

A Blog Sphere for Higher Education

Martin Ebner
Computing and Information Services / Social Learning
Graz University of Technology
Graz, Austria
martin.ebner@tugraz.at

Behnam Taraghi
Computing and Information Services / Social Learning
Graz University of Technology
Graz, Austria
b.taraghi@tugraz.at

Abstract: Blogs are an important part of the rapidly developing Web 2.0 phenomenon that revolutionizes the current World Wide Web. It thus makes sense for universities to investigate whether blogs can support teaching and learning. Our paper describes the installation and deployment of a blog sphere for Graz University of Technology based on the open source software ELGG and extended by us with new features that are essential for teaching and learning. This paper summarizes the first experiences that have been made within one year since launching our TU Graz LearnLand. We describe how the use of weblogs for teaching and learning purposes will need not only further extension but also a new approach to the teaching process.

Introduction

“From a sample size of around 2 million US people, US Web stats company Compete concludes that social networking sites are quickly approaching the traffic level of the big portals like Google and Yahoo.” (MacManus, 2006)

Personal publishing systems for the World Wide Web experience a growing popularity and nearly exponential deployment rate (Efimova & Fiedler, 2004). Furthermore, publications are full of positive statements on the growth of Web 2.0 technologies. The term Web 2.0 (O’Reilly, 2006) often described as read/write web leads to a new way to pay attention to information distributed via the Internet. Everyone who has access can contribute not only locally but also from a worldwide level.

Today the most important and visible field of these new possibilities are weblogs, shortly called blogs. The definition or description of weblogs cannot be explained within one sentence, but a majority of researchers would at least agree that a weblog is “a frequently updated website consisting of data entries arranged in reverse chronological order” (Schmidt et al, 2005) (Walker, 2007). This statement sounds neither very new nor very modern. But there are some important facts behind these words:

- “Frequently updated” means not only that the website itself is updated but also the “readers” of the weblog can easily follow the details of the updates. With the help of RSS (Really Simply Syndication) information can be consumed just in time. RSS is an XML based data format that carries the content of a website in a strictly standardised format that is similar to content organisation of a weblog (Nagler et al, 2007). RSS allows users to subscribe to a website and to receive new content using their favourite application (e.g., RSS Readers integrated in major Web browsers). RSS differs from email in that the users themselves decide from where they receive information. Users are monitoring the data in a user centred way.
- “Website” means online: One of the success factors of Web 2.0 technologies is accessibility. Today broadband access to the internet is provided in all developed countries and is affordable for nearly everybody. Accessing the Internet, especially for university students, is easy. On the campus Internet access is free, for the wider area special prices and availability allow affordable access. The times where broadband Internet access was limited to few university students are history.
- “Data entries” means user centred content: Weblogs are mainly authored by individuals, called webloggers (or bloggers) and sometimes of groups. It can safely be assumed that content is written almost exclusively by persons with no knowledge in web programming and HTML. Hence a critical factor of Web 2.0

applications is ease of use. Improving the usability was the precondition that a vast majority of bloggers are able to write personal and subjective content on the World Wide Web (Du Helen & Wagner, 2006).

- “Reverse chronological order” means collecting and sharing data in diary form: The newest contributions or posts are always displayed on top and are relatively small stand-alone entries. The real power of these short articles is the possibility to create hyperlinks to other articles or websites. Digital collections of small pieces of content instead of confusing endless lists of hyperlinks without comments seem to be a great advantage for users. Another significant advantage is that weblogs are searchable.

At first sight weblogs are very simple but their success story is amazing. The concept of decentralization, per-user publication (Karger & Quan, 2005) and user centred information/content is much more powerful than expected. Other studies point out that blogs definitely provide a useful information-gathering tool for practitioners (Porter et al, 2007) and that blogs from experts or researchers are of high interest and relevance (Heise, 2007). Keeping oneself or anyone else tracked and checking running progress are highlighted by (Luca & McLoughlin, 2005). Finally weblogs help bloggers to become a part of a wide communication network (Peschke & Lübecke, 2005). But Weblogs are not without controversy. On the one side the theory of “the wisdom of crowds” (Surowiecki, 2004) point out a great success: The knowledge of a big mass of people is more important than opinions of particular experts. On the other side there are critical announcements warning for estimating the power of Social Software (Keen, 2007).

