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Blozs for Corporate Learning

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Blogs for Corporate Learning

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ABSTRACT

The user experience of creating and maintaining blogs provides an easy way to publish content on the web, and has contributed to the proliferation of blogs. Taking notes while studying is a good habit, and most people tend to do it. The format of a blog has clear benefits for this purpose. The process of writing has the benefits of organizing thoughts, synthesizing ideas, memorizing by repeating, and of creating a good source for re-reading at later stages. Beyond personal benefits, other students may gain a lot by going over the study blogs of their peers. In this paper we describe three case studies we conducted with corporate learning students who used blogs to share their learning experience. We describe the rationale for the use of blogs, follow the case studies, and present initial results and conclusions we reached by examining the usage patterns as well as collecting data through questionnaires. We conclude with a list of features and ideas for enhancing a blogging environment for learning.

Categories and Subject Descriptors

K.3.1 [**Computers and Education**]: Computer Uses in Education – *collaborative learning*; H.5.3 [**Information Interfaces and presentation**]: Group and Organization Interfaces - *Web-based interaction*; K.4.3 [**Computers and Society**]: Organizational Impacts - *Computer-supported collaborative work*.

General Terms

Experimentation, Human Factors

Keywords

Blogs, corporate learning, peer-support, note-taking, reflection

1. INTRODUCTION

Blogs (short for Weblogs) are personal journals that display new updates in a chronological manner, where recent postings appear before older ones. Blogs are typically owned by one author, and readers may respond and conduct "talkbacks[1]" with the author per posting. The user experience of creating and maintaining blogs provides an easy way to publish content on the web, and has contributed to the proliferation of blogs. Blogs are used by journalists to publish uncensored opinions; they are used by professionals to distribute tips and solutions; companies make use of blogs for PR. While blogs' original role was that of a personal diary, we are seeing wider and wider use of them in the enterprise. It varies from probing customers by publishing new or coming developments in order to get feedback through the

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[1] Talkback is the term used for user comments within a post in a blog. Talkbacks allow readers to talk back to the author, and discussions may take place among author and readers

talkback mechanism, to keeping notes of progress in development organizations. In this paper we examine the use of blogs for note-taking in learning settings.

Taking notes is a very valuable tool. Notes help us keep track of what we are doing or what we plan to do. Writing helps organize our thoughts and may surface new ideas or new tasks that need to be done. Using the format of blogs and publishing our notes for others to read, opens the door for sharing experiences and thoughts. Blog entries that have the format of an article may be worth subscribing to, but even less organized postings may still be analyzed by search engines in order to be made useful to others. Some entries may be kept private for the benefit of the authors themselves, but generally the dynamics of talkbacks is very beneficial for clarifying issues to the readers, and for tightening the content of the blog itself.

Taking notes while studying is a good habit [14] and most people tend to do it on their own – be it in a physical notebook, snippets of papers, or in organized online documents. The format of a blog has clear benefits for this purpose. Beyond personal benefits, other students may gain a lot by going over the blogs of their peers. Well-written lesson summaries may save a lot of time for students who miss a session or misunderstand a point; but even less organized scribbles may serve for the location of peers with similar interests by searching blog contents. And finally, the social network that is built around sharing study blogs and the talkbacks in them is a network that has clear value in many aspects.

With this thought in mind, we conducted three pilots of using blogs for students to share their learning experiences. Being inside a corporate environment, the learning experiences that we dealt with were all corporate-learning cases. In one case, the participants of a face-to-face course that took place once a week for 15 consecutive weeks were given access to the course material through a course blog, and one of the students contributed her study notes for us to organize in a dedicated blog and publish for all other students' benefit to read and discuss. Another case was a pure peer-support case with no moderation or pre-organized material, where employees who spent some time learning a new area volunteered to organize their findings (good tutorials, articles, tips, etc.) in topic-oriented blogs (with a single owner) for the benefit of their corporate-peers who may wish to engage in the same type of learning. In the last case – the more detailed study that we conducted with 75 participants of a pilot – the students were involved in an e-learning experience of self-study online lessons where they were asked to reflect upon their studies and record their reflections in a Journal system that is similar in functionality to a blog.

