

Thematic Driven Learning

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Abstract: Learning Management Systems or e-Learning systems have been typically deployed to provide a means for the deposition of content which students access in a browse mode. Often a discussion space is provided to facilitate some course relevant communication. In this article we argue that if the e-Learning system can be adapted to match the educational design of particular courses, both students and teachers will benefit. Supporting assignment submission and evaluation is one aspect in need of attention. For a recent presentation of a course at the Technological University Graz, we have devised a new e-Learning paradigm termed *Thematic Driven Learning* which supports its constructivist course design. The use of WBT-Master to support learning and teaching, including submission and evaluation of assignments, is described and evaluated.

1. Introduction

The typical use being made of e-Learning systems such as WebCT (<http://www.webct.com/>) and BlackBoard (<http://www.blackboard.com/>) among others, and as reflected in recent literature, is for course presentation and deposition of content - that is, e-Learning systems are being used to support students in their learning activities, but often only to the extent of accessing content. A frequent outcome of lecture note provision on a server is a drop in lecture attendance.

Discussion forums are a popular aspect of e-Learning systems but without careful guidance, structuring, and monitoring this can simply result in 'stream-of-consciousness' postings. In addition, the involvement in discussion groups is usually assessed only on the basis of quantity or frequency, since this is simple to implement, and not on the basis of quality of contribution and relevance to learning goals. Evaluation of student assignments and contributions is not a simple task and understandably e-Learning systems usage extending to assignment submission (Sessink et al. 2004) and assignment evaluation and feedback provision is rare.

Good teachers know there is much more to be done to promote good learning by students than simply providing content to browse. Learning does not take place simply by reading or viewing content. The content, information, or knowledge, must be processed in the learner's mind. Support can be provided in structuring, reflecting - analyzing and synthesizing the knowledge, as is done for example in the project based learning paradigm (Lennon and Maurer 2003) implemented in WBT-Master (Helic et al. 2003). Consistent with the constructivist (Bruner 1966) theory of instruction, the learning paradigm implemented by Helic et al. promoted relevant student experiences to motivate student learning, structured the training in such a way as to be easily understood by students, and encouraged exploration and investigation beyond the set requirements.

(Lennon and Maurer 2003) make it clear that when properly supported by technology, teachers and learners benefit. Through the matching of e-Learning tools and educational design, we are able to offer a considerably enhanced educational experience for students and teachers. Actually, WBT-Master provides a number of Web-based tools, each of them supporting a particular teaching or learning paradigm. The tools form a Web-based integrated teaching and learning platform, that can be used, for example, to support the following teaching and learning paradigms: *Browsing* - student learning through access to content; *Tutoring* - learning through goal-oriented and situation-oriented

experiences; *Knowledge mining, profiling and delivery* – supporting knowledge exploration; in addition to the collaborative *Project based* learning paradigm already mentioned.

2. New e-Learning Paradigms

To accommodate the growing numbers of students in courses, and to provide relevant educational opportunities in a competitive environment, educators are considering how information & communications technology may be used to support teaching and learning. The typical use of e-Learning systems, to provide a *Browsing* function, is being augmented by a more sophisticated set of functions which can better match the particular educational design of a course. For example, in a course taking a goal oriented approach, the achievement of individual objectives can be facilitated through a built-in learning paradigm known in WBT-Master as *Tutoring*.

As we seek to improve the things we do, and to accommodate to a changing world, new tools and methods become important, and e-Learning systems have provided the educator with a powerful tool and many new possibilities. Unfortunately, most systems have been created with the assumption that the learning paradigm to be used is a given – it is fixed in the design of the e-Learning system. As is evident from the discussion above, the designers of WBT-Master recognize the need of an educator to choose a learning paradigm which suits the particular educational design of a course. The Societal Implications of Technology (Gesellschaftliche Aspekte der Informatik, or GAI for short,) course, at the University of Technology Graz (http://coronet2.icm.edu/wbtmaster/courses/room506209_room.htm), provides an example of adapting the learning support tool to suit the educational design.

The remainder of this article deals with the use of WBT-Master to support a constructivist course design, resulting in a new e-Learning paradigm we have called *Thematic Driven Learning*.

3. Thematic Driven Learning

In a recent offering of the GAI course the educational design did not fit any of the previously mentioned WBT-Master e-Learning paradigms, and required the creation of a *Thematic Driven* facility.

