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The e-Temple: Online Reflective Diaries Using a Virtual Learning Environment

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Abstract – Learning is a life-long process in an ever-changing environment. For students and professionals alike, the ability to constantly manage new knowledge and skills is pivotal. In such an undertaking, it is important not only to master content. To enhance our overall learning capability, we must also improve methods for acquiring other, less explored skill sets. This paper presents efforts made to help Swedish and UK students to develop and foster reflective skills using Internet technologies, especially with regard to the “hows, whens, and whys” of personal learning. Lessons learned point to important considerations when trying to encourage students to reflect – in general, and on systems design.

I. INTRODUCTION

Many aspects of society have changed radically over the past decade. Specific examples from engineering and IT disciplines could include computer use in homes, schools and at work, new work patterns, ubiquitous computing, and the rapid evolution of hardware and communication. Learning to cope with change and still be able to view it in context calls for reflective skills – a subject area found only in a few [1-2] syllabi. To promote and develop such skills, a new approach to accentuate students’ awareness of *their* role in the learning process was developed.

Initially, students partaking in this reflection initiative were final year students enrolled in the Edutainment Software Design (ESD) program at Halmstad University, Sweden. ESD is an undergraduate Informatics degree training systems developers for the edutainment sector. Upon graduation, students may find work as project managers or developers/programmers of edutainment, infotainment and advertainment, e.g. computer games, educational software from kindergarten to university, e-learning and professional learning packages, or promotion software for websites, marketing campaigns, etc. Students leave with a major in Informatics/Information Systems, accompanied by two minors in Media and Communication Science, and Education Science/Pedagogy, respectively. Their very last semester is entirely devoted to projects and dissertation work, carried out in Sweden or abroad.

ESD students have been motivated and trained to apply reflective and proactive techniques throughout their education. The program has embraced Knowledge by User Demand (KBUD) [1] to promote a greater responsibility for keeping up with change. The overall aim of KBUD activities has been not only to induce reflective awareness and a capability to constructively handle critique and assessments, but also to stress the importance of understanding how to carry out self assessment,

and to do so repeatedly. Developing problem solving and proactive students-to-be-professionals, aware of their competence development and cognitive styles has been a principal goal of the program, by many viewed equally important as providing theoretical and/or practical knowledge – which, at least in part, may turn obsolete over time. The 2002/2003 academic year was the first to host ESD seniors. Autumn classes focused on research methods and final-level seminars discussed current issues in systems and edutainment research and activities to further foster reflective practice in students. In June 2004, two cohorts (approximately 70 students) will have graduated from the program.

II. THEORETICAL FRAMEWORK

A. Virtual Learning Environments (VLEs)

Since the mid 1990’s, VLEs have appeared with an aim to support learning and teaching activities across the Internet [4]. “Virtual” does not necessarily mean Virtual Reality capability, although much research specifically investigates such aspects [5-6]. This paper will use a VLE definition provided by the Joint Information Systems Committee, quoted in [7]:

The term Managed Learning Environment (MLE) refers to the whole range of information systems and processes of a college or university (including its VLE if it has one) that contribute directly, or indirectly, to learning and the management of that learning. There is sometimes confusion between a VLE and a MLE. The term Virtual Learning Environment (VLE) is one possible component of a MLE: it refers to the component(s) within an MLE that provides the “online” interactions of various kinds which can take place between learners and tutors, including online learning.

Of specific interest in this paper is the VLE potential to function as a tool for discussions and reflections, a capability also discussed in [8-9]. VLEs allow speedy creation of student-devised resources without the need for advanced technical skills. Typically web-based, VLEs provide an integrated set of tools, enable easy upload of materials and offer a consistent look and feel that can be customized by the user. Some mainly supplement or support existing programs as opposed to delivering complete online courses [10]. The style and approach of communication in online learning and teaching requires particular skills [22-23]. It is important that the correct approaches are used in order to maximize the potential of this electronic medium.