Our goal over these pilots was twofold. On the one hand we wanted to corroborate our hypotheses that using blogs for organizing and sharing study notes will improve learning achievements and expand social networks. On the other hand we tried to collect comments and learn from the experience, in order

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to be able to enhance a blogging environment and adapt it for learning. While some or even all of our case studies are not necessarily unique to corporate-learning and our conclusions and recommendations may be suitable to a wider variety of applications, we choose to focus on corporate-learning. Corporate learning provides opportunities for a wider variety of learning experiences: from traditional training, to just-in-time learning.

In this paper we describe the three case studies, list the initial results they produce, and present our conclusions and recommendations for enhancing blogging environments and adapting them for learning. Section 2 of this paper surveys literature on note-taking, journals and reflection, existing blogging environments, and the importance of social networking. Section 3 describes the three case studies and our findings that lead to the conclusions and future directions that are brought in Section 4. We summarize in Section 5..

2. RELATED WORK

2.1 Note-taking

Note-taking, can be used for ensuring the availability of material for future reading and memorizing, and for marking places of difficulty. Some research on the benefits of note-taking emphasizes that the process of note-taking in itself helps to encode and recall material [3], whereas other research emphasizes the later reviewing of notes as an effective learning strategy [13]

However, the value of note-taking has also been questioned. In Plato's dialog, "Phaedrus", Socrates notes that writing may actually contribute to forgetfulness, since writing something down frees the writer from using memory to remember it. The kind of processing which takes place during note-taking affects their educational value. Verbatim note-taking is not as effective as note-taking which is done while processing information at a higher lever [6]. Students benefit from a lecture environment that permits deep processing while taking notes [1]. The self-consciousness which is evoked due to the public nature of blog posts may contribute to deeper processing during note-taking.

In addition the inconsistent quality of notes makes them an unreliable resource for review [17]. That is why a social control tool is important. Commenting on each-other's posts in a blog can increase their quality for the purpose of material review.

2.2 Journals and Reflection

Writing journals is a more formal form of note-taking, which has been used in a wide range of educational applications, from sociology and history, to mathematics and engineering [31, 32, 33, 36]. Journal writing reveals thought processes and mental habits, aids memory, and provides a context for personal growth [29].

According to Sommer [34], writing journals should not be given as an open-ended assignment to students. Journal writing, as an open-ended assignment may lead to student resistance to writing journals [12] or that students may find difficulty in knowing what to write about [22]. One way to overcome these problems is to provide specific exercises or guiding questions [24, 37].

Boud et al. [5] define reflection as an activity in which people 'recapture their experience, think about it, mull it over and evaluate it'. However, there are different definitions as to the objects and methods of reflection. Dewey's focus is on knowledge, acquired through use of the scientific method [9].

Boud [5] emphasizes reflection on emotion and experience, whereas Schön stresses reflection on action [30]. What is common to these approaches is that reflection is focused, rational thought which is triggered by some surprise, problem or difficulty, and is aimed to uncover something that is hidden.

The process of reflection replaces the automatic actions and associative thoughts which rapidly follow each other in the usual process of being. Reflection helps us organize our thoughts, to determine relationships between the objects of reflection, and understand them. This enables us to convert blind and impulsive action into planned, intelligent action, which better serve the actor's goals.

Reflection is not merely an aid to improve learning; rather, according to several models of learning, at least some forms of learning cannot occur without reflection. For example, in Kolb and Fry's model of experiential learning [19] four stages form a cycle, where each stage leads to another. It is the stage of observation and reflection which enables people to form abstract concepts from concrete experience. In contrast, other models for experiential learning allow some forms of learning which do not require reflection, although it is still needed for more profound learning [15, 16].

In the context of work, collaborative reflection can uncover political and emotional data which might be blocking operating effectiveness and can question the underlying assumptions and premises behind work practices. Sharing reflection within a community can make people move from a position of unawareness to their own actions and their consequences to a state of awareness. In particular, it can also make people be aware of inconsistencies between what they preach and what they practice [2] and be aware of errors and biases in obtaining information and in reasoning [7, 27].