However, weblogs *have proven to be an important part of the Web 2.0 phenomenon* and can play *a significant role* in the area of e-Learning. To close the gap between learning and technology Graz University of Technology decided to provide a blog sphere for their students and teachers. *This paper* describes the theoretical learning background and the concrete implementation as well as first *experimental results*

Theoretical background

Before discussing what Web 2.0 or weblogs probably can change in the teaching and learning process, it is important to note that teaching and learning will not be easier as before because both are active processes on the part of teachers and learners. In particular, it must be taken into account that knowledge is constructed by the learners themselves (Wittrock, 1974).

Discoveries about learning can be systematically and analytically combined into so called Theories of Learning – behaviourism, cognitivism, and constructivism. Due to the fact that traditional e-Learning mostly happened via drill and practice or interaction between computers and learners, learning scenarios by using constructivist theories were rare. However, learning is a social process and proceeds by and through conversation (Motschnik-Pitrik & Holzinger, 2002) and interaction between instructors and learners or learners and learners. Nowadays only few lecturers deal with these methodologies.

Furthermore one of the big advantages of Web 2.0 is the construction of knowledge. Blogging is a task over a long time period, where learners try to share and collect information and combine it with existing prior knowledge. Lecturers have to supervise the way knowledge is constructed, i.e., the process itself. This can lead to a switch from formal learning to informal learning – learning by reading, commenting, sharing, and collecting small contributions. Graz University of Technology is eager to use such possibly beneficial new ways of teaching and learning. To meet this goal the university created its own blog sphere, which will be described in the next section

Blog sphere at Graz University of Technology

Web 2.0 technologies are nowadays widely used within many different environments to fulfil the demands of users (Kolbitsch, 2006). ELGG¹ is an open source blog sphere platform that is being used as a social networking environment at Graz University of Technology. Its development was initiated in 2004 by Ben Werdmuller and David Tosh and designed to allow people to easily connect and share resources. Users can establish digital identities and connect with other users, collaborate with them and discover new resources through their connections. For this reason ELGG has been widely used at universities, schools, and scientific institutes in many countries. A complete list of organisations that are using ELGG at present can be found on the official website of ELGG (<http://elgg.org/about.php>).

¹ <http://elgg.org> (last visited 17.12.2007)

Core features

Web 2.0 technologies have some basic characteristics in common. Users feed the content to the system. They can share information with other users and can search and retrieve data they are interested in. These features can be used since October 2006 in the TU Graz LearnLand system² (figure 1) by students and lecturers at Graz University of Technology. Lecturers can supervise the process and the way how the knowledge is constructed. Users can post and share their documents, resources, experiences, interesting scientific contents etc. with other users in the form of weblogs and any kind of additional files. The information users post to the system are tagged with keywords that describe the content of that information. Keywords play an important role in search capability of information in this platform. Similar data are linked to each other with the help of these tags. Searching for items in the system results in retrieval of resources that are tagged with those items as keywords. This search feature leads to a very efficient related information retrieval.

HTML based weblogs play a central role in information presentation. Due to their HTML structure, many kinds of multimedia files such as “youtube” clips, PowerPoint presentations, flash applications, etc. can easily be embedded and presented consequently in a blog. “TinyMCE”³ is a java script based HTML editor that is used in TUGLL for this purpose. It provides users with many useful tools needed to create an HTML based document. Consequently users must not have HTML knowledge to present their information in a weblog, which is a great advantage for students of fields not directly related to computer science.