B. Reflection and Motivation

Fostering a reflective approach to learning is important both for students and teachers [13]. Activating thought on subject content and reflection by individual students enhances the overall learning capability [14]. It is often assumed that the relationship between course activities and students' long term goals to obtain academic credentials will be sufficient to ensure motivation. However, this is seldom the case as students nowadays have to deal with many different calls on their time and have to be able to multi-task to a sophisticated degree. A comprehensive list [18] of conditions prevails for learning in a traditional mode but online learning situations can have the disadvantage of being less compelling as those in the real world.

People learn best by doing things and not by being passive recipients [11, 15-16]. Active participation is therefore a condition for motivation. One of the advantages of learning online is that, by putting students in control, it places the onus on them to actively engage in tasks. They must do the searching, make the decisions, contribute to conferences and solve problems. This encourages them to take responsibility for their own learning [17-18].

In gaining new insights, we need to be reflective and put our knowledge into perspective. Managing change while still retaining an ability to simultaneously view issues in context calls for reflective skills, a subject not found in many university syllabi. In its narrowest sense, reflective learners can be seen as those who explore their experiences of learning, to better understand how they learn – with the ultimate goal to improve further learning. In literature, this process is often referred to as “learning to learn”, and the bedrock of becoming a “lifelong learner”. Reports indicate that reflective learners may be more self-aware and self-critical, more honest about themselves and also, more open to criticism and feedback.

Journal writing has long been recognized as an effective strategy to promote reflective thinking and learning [25]. It is by making connections between different experiences that we create meaning and internalize our learning – activities that this paper's website strives to promote. Human beings are by nature “connection makers” and “meaning makers”. Reflective learning diaries enable us to create a record of the connections and meanings we are subjected to when engaging in learning experiences. All are very personal – no two people will encounter exactly the same response to any one experience.

III. MODULE GROUPS

In order to begin to understand the reflective processes that students carry out in their learning and to see how these are practiced in online mode, reflective online diaries were included in the assessment of three modules. The VLE used initially was the Internet-based Basic System for Cooperative Working (BSCW) [11], selected as it was available to all student groups taking part in the research and regarded as relatively simple and straightforward to use also for the non-technological oriented students. The overall outcomes from these modules were compared with each other to establish any factors that became apparent [21].

A. Current Issues in Edutainment Software Design (Sweden)

This particular mandatory module was the last theoretical class of the entire program. It incorporated multi-modal contacts with teachers and fellow students. Activities included online learning and tutoring as well as more traditional approaches including lectures, tutorials and face-to-face seminars. Sessions calling for physical or virtual presence were scheduled in the same way as any classroom meeting, following a fixed time-table. The module was taught in English with all papers also being written in English. This situation was not unfamiliar to the students as they had been taught by international lecturers on many occasions throughout their three years of study. Although all students were Swedish, they were able to converse fluently in English, both verbally and in writing.

The purpose of this module is to broaden student awareness of current research issues pertaining to edutainment systems development. It runs from November to January in each academic year. Upon completion, students have read 30 to 45 research articles (or about 500 pages of text) and have had lectures on academic writing, the review process, peer reviews, and other issues pertinent to the area. During this research, students have typically added five or more “individual” articles to their theoretical framework. Each year, the module list of topics and themes is revised. For the first cohort of students, research themes/topics include Applications for special groups, Edutainment Robotics, Systems methods in Edutainment Software Design, Software for traditional schools/teaching (K-12), Software for simulations and company training and Mobile, distance, and e-learning.

The module involved input from two tutors, one based in England and the other in Sweden. It commenced with a lecture where students were provided with the module content and an outline of what was required from them with regard to assessment. Students were randomly divided into groups of five or six students and presented with their topic /theme for investigation. Assessments included an individual research paper (focusing any of the areas), a group research paper (focusing the given theme), an individual reflective diary, outlining the group dynamics throughout the writing process and five reflective (group authored) critiques reviewing the other groups' papers.

Besides traditional sessions, a blended e-learning approach was used. During most weeks, students only had a short time (15 minutes/group) to interact with the campus-based teacher and were therefore encouraged to use the VLE to facilitate interaction with both tutors, with other groups, and for comparison of work. Early in the module, all groups had a discussion session on campus with both tutors. The agenda included a review of group progress to date and instructions on how to use the VLE for group work (how to log in, how to handle up- and downloads etc.).