Journal writing helps people to become more reflective [4, 39]. Blogs, as collaborative journals, have the potential to foster collaborative reflection, where the object of reflection may be either work practices, or knowledge which is required for one's continuing education.

2.3 Blogs and Education

Most journals have a single writer. Collaborative journals have been suggested in order to build a community of learners though the process of critical co-reading and co-writing. Greater collaboration can be achieved by sharing entries with the class, and using them to stimulate discussion [25]. Blogs can be viewed as collaborative electronic journals.

Blogs are used in a variety of ways in education [20]. Blogs can support teacher-teacher communication by sharing experiences and course material. Some blogs support educators by providing news and links to items of interest, acting as filters of content from other sources, or by providing original content.

A blog can serve as a homepage for a course, with announcements, links, observations, and learning resources posted by the teacher, whereas comments and questions can be posted by the students. Another option for teacher-student communication uses blogs more as a mentoring device: students also have their own blogs, and although the teacher/mentor blog has special significance, students have control over their own space. The mentor's blogs is then used both to make observations about the

subject material, and to bring posts from other blogs to the attention of the community.

Finally, blogs can support student-student communication, which is especially important in a corporate environment where most of the time there are no teachers. On top of their normal journaling function, blogs can be used as an asynchronous communication device between students, similar to bulletin boards.

2.4 Social Networks and Education

Just as wires connecting computers create a computer network, connections and relationships between people create a social network [38]. Social networks are very important in online communities [11]. They help to build stronger communities and diffuse information.

While the area of social networks starts from the works of Moreno [23], there are several works that date back to the beginning of the 20th century, noting the importance of social networks for education (see Freeman [10] for an excellent summary). Freeman cites works that looked at how children interacted with each other during the education process. He shows very interesting examples of how children choose companions for study, how they study together (watch each other, talk to each other) and many more. These works show how important it is to have an effective social network as part of a study process.

In the corporate setting, social networks are even more important, especially in large organizations [8]. Most of the work can be done more effectively with the help of close and remote colleagues. The same observation is valid for the corporate learning situation. While many mostly remote individuals need to study the same material and gain the same values, social networks can play a vital role in information diffusion and more effective learning.

Blog features such as commenting, RSS feeds, and interlinking with permalinks and blogrolls, supports social networking which is absent from journals. Permalinks provide a unique URL which refers to a specific post in a blog. Blogrolls, which are on the sidebar of many blogs, contain links to other related blogs. In many cases the related blogs belong to people who are in the blogger's social network. Permalinks and Blogrolls support the static documentation of the social network, its structure, and the topics which are of common interest to the community. RSS feeds allow people who are interested in a group of blogs to scan the latest posts and know which blogs have been updated. RSS feeds help people to watch what the people in their social network are doing, and talk with them.

3. THREE USE CASES

As we can see, note-taking, reflection and fostering social networking is very valuable in educational processes. Journals has been used for note-taking and for encouraging reflection, however blogs can provide the benefits of journals and add social networking to the experience.

3.1 Study-notes Blogs for Face-to-Face Class

A Business Education Program for about 20 managers and project leaders was conducted in our lab. The program was a face-to-face class that met one day a week over a period of 15 weeks, where different teachers came before the group and conducted face-to-face lessons, typically based on an overhead slide presentation. In some, but not all presentations, handouts were given to the students prior to the lesson. Some of the students took organized

notes on paper, others scribbled here and there over the handouts when these were given, yet a few others brought their laptops with them to class and took notes electronically. One of the students, who used her laptop for taking notes, shared her notes with one or two of her peers at the end of the day. She wrote somewhere between five to seven Word pages per week, and used to go over them and polish them at the end of the lesson and then forward them through e-mail to the peers who asked to share them.

Realizing she was sharing her notes, we brought up the idea of creating a blog for her so she could share her notes electronically. We pointed out the ease of use, the ease of peer access, and then also the ability of peers to leave comments and conduct discussions over the blog. The student happily contributed her notes to us and assisted us in configuring the right environment for publishing her notes – the appropriate categories, and especially breaking the seven-page summaries into smaller chunks appropriate as blog posts.