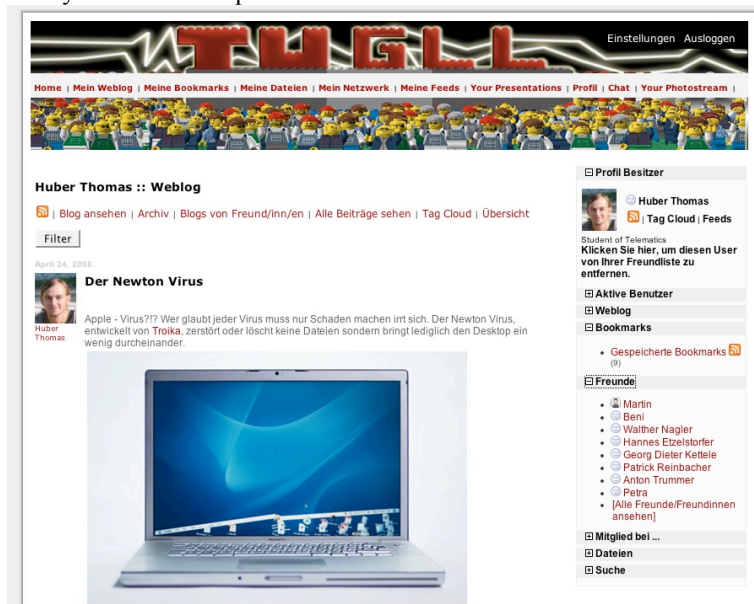


Figure 2: Screenshot of TU Graz LearnLand

Communities and RSS feeds are two additional significant points of TUGLL. Communities are virtual places where users with similar interests can find each other and share information. This could be, for example, a specific course, or any scientific subject. Every lecturer and student can own a community, which currently can be created only by a TUGLL administrator. Communities are similar to user accounts. They have their own weblogs, files and all other features, which users control in their private areas. Users can restrict access to the data that they post to the system, regardless of where they post their data into, be it their private areas or membership based community ones. Access restrictions can be set to public, known users, a user's community, or a group of user's friends or membership based communities that can be defined by the user himself. Community owners have control over membership to the group. They can keep their communities open for every user to join or can restrict access. In second case, other users need to apply for membership that must be then confirmed by the community owner to let them join the community. While the system grows rapidly, the number of created communities increases, which can cause difficulties in finding a specific community. This problem is solved through the community profile. Communities have, similarly to users, their own profile, which can be set by the community owner. Searching for keywords that are used in a

² <http://tugll.tugraz.at> (Last visited: 17.12.2007)

³ <http://tinymce.moxiecode.com/> (last visited: 17.12.2007)

community profile leads to that community through search result. Furthermore, there is a list of all users and communities in the system, which makes it easier to look for a community by its name.

All shared information in users' areas and communities is available through RSS feeds. These are based on XML that is mostly used for content transmission between different platforms. The feeds are subscribed by users through any RSS reader such as browsers, plug-ins, or stand alone applications. Users also have the possibility to search for specific tags in all or parts of the system, for instance in a community, and subscribe to an RSS feed based on their individually selected keywords. In this way they are always up-to-date and do not need to search for desired information manually.

TUGLL offers also an internal RSS reader that makes it possible to subscribe RSS feeds from external sources in addition to sources from TUGLL itself. Consequently external sources from other sites can be integrated into the system through these RSS feeds. Users have the possibility to create a view on these on their dashboard for personal usage or provide other users with the external resources in weblogs.

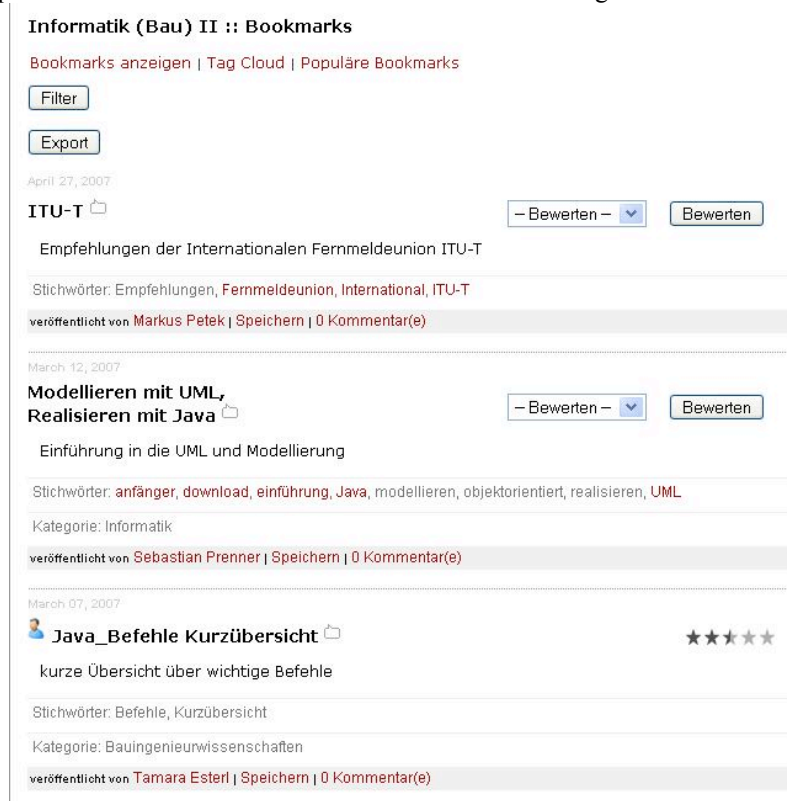


Figure 1: Screenshot of the Bookmark Plugin with Ranking

Developed extensions

Expandability is another advantage of the modular structure of the system we use. Plug-ins can be easily implemented and attached to the system to increase and expand the functionality without interfering with other modules. Following chapters describe Plugins developed by the Social Learning Team with a special focus on learning purposes:

Bookmark Plugin

The bookmark plug-in (Figure 2) is an example showing part of the functionality that has been implemented by the Group Social Learning at Graz University of Technology. It makes it possible for users to share interesting links and URLs as another kind of information additionally to blogs and files, similar to famous applications like del.icio.us. Through the basic share and tagging structure of the system, users also have the possibility to search and retrieve bookmarks tagged with keywords they are searching just as in other modules. They can easily expand their own bookmark list by adding bookmarks they find interesting to their own list.