Thirty-five students studied the module in 2002/2003, with all but one group consisting of six members. Besides being familiar with traditional methods of receiving information, the group was also accustomed to questioning and seeking innovation at every opportunity, rather than merely accepting traditional teaching methods. In that respect, they could be

seen as different from traditional student groups as they had continuously received encouragement to develop and use reflective learning skills all through their studies. For feedback, all students received a full critique of individual and group paper from both tutors (in writing, as comments in their text). They also received a shorter, written comment on their reflective diary, which contained each student's own reflections on their experiences, from start to finish.

The factor that had not been anticipated by the tutoring team was the difficulty these students experienced in reflecting "on demand". On several occasions, they had been exposed to similar activities, but they had never before used a VLE for such work. As the module progressed however, their apprehension receded, and their reflective diaries came to be just as valuable for individual insight as was intended. However, the initial stall in reflective productivity caused the authors to ponder further: how could reflective diaries be used and what further factors needed to be considered?

B. Business Information Technology 3, (Sweden)

BIT3 is a final-year (senior level) module in E-commerce at Halmstad University, Sweden, designed specifically for international students on exchange. The group in question participated from March to May 2002. Students of various nationalities enroll in this module and receive part of the content delivered in traditional pedagogical styles associated with tertiary education, i.e. lectures, tutorials and seminars in face-to-face mode. Time-tabled sessions were taught in English by a British tutor, in a classroom setting. The remaining module content was delivered via the Internet through BSCW.

Despite all students bar one working in their second language, their reflections provided an interesting insight into individual student learning experiences as well as group performances. In comparison with ESD, BIT3 students had received a similar non-prescriptive introduction and yet did not seem to be struggling so valiantly with what was required of them. Texts were largely descriptive as anticipated but students also made more general use of the VLE to share useful information, e.g. highlighting URL's that could be of use for others within the module. All BIT3 students were communicating in English (as their second language) but this did not seem to pose a significant problem, either virtually or in print [4].

C. Online Learning ITY241(UK)

ITY241 was offered to second year students within the degree structure at University College Worcester, a British partner institution of Halmstad University [19]. The group participated in the twelve week module conducted from February to May 2002 when ITY241 was studied by two groups of students. One group studied in a traditional face-to-face mode with weekly lectures and tutorials while the other studied in a blended learning mode with two lecture sessions – one at the beginning and one in the middle of the semester. In this analysis, the focus was on the e-learning group. Time-tabled sessions relating to this module were taught in English by the same English tutor that took part in the other modules in this analysis. The module information was delivered mainly

using BSCW. Together with lectures and OHP slides, online chat sessions supplemented the learning.

Students were studying in their first language of English but this was their first experience of studying a module in blended learning mode. In their reflections, students commented that:

- This style of learning was more convenient than attending regular timetabled tutorials.
- They communicated more than in previous modules, with other students and the tutor, using email and conferencing.
- They enjoyed the learning experience more and felt more motivated to learn when compared with regular lectures.
- They learned more when compared to traditional input styles.
- They would choose to take further modules online, if offered.

Students in this group achieved grades for their assessments that were at least equal to, or often better than, those of the other module group, taught in a traditional mode. Thus, the challenge of learning from a module delivered online and one taught traditionally in a face-to-face mode had produced successful outcomes – a circumstance we felt eliminated the on-line factor as restricting the reflective process.

IV. DEVELOPING THE E-TEMPLE

One of the outcomes from the initial research was the realization that the BSCW software did not possess the sought-for functionalities required for a reflective focus. Therefore, a different, bespoke and newly-developed "reflective" VLE was developed named the e-Temple, now offered free to providers of tertiary education [12].

The e-Temple is valuable both as a tool for research and, in its analysis capacity, for informing teachers of their students' development. Moreover, it has as a training environment facilitated a reflective interface for participating students, when and where required. Finally, it is software built with evolutionary design in mind. The development of the e-Temple has in particular drawn its ideas from participatory design. It has been given a level of design flexibility allowing evolution through its users and their understanding of how one best can develop reflective skills.