We spent a few weeks toying with organizing the summaries into the blog. The basic categories we created were topical – by the topics of the course. The blogging environment we used had the typical calendar on the sidebar, but we realized it was not enough – the blog calendar indicated the date of **publishing** a post, but not necessarily the date the lesson took place. Navigating through study notes is often done by the date of the lesson – either for recalling an item that "was discussed two weeks ago", or for students who missed a whole day and want to catch up. We therefore added an orthogonal set of categories, each carrying the date of the lesson. Finally, we added yet another set of orthogonal categories, indicating the **type** of a post: most of the posts were summaries, but some included new terminology (typically the first few lines in a summary) that we decided to categorize separately, others were assignments. In order to support these three different sets of categories, we used the hierarchical structure of categories in our blogging environment (and created three different branches of the tree). When publishing the posts, we used multiple categories to classify each.

A challenge we encountered, had to do with the reverse chronological order of the blog. While it is useful to place the most recent week's summary at the top, the reverse order of different chunks of the same week's summary made reading difficult.

Four weeks into the program, when the blog already contained a few weeks of summaries, we approached two of the other students in the program and asked that they review the blog and let us know what they think. The feedback we got back was positive and encouraging. They did complain, though, of the reverse order of posts, and one of them volunteered his own notes for a blog that would maintain one long weekly post rather than the broken down to topics posts that we created. The other person decided not to contribute her notes to yet a third blog, as her note-taking habits are different and she usually just scribbles comments that she claims would be out of context and of little use to others. Another suggestion that was made was to add the formal material of the course – so that each lesson summary would be linked to the right formal presentation. We adopted this idea and created yet another blog – this time a formal blog of the course, where we posted the weekly presentations. Blog entries of the formal course blog could now be tracked back from the student blogs, student discussions over the presentation could take place in talkbacks,

and the students of the course could download the presentations from a central place.

The introduction of the three blogs (two of students and one of the formal course materials) was not as successful as we expected. People were pleased to have a central place for getting the presentations, but some said they'd rather get it over e-mail. Those who used to get the well-organized study notes over e-mail from a peer now got them from the blog. However, no talkbacks were posted in either of the blogs, and discussions – on the notes or on the formal presentation – did not take place. Partly, it can be explained by the fact that the diffusion of collaboration technologies is not easy; it requires careful design and implementation [35]. Some people were not familiar enough with blogs to use them efficiently; some others were strongly prejudiced against new technology. So we could have achieved a better level of participation if our introduction of blogs in this course was less ad-hoc.

While we could not use this pilot for studying the interaction between users, we did learn a lot about the dynamics of note-taking through a blog. We learned about the different sets of categories that posts should be classified to. We learned of the need to organize one long summary into smaller chunks, in a way that would fit the chronologically reversed publication order of a blog. We further learned, by interviewing the student who contributed the notes for our first blog, that writing to the blog was a different experience than writing to herself, even though she was sharing her notes with others before – something in the larger audience and the persistence of material on the Web (even if just the corporate Intranet) made her take clearer notes. This difference implies that some overhead is inflicted upon note-taking students when publishing in a blog – it is not as simple as clicking a "publish" button on notes written in any case. This means that writing a blog as a part of e-learning process is an activity requiring some additional effort from the user. Thus an added value is required, in order for people to choose the form of blog. We anticipate at least three types of added value: 1) that writing more detailed notes would improve the comprehension of the writer [18]; 2) that sharing with others, getting their comments, and even conducting a discussion with them would increase the comprehension further [25]; and 3) that the interaction with readers and the contribution of their study notes to other will increase their social capital [26, 28].

We could not verify this in that study, however we need to focus on the added value as we continue exploring usage of blogs in e-learning environment to be able to convince users to invest additional effort and manage personal e-learning blogs.

3.2 Topical Blogs for Peer Learning

A different pilot using blogs that we conducted in our lab was a peer-learning project. The rationale that led to this pilot is that in our lab, as in many corporate environments, people have to keep up with technology and learn new things everyday. It is not formal learning in an organized class, but rather locating material – articles, tutorials, books – over the Web or through other channels and going over it for the purpose of learning. It often happens that people in different parts of the organization study similar topics and are not aware of each other. Newcomers, who need to learn the same topics, may lend a book and get some tips from more experienced people, but are usually left to search for info on their own. Organized lists of resources are seldom kept, and knowledge and estimation of the quality and worth of the different resources is totally ephemeral and is not shared with

others. Topics that are required by all are usually part of the training program of the lab, but quite a few topics that are in the gray area between broad knowledge and very focused information, are uncovered today.

