INTENSIFYING THE RELATIONSHIP BETWEEN E-LEARNING POSTGRADUATE STUDENTS

Sandra Rihs[1] and Philippe Thalmann [2]

[1] Sandra Rihs, Assistant, Swiss Institue of Technology Lausanne, EPFL-ENAC-REME, BP 2 140, 1015 Lausanne, Switzerland, sandra.rihs@epfl.ch
[2] Philippe Thalmann, Professor of economics, EPFL-ENAC-REME, BP 2 137, 1015 Lausanne, Switzerland, philippe.thalmann@epfl.ch

Abstract *¾ The postgraduate course for construction management and economics at the Swiss Federal Institute of Technology in Lausanne is an e-learning course for architects and civil engineers. The students are mostly full-time employees, who put a strong emphasis on minimizing disruption of their normal work. This design uses both group work and collective website building to compensate often observed disadvantages in Internet based courses such as solitude and ineffective learning. The course is organized as a well-balanced mix of online work and face-to-face meetings, which has shown to be vital for the creation of good working relationships between the students. They bring construction projects from their practice to elaborate the content of the course. By working on actual projects a strong link between work and education is created. This paper outlines the important components of the course and discusses the results of a preliminary evaluation.*

Index Terms ¾ Collective website building, problem-based e-learning, systemic knowledge management, virtual teams

INTRODUCTION

The postgraduate course in construction management and economics is part of the NLT programme (New Learning Technologies) of both Federal Institutes of Technology in Switzerland. It was launched in November 2001 and is due to end in November of this year.

The main objective was to create an effective e-learning environment for full-time employed architects and civil engineers, based on the belief that "the interactive capabilities of some distance learning technologies, especially those available through the Internet, (...), may be more attractive to adults." [1] The choice of the platform as well as the pedagogical scenario are key issues to help achieve this objective.

COURSE STRUCTURE

In this course teams of young architects and civil engineers learn how to manage together a construction project over the Internet. The goal is not only to develop competences in project management, but also to work efficiently in groups and over the Internet. Furthermore the construction project is to be integrated in a pluridisciplinary context, which includes economics, technology, materials, human resources, quality and risk management.

The Swiss norm for standard operating procedures for construction projects is used as an underlying structure of the course. Based on this norm the students elaborate their project from the early planning stages to considerations related to the future demolition of the building / structure.

The norm has six phases and twelve processes which are treated in the ten sessions of the course. Each session is framed with two meetings, one in the beginning, with an introduction to the process and the final meeting (generally after three weeks) in which the groups present their work.

During the three weeks of collaborative online work the teams are free to organize themselves as they wish. The projects are being evaluated during the final meeting of each session. Both the online work and the presentation are taken into account.

PLATFORM

The platform is not a common e-learning platform. It was designed "for improving business processes and is used by industry, associations and public administrations for process management."[2] It is based on XML(eXtensible Markup Language) and therefore the content can be reused for other platforms. The most important criteria in the selection procedure were the possibility to edit a web page online without knowledge of HTML programming and the process based structure, which can easily be adapted to any management activity.

For this course the platform was divided into two systems. One system was transformed into an e-learning environment. It includes the course schedule, a forum, a virtual library and a short description of students, experts and tutors. The other system uses the process management structure as a basis for the student's work. The students can add and complete their group work by simply attaching files or typing on their project page shown in Figure 1 and 2.