Design considerations to date have specifically targeted reflective insight – an aspect that traditionally has been given low priority but now seems much more important. If Internet-based teaching and learning support is to develop beyond merely database-driven textbooks, new capabilities must be developed. Working actively with the e-Temple concept also in the classroom, students may be "forced" to reflect, both on-line and with regard to the software itself.

In its current version, the e-Temple is mainly a set of individual forums, connected through a database. The menu system displayed to students suggest however added (but at that time, not available) functionality. One objective of the website is to induce further thought on systems design from the students. In presenting the system (in particular in Sweden), students have been encouraged to suggest improvements to this "50% ready" system. Reflecting on how reflective systems can be designed will also, it is our hope help improve the individual's process.

As a research tool (for the tutors), the e-Temple has more functionality. Its general setup is sectioned, so that new institutions can be added and start from scratch without affecting each other. Each organization is assigned a head administrator, who then will handle all tutor and forum generation for that unit. Each "World" can then hold an "unlimited" number of forums and users. As a tutor, individual student's entries can be followed regarding when they are made and also create summaries of all diaries from a particular group.

It must be noted that this package is still in early (but full) use, and that functionality on both student and tutor sides will be a priority during the next year. The software has however been constructed particularly with reflection in mind. Consequently, it has not been loaded or burdened with much of the traditional functionality of a community website. Entering the e-Temple, students should instantly know that reflection is the focus.

A. e-Temple use at Halmstad University, Sweden

In 2003/2004, there were 36 ESD students studying the module Current Issues in Edutainment Software Design. Divided into six equal-sized groups, the students received a similar module structure to before. The e-Temple was now used in place of BSCW, enabling the student groups to input their reflections throughout the development of their group paper and provided a valuable insight into their learning process.

As part of their assignments, the students were encouraged to enter personal thoughts into a web-based diary on an individual basis, concerning their development of knowledge and team-work skills. As mentioned, they were also asked to contribute to a discussion on the further development of the application, a task which in itself forced supplementary thoughts both on reflection and on the design of a system, aimed at promoting reflective capabilities.

The increased functionality and reflection oriented emphasis had a significant impact on the usage rate of the VLE with a corresponding improved insight into the students' learning. Adding more engagement and responsibility to the reflective process (and combining it with a discussion on how to develop reflection systems) appears to have increased student efforts further.

B. e-Temple use at Aston University, Birmingham, UK

CS1280 is a mandatory Computer Science module at Aston University, Birmingham offered at introductory level. Studied over 12 weeks during the second semester of the academic year, the module consists of theoretical and practical aspects of developing web pages using HTML, PHP and MySQL. The module is delivered through two lectures each week for theoretical concepts and one practical class to develop and practice the necessary practical skills. The module involved lecture input from the module leader with the assistance of a Computer Science Officer for the practical classes. Approximately two hundred students drawn from Combined Honours Computer Science, Computing for Business, Electrical Engineering and Internet Systems study the module with most recipients possessing a reasonable grounding in computing concepts but

little experience of designing or developing web pages. The module is assessed through examination and individual coursework with the reflective diary forming part of the assessment.

During the academic year 2003/2004, the reflective diary consisted of a paper-based collection of thoughts, ideally collated during the development of the coursework. This provided an insight into thoughts, ideas, challenges and events that had occurred as well as any particular problems that had been experienced in relation to the work. This was the first time that such an account had been requested as part of the assessment for this module and the information provided an illuminating account of the skills that had been developed and also the problems that had been overcome in producing the coursework.

The assessment criteria specified a 500 word length on the account. Most students produced a one page text in response. The material produced provided a very interesting insight into the learning of students who are enrolled on what is perceived to be a very theoretical and academic course but not with great depth. To enable a deeper insight into their learning processes another vehicle was sought which would provide a more step-by-step approach across the full duration of the module.