RSS feeds play an important role for the bookmark plug-in. Feed subscription of a specific keyword leads not only to resources tagged with that keyword, such as weblogs or files, but also to bookmarks that have recently been added to the system and are tagged with the same keyword.

Ranking Plugin

The combination of the bookmark plug-in with a rating module increases the usefulness of bookmark usage. Rating systems are an ideal measurement tool that provide users with the possibility to rate the content offered by other users and track the ratings of their own content. Thus users can differentiate and choose higher rated search results.

A sample usage of the bookmark plug-in in practice is illustrated for the community “Informatik (Bau) II”. This community relates to a course at Graz University of Technology. Students attending this course have shared their bookmarks in this community related to the Java programming language. They also have rated the bookmarks. Consequently they have an overview over links that are useful for the course they are attending and can see the best ones according to the ratings. In addition to this advantage, the students who will be attending this course in following years will also benefit from the existing community content. The rating module so far is restricted to bookmarks and users. Bookmark rating is done by the user, but the rating of the user is much more complicated. User ratings are computed according to the quantity and quality of resources the user shares, which depends on content ratings given by other users. Two factors play an important role in the quality part of the user rating algorithm: how precisely the users rate the content and how well their own content of data is rated.

Based on the theory “wisdom of crowd” two paradigms were implemented:

1. If we assume that the rating of a huge number of people leads to a good, realistic estimation of the bookmark quality, than should the status of the user improve if he is ranking bookmarks similar to the rest of users. We call this user rate accuracy factor F_{UR} .
2. The user should get also an increasing status if he/she is very busy. With other words if a user save a lot of high quality bookmarks into the system his rank gets higher and higher

By the combination of these parameters we like to guarantee a fair user ranking.

The initial ranking algorithm looks like as follows:

$$S_U = F_{UR} + F_{UC} \leq 10$$

S_U is the user state and is calculated as the sum of two factors as described above

F_{UR} : User rate accuracy factor

F_{UC} : User contents rate factor

F_{UR} is the user rate accuracy factor which shows how precisely the user has rated the content. The difference between the rate, given by the user and the actual content rate is a measure of user rate accuracy factor which is indicated in following formula:

$$F_{UR} = \sum_{i=1}^{\infty} (0,1 - \frac{D}{40}) \leq 5 \text{ whereas } D = |R_C - R_U|$$

F_{UR} : User rate accuracy factor

D: Difference between user and content rate

R_C : Rate of content

R_U : Rate submitted by the user

F_{UC} is a factor which shows how good the contents that are shared by the user are rated. On the other hand it implies the quantity part of ranking algorithm. The number of contents, that user shares has a role in this factor. It is used as a measure of user’s activity. The more content a user shares the more positive influence it has on this factor. This factor is calculated through following relation:

$$F_{UC} = 0,1 \cdot M_{UCR} \cdot N_{UC} \cdot 2 \leq 5$$

F_{UC} : User contents rate factor

M_{UCR} : Average of rate of user's contents, submitted by other users

N_{UC} : Number of content items, the user shares

According to the relations described above, user state is calculated (from 1 -10) and mapped into four distinctive categories (beginner – advanced user – high end user – administration user). The current state is also shown via a small user icon below the user picture.

Users with higher status have more rights in the system, larger repositories to upload files, etc. This approach should increase the user motivation to be more active, which leads to a considerable increase of user involvement.

On the other hand the effect of bookmarks with ranking is that all users or particularly members of a community gain the experiences of the other members in the community. Bookmarks can be assigned to specific categories which imply in turn the field of studies. Furthermore bookmarks are sorted according to the users' ranking and the number of users who share them. This provides users automatically with a list of most important and relevant links to their field of study. As the bookmarks can be filtered, for instance by keywords, it is very easy to retrieve a list of bookmarks on a specific topic in a field of study (category).