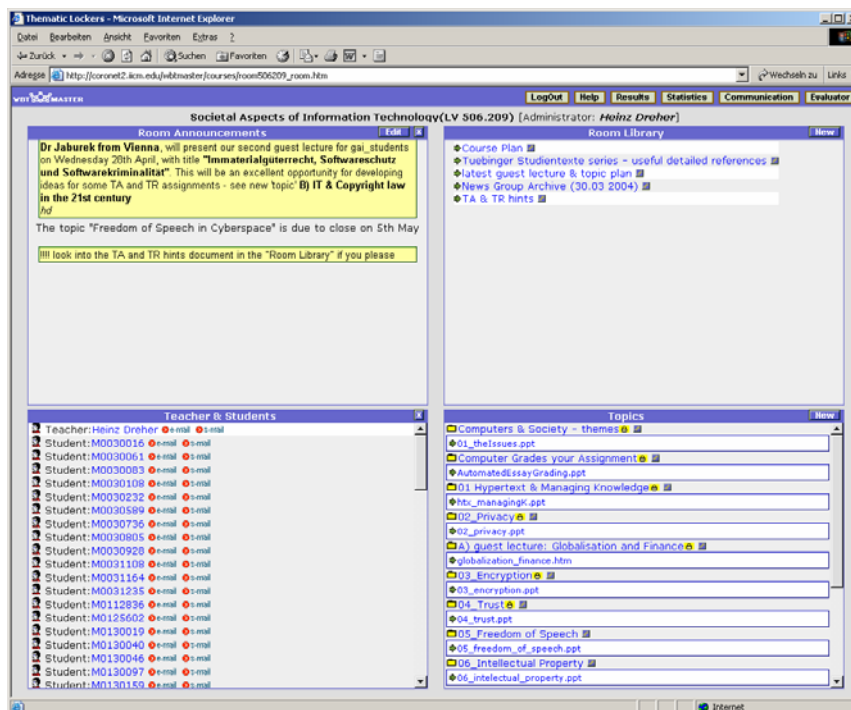


Figure 1 – the GAI-course and its *Thematic* configuration

The course designer wished the students to have access to a variety of topics or issues organized under *Themes* aligned to the textbook chapters, for example: Privacy; Encryption; Trust; Freedom of Speech; Intellectual Property; Computer Crime; Medical Informatics, and Ethics.

Educational materials, or content, for each of these themes was provided as a starting point for students (Fig 1).

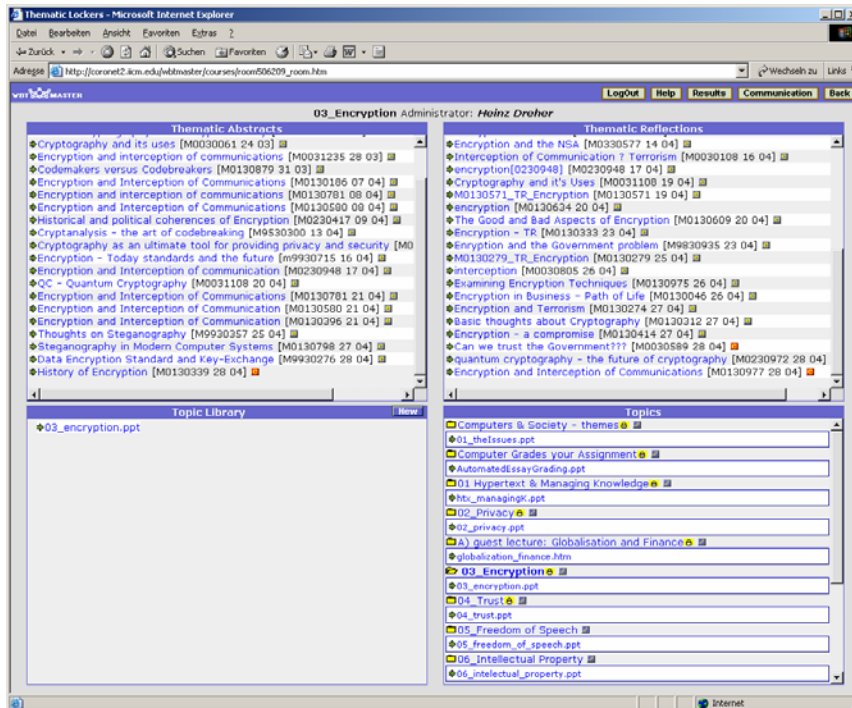


Figure 2 - Thematic Abstract and Thematic Reflection assignments

To promote learning students were required to select one *Theme* under which they would write an assignment giving a topic *Abstract*, and in other assignments, students were required to write a *Reflection* on issues arising within a further selection of *Themes*. Students learn better if they are able to work on matters of interest or relevance to them, thus student motivation was high as they could align their learning with their interests within certain broad parameters of course.