An introduction to e-Temple was provided during week 4 of the module, involving the module tutor and also the input of a guest lecturer from Sweden, linking through web-cam for the lecture. This enabled the same tutoring team as in the earlier Halmstad University module to participate in introducing and explaining the reflective diary component of the assessment to ensure continuity for the research. Through email, students were provided with a username and password and, through the lecture input, students received guidance on how to use the system and what was expected of them. The e-Temple introduction coincided with the distribution of the coursework specification and students were encouraged to start their contributions to e-Temple from this early stage to ensure that the whole learning process was documented. Additional lecture input, again using the two tutor tutoring team as before, was also arranged during week 11 of the module to encourage students to use the system and to address any queries that students had.

V. RESEARCH OUTCOMES

Much of e-Temple development has so far been based on input from early-phase users/reviewers in Sweden and the UK. There has also been demonstrable interest in testing the e-Temple from an Australian educational institution. The aim is to include more active institutions as early users by end of this year, when our own full-scale tests (by that time, close to 300 users in three modules) have been completed.

With regard to student use and acceptance, the e-Temple seems to be a success. For students unfamiliar with the Internet, the simplicity, i.e. no functionality overload, is appreciated. It is perceived as a fairly straight-forward tool, which leaves little room for errors or the risk of "getting lost". On the other hand, students with extensive experience of Internet and community use find it, not surprisingly, rather Spartan.

A second component in working with the e-Temple is a discussion on the actual design of websites aimed at reflection. It seems from the first attempt (with senior ESD students in Sweden) to trigger a creative discussion. The students engaged very enthusiastically in an ad-hoc group assignment to suggest new and innovative ways to improve the e-Temple in general (mainly design issues) and how to encourage and stimulate reflection in particular. Without doubt will many of the suggestions will be implemented over time or made available for teachers to activate as "plug-ins" after discussions in their respective classes:

- Password hints and automatic e-mail with password sent to registered user if password is forgotten but correct answer to challenge question is submitted (already implemented).
- "Reflective question of the day" with direct statistics/feedback when question is answered (students also added a preliminary list of 10-15 questions that could be posted).
- URL library of "good, reflective links", to add to the actual learning about/understanding of reflection itself.

These three are only examples from an interesting list, created during a one-hour group discussion following a presentation to students of the ideas of a system for reflective diaries and the challenge to suggest improvements.

To further exemplify how the e-Temple can be used, the remainder of this section will present findings from the actual use by students in Sweden (senior-level, ESD) and in the UK (first-year, CS1280). Our aim with comparing these two groups, different in both Internet and academic experience is to display the full spectra of user experience into the discussion framework. In an earlier study [21] the span of students using reflective diaries varied among students with different subjects and backgrounds rather than academic phase (all groups were at intermediate or final level of undergraduate study).

A. Initial findings at Halmstad University, Sweden

During six autumn weeks (2003, when ESD students last used the website) close to 100 entries were made, totalling more than 20 pages of printout. Students in the previous (2002) year had only generated about half as much using the more traditional software. The e-Temple users also seemed to acquire a better understanding of reflection itself as a concept. Comments in the diaries lead to the conclusion that a demonstrated and enhanced reflective capability at least in part could be attributed to this better-fitting, more targeted software.

Working with the e-temple on the Halmstad modules provided particularly useful insights into the ways that students work together in groups and their ability to reflect on the work of others. Certainly in comparison with the comments obtained from the previous cohort, the recent input is more detailed and students are confiding their thoughts and concerns to a deeper level.

"I felt that the group leaders weren't too pleased with me. But they did not tell me straight out (as I usually do, because I think it is the best way).....I hope they don't bad mouth me to much in their diaries!"

The e-temple provided an opportunity for students to document their frustrations concerning the way that group

members work together providing the writers with some protection:-

"..... it felt like this group assignment did not get the priority that I wanted to give it.It ended up with just being me writing my part, the other ones did not have the time. By then it felt as if I was doing all of the work" and "We had a group meeting this MondayWe have a couple of slackers in our group, they think they are taking part in the article by sitting quiet beside us when we are writing and seem happy about the article being written without much of their help. When you want help from them you must order them to do things. But should it be like this?"