View Plugin

The goal is to let users present and share their information as well and as simply as possible and retrieve the data they are looking for in the shortest time and least complicated manner.

In order to simplify the data presentation in different communities, "views" were implemented as an extension for blogs and bookmarks. Users need only to create the blog in their private area and create views of the content in the desired communities. Using views is very advantageous. Without them, in order to make the same content available in different communities, users had to post the content into each community separately. By using views, they can now create views of the content in the desired communities while posting it into their private area without any additional effort or duplication. The content they have posted is automatically observable in the communities for which the views were created.

Further extensions

A further core extension is print functionality of weblog contributions. This is an essential need in educational systems where information and documents are preferably used in written form.

In order to simplify information retrieval, filters and categories have also been implemented.

Users can set a category for information they post. Categories are predefined tags that are frequently used by the users such as field of their studies.

Resources can be filtered by time, tags, categories, users, etc, which contributes to a better and more efficient retrieval of information. This is advantageous for communities, where users are interested in specific resources that can thus be filtered out easily.

Discussion and future Work

After one year of practical experience we can report that the system is in everyday use and is well accepted by its users. Especially for teaching and learning purposes there are some more points that must be taken into consideration:

- Usability: the ease of use aspect is fundamental for user acceptance. First usability tests showed that even small enhancements lead to a better understanding and accomplishment of given tasks (Ebner et al, 2007). Despite all the research work it is still hard to explain the thinking behind such a system. The "lost in hyperspace" phenomenon (Kerres, 2001) increases considerably because there is no hierarchic structure and no perceivable arrangement of information. The content of a high number of parallel and similar weblogs with even more contributions, files, or bookmarks is a decentred arrangement only reachable through search or hyperlinks. Our experience shows that this is a new way of learning and thinking, and that the adoption process can take time.
- Bookmarks: The developed bookmarks plug-in works very well. Many learners use it to save and share their bookmarks. The keywords make them search- and findable. With the help of the ranking algorithm the best ones are presented on the top of search results. Learners also mentioned that they might like to have an

export functionality that allows them to export all bookmarks to their favourite browser. It is planned to extend the bookmark plug-in with an import/export feature as well as the capability to import a WWW address directly from the Web browser.

- Style sheets: Currently a special template and style sheet that was developed for the University is in use. In future users will be provided with more templates so they can choose their own look and feel. Further a clear difference between the private and community areas must be established to avoid navigation problems and misunderstandings of the actual position.

Web 2.0 technologies play an increasingly important role in e-Learning systems. Related open source software is widely used by the ELGG development team. Photo galleries as well as audio and video galleries are just some examples of new features of ELGG planned for the future. Photo and video galleries can be very useful for, e.g., students of architecture. Video galleries can also be used as a podcasting tool. The ability to embed multimedia files such as audio and video in blogs as flash applications makes these new features even more useful.

Another useful feature will be a LaTeX typesetting plug-in of the “TinyMCE” editor. With the help of this plug-in users will be able to copy LaTeX code in their editor and convert it to HTML formatted content to be inserted in their weblog. This feature will be useful for technical students who want to include scientific information with mathematical, chemical, or other specially formatted technical content in their blog. The LaTeX plug-in will provide them with this ability.

Presentation tools are an essential part of any educational system. Users should have the ability to summarise their resources in the system and present them as a whole in form of a presentation tool. HTML weblogs with all their features, files as additional resources, and bookmarks as references could help to create a very efficient presentation for students. This therefore is planned as another near future extension.

Eventually a kind of learner monitoring tool should be implemented that allows to manage a high number of learners over a long time period. The problem of losing the overview over all activities is very high. RSS aggregator functionality and statistical analysis should help to alleviate such problems.

Conclusion

Teaching and learning via weblogs is possible – a simple statement. The strength of this kind of lecturing is learning by exploring and discussing. However, the role of the lecturers is changing dramatically, from teacher to a kind of coach or discussion partner.

From a didactical point of view for example bookmark sharing become highly valuable, if the amount of saved and ranked bookmarks is increasing. Not only the sharing will lead to an information exchange amongst generation of students, even more the system will be able to present the best bookmarks to each field of study automatically. Students can enhance an existing list to provide more interesting learning materials in their specific field.

Our future work will be concentrated on the integration of Weblogs in our learning activities so that eventually all learning processes can be made visible for further discussions. Special “views” will help to provide the collected data as a personal e-Portfolio that should be useable over life-time.

Solid research work will be necessary to investigate the learning process with and through Weblogs to improve future learning scenarios.

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