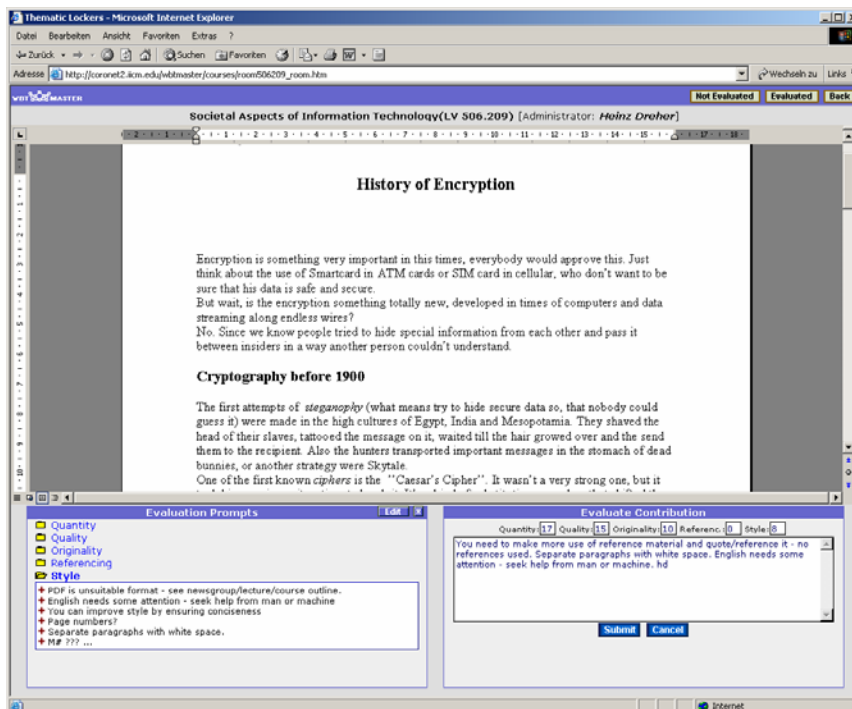


Figure 3 - assignment assessment support function

Submitted assignments added to the material or content which could be used and quoted by students in subsequent work. Since the *Reflection* assignments were an opportunity for students to argue their own ideas, a lively discussion, or idea interchange could ensue. A series of guest lectures on specialist topics aligned with the *Themes* provided a source of additional material for student use.

Periodically, say every three or four days, assignments submitted according to *Themes* were assessed on-line using the WBT-Master *evaluation* function (Fig 3). Feedback, which was generated with the help of a selection of pre-prepared possibly suitable comments aligned to the assessment criteria for that assignment together with a score for each criterion, was available to students on-line (Fig 4).

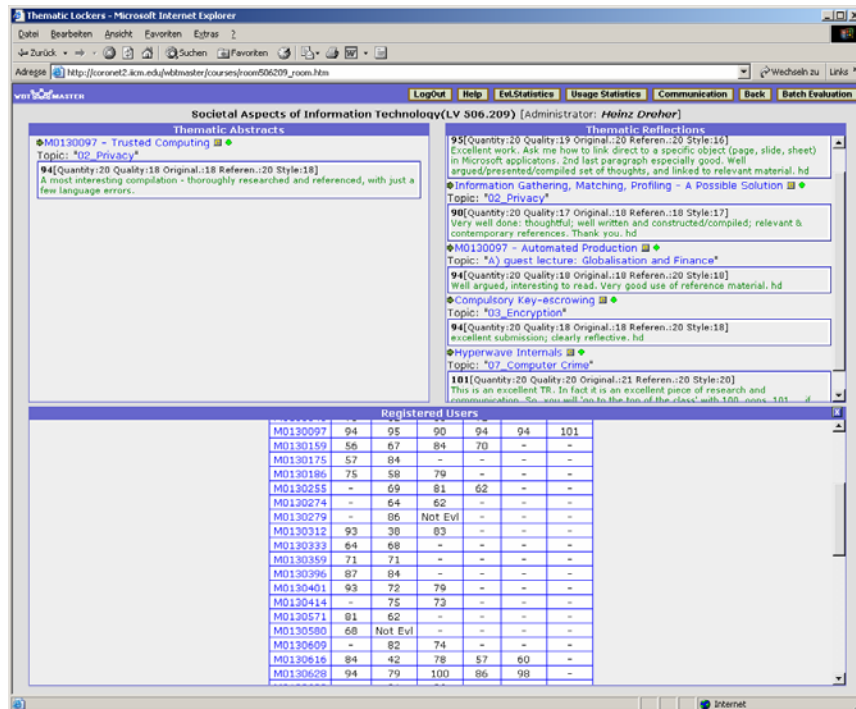


Figure 4 - example of feedback to students

4. Evaluation

4.1 Student perspective

Students were provided with a means to rate the WBT-Master features they were using (Fig 5). Thus, they were asked a number of questions, such as:

- Does WBT-Master provide a powerful and convenient training environment for teachers and students; the average score was 3.0 at the scale from 0.0 to 4.0
- Accessing training materials with WBT-Master is easy; the average score was 2.8
- Uploading contributions with WBT-Master is easy; the average score was 3.4
- Accessing evaluation results is easy and informative; the average score was 3.5
- How would you rate the system concerning training support; the average score was 3.4.

The results show a high acceptance of the system by students, especially for the purposes of submitting their contributions to the teacher, and for accessing the feedback from the teacher. Basically, these two results show a tremendous improvement in the communication between the students and teacher over the traditional classroom course, where the communication is usually restricted to student questions during the lectures. This improvement is even more visible comparing it with a standard *Browsing* e-Learning approach, where less students come to the lectures, and the communication via discussion forums is usually quite sparse.

Also the results of the questions concerning the ability of the system to provide training support and environment are quite good.

The only slightly worse result was for accessing of training material. Considering the prototype state of the system and few compatibility problems with some browsers and operating systems combinations such a result is easily understandable.

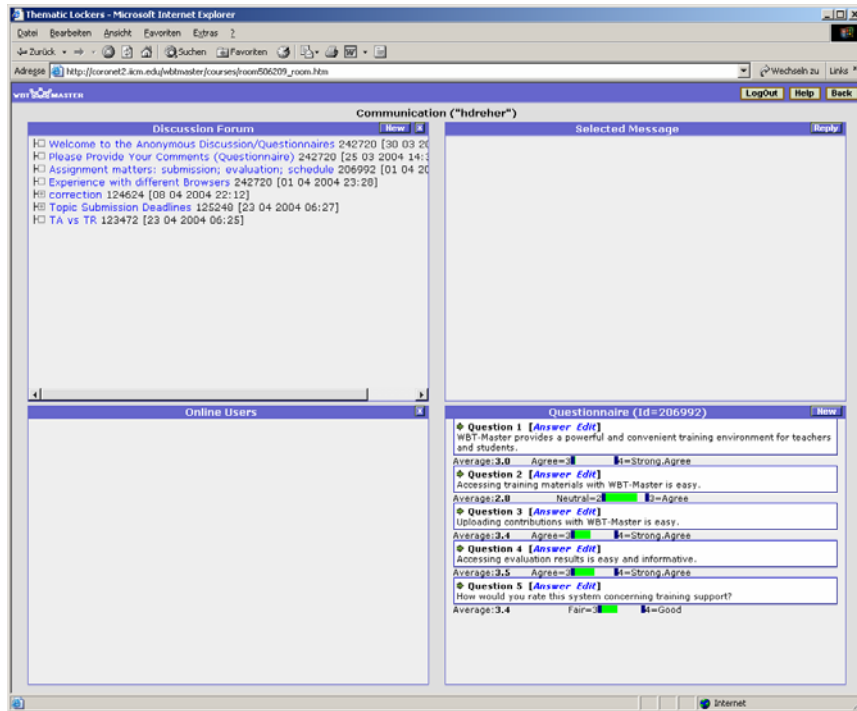


Figure 5 - student ratings of WBT-Master

4.2 Teacher perspective

The GAI course has nearly 200 registered students, and to provide a relevant, motivational, interesting and rewarding learning experience, the educational design called for six assignment submissions during the semester. Quite obviously, any support to manage the assessment workload, for example, would be an advantage. Figure 6 shows the assessment management aspect of WBT-Master and Figures 3 and 4 (see above) gave some insight into the support for the assignment grading function.