An idea to modify this situation was raised in our lab. It was suggested to assemble a list of these uncovered topics, assign a champion to each topic, and ask them to collect the resources they find important and valuable for learning the topic. The original idea envisioned a system that would allow the champions to publish links to the resources along with their personal opinion of them, and allow users to vote on the quality of resources, for the benefit of all employees. A very sketchy design of such a system was already materializing, when we stepped in and explained how blogs could fit in easily.

We demonstrated the ease of use – the easy editing and publishing of new posts with a relevant link and freestyle notes. We presented a typical view of a blog – the reverse chronological order of posts (giving the more recent articles on a topic the best visibility, yet maintaining the order for a bottom-up reading for new users); the sidebar with placeholders for some general description, list of important links, and the power of filtering by date or by categories. We emphasized that on top of being a simple and strong publishing paradigm, blogs also support talkbacks, where readers may comment on specific posts and in the case of a topical blog may convey an opinion on a reading source that is being presented. While talkbacks are not a voting system as the original idea planned, they may supply richer information and opinions of different people, and may be stronger for knowledge exchange than a voting system.

The idea to use blogs was adopted, and a group of eight champions who were selected to be the first to pilot the idea got together for a short brief of what is expected. They then departed and collected the material they already had in order to construct initial blogs, each on their domain. Eight empty blogs were constructed for the chosen topics on a b2evolution[2] environment that we installed for research purposes, and each champion was assigned a user-id and access to their blogs respectively.

While working on their blogs, the champions identified different types of articles and used the mechanism of categories in order to classify the resources. Comparing the different categories that each champion defined, we discovered a great deal of resemblance and composed a unified set of categories. These included: *Introductory papers*, *advanced papers*, *tutorials*, *good to know* (e.g., for personal tips), *lab impact* for publishing specific projects that are involved in the topic, and *contact people* for enabling people to expand their social network with people who are relevant to the topic – inside or outside the organization.

What we discovered is that people found it very easy and natural to collect and publish information using blogs. They were excited to be able to not only share the information but also be able to solicit comments and have open discussions over pieces of information in question. In addition different uses of RSS were discussed in order to make good summaries of published information and get it to people in the most convenient way.

This pilot is now in the stage of peer review among a group of 20 lab members who review both the content and the concept of using blogs and should recommend the right way to disseminate the idea among all lab members, to encourage more people to

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share their knowledge through such blogs, and to raise awareness to this source of knowledge.

3.3 Personal Journals for e-Learning Class

The third case study we work on this year is an experiment we conducted with a group of corporate e-learners who were encouraged to use a Journal for documenting their reflection over the different e-learning components that they take.

A natural definition of an expected added value that may be gained by the use of blogs in learning is better learning achievements – both to those who use blogs for reflections and share their reflections with their peers, and to the peers who gain access to notes through blogs. Part of the experiment we conduct aims at measuring and comparing the learning achievements of blogging students with those of regular e-learners.

Additional potential business value exists in the social network that develops through the use of collaboration technologies [8]. Another part of our experiment aims at measuring and comparing the social network expansion among participants through the blogging experience.

We conducted our study on a Journal system that was created for participants of a newly developed enterprise-wide leadership-development approach, to reflect on their work-based learning experience. Each participant in this newly developed approach studies a principle or a model on leadership and management, conducts a work-based learning activity, and then uses the Journal to reflect on what happened, why it happened, and what should be done about it. The reflection process is guided by a list of questions per module.

In our experiment we used two groups of corporate e-learners who were engaged in the same e-learning activity. Our experiment group is composed of 75 participants of a pilot trying out the newly developed approach described above. The control group includes 15 participants of the existing leadership-development approach who happen to study a subset of four topics that are included in the new approach as well. The experimental group members were instructed to use the Journal system for reflection at least on a weekly basis and encouraged to browse through the reflections published by their peers and make use of the built-in talkback mechanism for leaving their comments. The control group was not given any supporting collaboration technology.