B. Initial findings at Aston University, Birmingham, UK

Progress so far on the Aston modules has indicated that e-temple is providing a very valuable and interesting insight into previously undocumented individual students' thoughts, learning and management skills with regards to the assessment. Several felt really daunted by the task set.

"I've been looking at the cwk for this course and I can honestly say I have no idea what so ever how to do it....I dont know what to do" and "I'm finding this subject really hard.I dont know what I'm doing and I dont know if I will pass, I am really scared...."

Others felt that the task was relatively straight forward and anticipated few problems.

"After originally being completely baffled by the coursework, closer inspection has led to me having a basic understanding of the problem.I now have a basic idea of what is required" and "well, I have used the weekend to analyse the coursework. it doesnt seem like the most difficult thing in the world....."

Indeed, several provided a step-by-step account of their progress to date and highlighted their enjoyment of the learning process.

"I started my visual plan on paper today but before I could start I needed some inspiration,.... Visually it has given me some ideas which i could implement in my coursework..... I now have a draft plan of what i want my web design to look like. Therefore, my next step now is to start developing....."

Quite a number commented on their problems of time management and juggling work from several modules while others confirmed that they found few problems in using e-temple. It was also interesting to note the various contribution rates to the e-temple with some students contributing several times each week while others still had to commence contribution.

C. Additional ideas for e-Temple use

Beyond affecting implementation in a number of courses, the results are informing subsequent online developments at Aston University, Birmingham with regards to Personal Development Planning. PDP is a UK Higher Education initiative which has to be available to all UK students by 2005/2006. Facilitating a structured and supported process, the aim is to help individuals better reflect upon learning, performance and/or achievements and to assist in planning future personal, educational and career development.

The idea for a personal development profile (PDP) in Higher Education emerged from the National Committee of Inquiry in Higher Education [24]. This incorporates an institutional record of learning and achievement and an individual personal record of learning, achievements, progress review and plans. It is important in making the outcomes of learning in HE more explicit and the basis for academic standards clearer, arguably improving the quality of learning overall. H.E. institutions are expected to use a transcript from 2002/2003 with the PDP element being operational across the whole of the HE system and for all awards by 2005/2006. A pilot scheme for electronic PDP at Aston is being introduced initially during the academic year 2004/2005 involving four groups of students:

- Students studying the International Foundation Programme in Business to encourage these students to develop their ability to express themselves with regards to their learning.
- Undergraduate students in Combined Honours (Stage 1) studying across the Schools of Aston to monitor their transition into Higher Education as well as encouraging and facilitating reflection.
- Undergraduate students on placement (Stage P) from across Aston University to monitor the development of their work-related skills during the placement year as well as encouraging and facilitating reflection.
- Postgraduate students across the University on research degrees.

The outcomes from this first project will inform a second phase of the project during the academic year 2005/2006 in which PDP's would be used more widely in the academic lives of all Aston students.

VI. CONCLUSIONS

Although the research is by now means complete at this stage, it is useful to reflect even at this stage and consider what has been learned and how approaches could be changed to deal with any issues.

One important outcome to date has been the addition of the timed input of the information. Not only does this provide a clearer into the students' learning but also seems to be encouraging students to contribute more to the diary, which in itself leads to a more fuller reflective account.

The research to date has taken place in two different types of University: a relatively new technology oriented institution (Halmstad) and in a more traditional older style institution (Aston). While students in the newer Universities are familiar with reflection, students from the older style Universities receive relatively little guidance or experience in reflection. However, the students participating in this research have demonstrated that they are finding relatively few problems in reflecting and are providing an interesting insight into their learning, previously undocumented thereby enabling a more in-depth knowledge of their learning by the module tutors.

The accounts have involved individual and group reflections, providing unique insights into the ways that students work by themselves and in liaison with others. It has

provided very useful information particularly in relation to the design of future teaching, learning and assessments to ensure that students are able to demonstrate their full potential thereby maximizing their achievement.

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