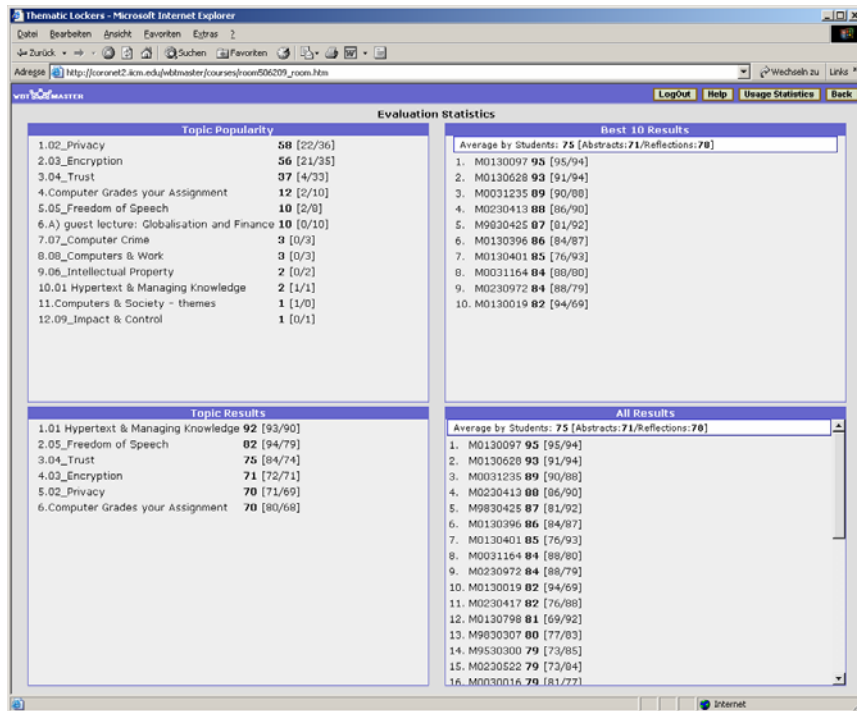


Figure 6 - assessment and grade management

A valuable feature of WBT-Master is its graphical representation of student activity. The graphs in Figure 7 reveal the assignment **uploading** activity and thus an indication of assessment

workload, whilst the **browsing** graph provides an indication of student learning related activity. In graphs, the date and the number of students is presented in a pop-up window as a particular column is pointed to with the mouse.

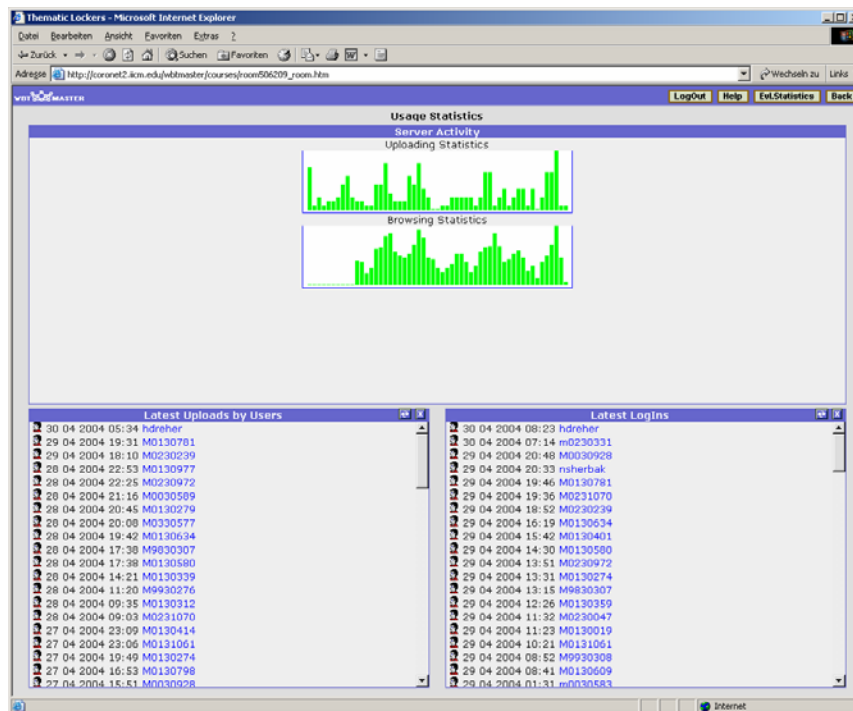


Figure 7 - GAI course student activity over time

5. Conclusions

The predominant use made of e-Learning systems has been to provide some sort of a *Browse* capability for accessing course content, often complemented with a discussion space. We are of the view that much more support can be offered by e-Learning technology, especially when adapted to suit the education design.

We have presented some suggestions for alternate e-Learning paradigms, including the new *Thematic Driven Learning* paradigm, and provided an example of its use in a recent course offered at the Technological University Graz, Austria.

The advantage to students is that they are free to manage their time and resources to achieve their education goals in a supportive and rewarding environment, whilst the advantage to educators is that they are able to deal with large numbers of students in a consistent manner without the usual quality compromise.

The e-Learning system WBT-master has been demonstrated as a tool for students to support their learning, and for educators to support their teaching and course management.

References

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