In order to assess the learning achievements of our participants in both experiment and control group, all participants underwent pre-tests specific to the learned topics. At the end of the pilot period they will undergo final tests so we can compare the learning achievements relative to the baseline of each group and between groups, to study the effect of the use of the Journal.

In order to assess the social network expansion of our participants, we asked each of them, prior to engaging in the pilot, to go over a list of all participants and rank their level of familiarity. The rank was based on binary parameters such as whether they met face-to-face, communicated otherwise, would recognize each others' pictures, etc. An identical questionnaire was sent to the participants recently, at the end of the pilot, and initial results already exist.

During the e-learning period (that lasted about five weeks and ended very recently), we followed and logged the activity on the Journal system. We recorded posting both private and public entries, as well as leaving comments in other people's Journals.

Pre- and post-pilot questionnaires were given to participants in order to collect more data. Some of the data, such as their previous familiarity with blogs and their note-taking and note-sharing habits, will be used as control variables when we analyze the results. Other questions were aimed at getting their thoughts on note-taking and the use of the Journal.

When asked about their previous familiarity with blogs, 39 of 67 (58%) participants who responded to this question said they are not familiar with blogs at all. Nine claimed to read blogs regularly, and two indicated that they are bloggers. These data are in line with overall statistics: In a survey conducted in 2003, 2% of adult internet users maintained web diaries or blogs, and 11% have read blogs or diaries of other internet users. About a third of these blog visitors posted comments to a blog [21].

Several questions about note-taking habits indicated that the majority of participants take notes regularly (responded with 6 or 7 in a 1-7 scale where 7 was "always taking notes"), though the amount of notes taken was not high (over 40 of 67 marked closer to the "scribbling" end of the scale). When asked about the use of technology, we got a clear picture of traditional use of pen-paper rather than taking notes electronically. An interesting distribution was observed in the question that tried to distinguish between note-taking in moderated sessions vs. self-study sessions. While the distribution in moderated sessions was similar to that in the general question on note-taking, the distribution of people who take notes in self-study sessions is very different – much less people tend to take notes in self-study sessions. An open ended question asking for participants' opinion on these differences indicated two reasons for taking notes: some of the people reported to take less notes in self-study sessions as "the material is there in any case" indicating that they take notes for later reviewing the notes as emphasized in [13], while others claimed to take more notes in self-study sessions as they have more time to process and reflect as emphasized in [3].

The participation level over the Journal was rather low – 34 entries (posts or responses) were published by 21 participants. During the pilot period we used two occasions of preplanned conference calls with all participants, in order to raise awareness to the Journal application and encourage people to use it. However, activity did not pick up much. In an interview with one of the participants, she raised two possible reasons why that may be. One reason she raised was that people felt forced to use the Journal and it caused some resistance. This is an interesting observation that may be specific to the pilot environment, but it implies that the benefits of using the Journal should be made clear so that people **want** to use it, rather than enforce its usage. Another reason was the lack of critical mass – or as the participant phrased it: "I published some posts and did not get any responses so I had no motivation to publish more". Clearly, the diffusion process we used and the short period of time the pilot was running were not enough for yielding enough activity on the Journal.

As we analyzed the posts that were published, we found that only nine of the 34 posts were structured posts that followed the reflection exercises of the program. We were pleased that people were using the Journal for freestyle reflection, though when interviewing some of our participants they indicated the tediousness of copying and pasting the reflection questions into the Journal, and suggested to have forms for this matter. Out of the remaining 25 posts, we discovered 5 that were questions – students who were wondering about specific points in their

learning sessions and were trying to solicit a discussion with their peers over their Journal. Most questions were left unanswered, and while this could be explained by the low volume of activity, it occurred to us that questions should have been published in a different manner than reflection posts – so that they have better chances to be answered. Similarly, one of the posts was a tip that a student tried to give to his peers – a short paragraph that is worth knowing. Such a post should also be given better publicity.

