading and writing contributions to wikis and discussion forums. The results show that 59% of students said reading contributions in wikis is helpful for learning (stating “I totally agree” and “I generally agree”) while only 21% stated that writing in wikis is helpful for learning. Reading contributions in forums helped 29% of the participants, whereas writing in forums was helpful to 26%. This survey supports the general statement that a shared workspace that supports a constructivist and learner-centered approach is helpful for learning.

The pedagogical value in the context of learning is described in several publications (Babcock,
Weblogs can foster the establishment of a learning and teaching environment in which students and teachers experience a greater degree of equality and engagement. Du and Wagner (2007) published results of a study of an information systems undergraduate course (31 participants). This study indicated that the performance of students’ Weblogs was a significant predictor for learning outcomes, while traditional coursework was not. Moreover, individuals’ cognitive construction efforts to build their own mental models and social construction efforts to further enrich and expand knowledge resources appeared to be two key aspects of constructivist learning with Weblogs. According to this study, there is a potential benefit of using Weblogs as a knowledge construction tool and a social learning medium.

According to the survey at hand, Weblogs are not yet widely used, and their potential seems to be limited. It can be assumed that these limited prospects will change when the penetration of Weblogs into the daily routine of the students increase—for private as well as for educational purposes.

To avoid possible pitfalls about the application of these instruments in the context of learning, some social and psychological issues must be taken into consideration (Kreijns, Kirschner, & Jochems, 2003). Social interaction is essential for members of a team to get to know each other, commit to social relationships, develop trust, and develop a sense of belonging in developing a learning community. The size and the composition of the learning communities seem to be important factors in how interaction and communication within the learning community will take place (Dooley & Wickersham, 2007). There are also many unresolved issues, like the provision of the technology and the services, intellectual property rights and digital rights management, the security of data, access restrictions to the content, and information ethics (Attwell, 2006; McGill et al., 2005; Sharma & Maleyeff, 2003).

CONCLUSION

The aim of this contribution was to investigate the experiences of students using social software tools in the context of learning. Wikis, Weblogs, and discussion forums are typical social software tools and were used for this survey.

The results clearly show that wikis and discussion forums can support learning and collaboration. The usage of Weblogs in this study was limited and hence no statements about their applicability can be made. In order to assure a successful implementation of these tools, social and psychological issues must be taken into consideration as well.

The results of this study are the basis for the introduction of social software into education to help students set up individual learning environments. These learning environments should support lifelong learning.

There are likely to be other unplanned consequences of the intensive use of the Internet in general and social software especially. Further research is needed to explore possible problems and solutions.

The results of the empirical survey indicate that a long-term study in combination with the further development of social software tools may be promising.

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