The social network that we mapped prior to the pilot was rather sparse. Our participants were from all over the globe, and very few of them knew each other. Of the 34 entries in the system, 11 were responses to other people's posts. No discussion threads were developed, and it turns out that only seven participants socialized over the Journal (by responding or getting response). Not all post-pilot questionnaires were retuned yet, so we do not have a full map of the current social network, but of the results we do have we noticed that for those who socialized with each other over the Journal and did not know each other before, an acquaintance was now reported in the questionnaire.

In the following section we summarize the observations and conclusions of all three use cases, and suggest future directions for adapting blogs for learning.

4. CONCLUSIONS and FUTURE WORK
These settings of the three pilots we conducted are rather different and the use of blogs in them may have different purposes – in the face-to-face setting, people meet each other and the use of blogs is mainly for exchanging notes; in the case of peer-learning, no organized material is available, and peer blogs turn out to be the source of learning for newcomers and people who are novices to the domain; in the e-learning setting, a group of strangers who are not collocated take the same course at the same time. The use of blogs there is mainly for the personal benefit of reflection, with the added value of peer support and community building.

All three pilots are still going on. Full results of our studies are not expected before year end 2004. However, although we only have initial results, and while the three pilots are of different settings, we still found many commonalities, and based on our observations and discussions with the bloggers we came up with a few conclusions and designed some features that may enhance a blogging environment and adapt it to learning. We describe these features in the following subsections.

One important observation has to do with the diffusion of blogs for learning. The facilitation of a blogging environment, as with typical collaboration environments, is not an easy process. We described elsewhere [35] a framework for the successful diffusion of collaboration technologies and so will not repeat it here. However, future research should attend to the unique characteristics of blogs that may produce additional difficulties.

4.1 Categories and Types
Blogging environments typically support classifying posts into categories. Categories enable the easy filtering of posts when viewing the blog – viewers may choose to focus on the posts of just one category, or select multiple categories and limit the view to the posts in them. All three case studies made use of categories for classifying their posts to different topics. However, all cases encountered a need for an orthogonal way of classifying: In the face-to-face class case, in addition to quite a few topical classifications, we also found the need for temporal classification, and on top of that we had a classification by type: summary,

assignment, terminology. In the peer-learning case, we classified mainly by type: article, tutorial, contact person. The e-learning Journal experiment had built in topics and categories (matching the specific program for which it was developed), however while following the students posts we discovered posts that were questions, and posts that were tips.

Categories are important for filtering posts by different topics, time, and type. However, there are cases where posts of different types should be **handled** differently. There may be different actions that the system may take based on the type of post: *Lesson summaries* may prompt an alert on subscribers' system, while assignments may be of less interest to them; *Assignment posts* may send an alert to the moderator of the course; *Questions* may be handled differently – for one, they may be sent to the moderator for an answer. However, peer-support may be implemented by managing a list of relevant questions in different contexts – on the course page or on specific lessons. These questions will be visible to other students who visit the same context and they may enter the post and supply an answer through talkbacks, or they may simply read if they wish to know the answer themselves. *Tips*, on the other hand, may be short posts that are worth reading – they may be lost in the blog, but if set a specific area in the relevant context for displaying different tips of the last few days, may enable the relevant people to encounter the tip.

Adding temporal types for classifying posts may solve the difficulty of reverse order posts that are part of the same lesson summary. Posts of the same lesson may appear in correct chronological order, even though the lessons appear in reverse chronological order.

We conclude that a blogging environment used for learning should be enhanced with a mechanism for classifying by type, and a configuration system for defining different actions to be taken, based on a post's type.

4.2 Interconnectivity of Blogs and Courses
Blogging environments support different filters that allow users to locate blogs based on their belonging to specific directories and by supporting different types of search. They also support the serendipitous encounter of interesting blogs by displaying, on their front pages, lists of most recent posts, newest blogs, and additional lists based on different scores and visitation statistics.

In our case studies, and especially the case of the e-learning experiment, we discovered that navigation through blogs was not easy enough – which is likely to be one of the factors for the low volume of participation. E-learning environments that maintain their learning material online (course readings, lesson presentations, etc.) will benefit from creating a tighter connection between material and relevant blogs. The front page of a course should support views that are similar to blogging environments: It may list the blogs that are dealing with the content of the course, as well as display recent posts and new blogs, for allowing students to serendipitously locate peers for potential co-studying. Specific lessons within a course, should list the blogs that referred to them – and in fact may list the specific posts that are study-notes of the lesson.

Aggregating posts by courses and lessons imposes an additional view of the collection of all posts. Blogs are the typical view – organizing posts chronologically by the author – but in fact, if we consider each post a valuable piece of knowledge, then aggregating them in additional views and contexts such as by

course or lesson will make them more accessible and useful to more people.

4.3 Blogging as an Integral Part of Activity

Some blogging environments (e.g., Google's Blogger[3]) support a "BlogThis!" button that allows to post to one's blog without visiting the blogging environment itself. When encountering an interesting site, clicking the button opens a mini-interface to the blog, already containing a link to the site and even a quote of text if any was highlighted.

Our peer-learning students who created blogs that are organized lists of relevant resources, would find such a button most useful, as their current process is to identify a relevant resource and then to manually copy-and-paste its details into their blog.

Our face-to-face class student found it easiest to use a word processor for taking her notes. A "BlogThis!" button on the word processor could have saved part of the manual copy-and-paste here too.

Our e-learning students are studying online courses. They are then encouraged to reflect upon their learning and summarize their reflections in a Journal. One of our students commented that a sidebar with editing capabilities attached to a lesson would have improved her summarizing process – she would have been able to take short breaks during the learning process, for note-taking. A "Save as draft" option should be supported so that the notes may be saved before they are actually published.

We conclude that a blogging environment used for learning should be enhanced with tools that integrate the note-taking experience with the learning experience by making **blog-in-context** easier.

4.4 Encouraging Reflection

Our e-learning case study encourages reflection as part of its study method. In addition to the learning material, each learning module includes a set of questions that guide reflection. The students are encouraged to go over the questions and report on their reflection in their Journal. 25% of the posts made in the Journal during our experiment were structured posts based on the guiding questions. These posts had a copy of the questions pasted into them, and the responses inserted between the lines. Two of our students commented that a form containing the questions would make it easier for them to go over the guided reflection questions. A "ReflectThis!" button that pops the blog interface already including the relevant questions to the current context would be a good solution for these students, and would go along with the claims of Paterson [24] and Walden [37] who recommend a guided reflection process.

Reflection involves reference to one's past [9]. Past experience provides a basis for suggestions to overcome the difficulties that initiated reflection in the first place. Examination of the past can also help to evaluate these suggestions by comparing the present situation or problem with similar cases in the past. Furthermore, reaching conclusions requires organizing knowledge by reviewing facts and ideas which have been observed and raised in the past, and relating them to each other. Becoming aware of the benefit and importance of reflection [9, 30], we came up with an idea that may encourage students to go back to previously studied material and reflect upon it in retrospect.

We designed a "Reflection panel" that resides at the bottom of the sidebar and occasionally pops up the content of previous posts in one's own blog. The selection of the popped up post may be done temporally (e.g., "A month ago you wrote about…") or topically, (e.g., by identifying textual similarity of the current lesson or post with previously written posts: "You wrote about hexagons here too"…). Students may choose to totally ignore the reflection panel (and even hide it) if it distracts them, but they may find it interesting to click the suggested post and re-read it. While re-reading, students may wish to reflect on that material again in a new post; they may click on a "BlogThis!" button on the previous post, for creating a trackbacking new post.

We plan to study the user experience and effect of the reflection panel.

5. SUMMARY

In this paper we present the benefits of using blogs for learning. We open with a related-work section that surveys existing research on note-taking and reflection, as well as the use of collaboration technologies for peer-learning. We claim that the easy-to-use platform of blogs has great potential in bringing the benefits of note-taking and reflection into learning environments, with the added value of collaboration and social networking.

Through 2004, we conducted three different pilots, using blogs for students to summarize their learning experiences and share them with their peers. The three pilots involved three different learning settings – a face-to-face class, peer-learning within an organization, and an e-learning class. The paper describes the use cases of these three pilots and their initial results.

Based on our observations and discussions with the bloggers in the different pilots, we came up with a few conclusions and designed some features that may enhance a blogging environment and adapt it to learning. Our conclusions are described above.

6. ACKNOWLEDGEMENTS

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