FIGURE. 1
SCREENSHOT OF AN EMPTY PROJECT PAGE

FIGURE. 2
SCREENSHOT OF A FINISHED PROJECT PAGE

PARTICULARITIES

The combination of group work, collective web-site building and problem-based learning in the context of individual construction projects is a challenge for the students as well as for the tutors. This particularity shows effects in following features:

- **Systemic knowledge management:** The knowledge is acquired through a constant flow between the students, the experts and the tutors. The content is elaborated by the students through research in the virtual library and the Internet, they are only given an introductory overview at the beginning of each session.
- **Interpersonal relationships:** Framing the online work with face-to-face meetings is an important factor to intensify relations amongst the students.
- **Facilitated communication:** The tutors are able to constantly follow the students progress and can therefore intervene if needed.
- **Evaluation:** The students are being evaluated both on their online work and on their presentation at the end of each session. The tutors' work focuses mainly on evaluating how knowledge is applied, less on teaching only theory.
- **Evolution:** The students' and experts' comments are taken into account to constantly improve the course. An evaluation of the course by the students is currently ongoing. Findings of this evaluation will be discussed during the oral presentation.

PRELIMINARY RESULTS

The results will be shown under four headings: Group work, online editing, role of face-to-face meetings and mentoring.

Group work

The groups are composed of three to four persons, which appears to be the right size for this form of education. During the first day of the course the ten participants have chosen with whom they wanted to work. The students later confirmed that they would have preferred to have more time to get to know each other, which confirms previous findings that face-to-face contact is "crucial in the early phases of virtual team life."[3]

Limited face-to-face interaction proved to be a problem for one group. Difficulties with communication during the first sessions lead members of the group to consider abandoning the course.

At that point the group, the professor, the tutor and an expert convened an urgent meeting to address these issues. During the discussion the team-members were encouraged to rebuild trust amongst them. We let them express freely why they were participating in the course and what the problem with their group was, applying the principle that "purpose is the glue that holds them together."[3]

After this intensive coaching they were able to overcome their difficulties, build up trust and a good working relationship. This experience became part of the shared knowledge of the whole course.

On the positive side we observed that the sharing of competences within and between the groups is very satisfactory and is still evolving.

Online editing

The design of the platform allows the group to edit their work online and to communicate through a forum shown in Figure 3. One group compared their forum to a tamagochi that had to be fed by information, or else it would die. This group confirmed checking the messages in the forum of the course before looking up their emails at work and their forum is working very well.
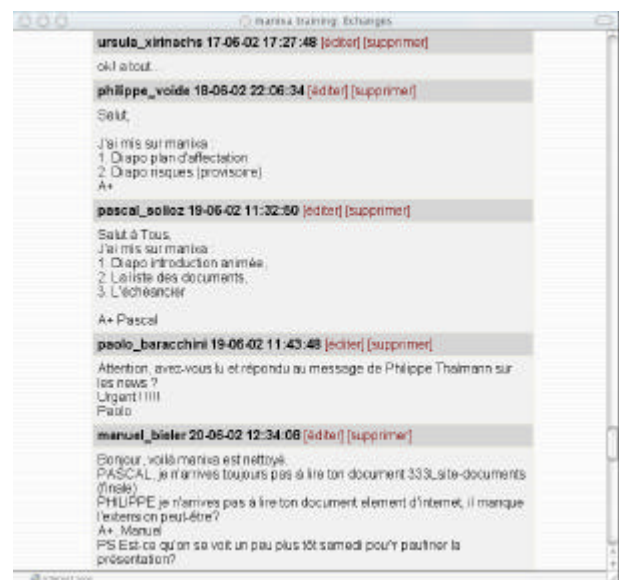

FIGURE. 3
SCREENSHOT OF THE FORUM

The only problem to be noticed in the online editing is of technical order. Even though an Internet connection is required for every student, some of them encounter difficulties to work online, mainly because their office allows only intranet connections. To overcome these difficulties they arrange themselves to work from home or through e-mail.

Role of face-to-face meetings

"Clarity in roles and procedures is critical to the team. Ideally, this is developed during a face-to-face meeting before the onset of teamwork."[3] There is little doubt that all students would agree with this statement. We usually offer free time after the official introduction to a new session and all of the groups use this time to clarify what has to be done and by whom. Without this clarification they reported finding it difficult to determine priorities.

But even a good preparation of the group work cannot always avoid difficulties. When problems emerged, the participants found it necessary to meet physically or to have a phone conference. It seems that in times of trouble synchronous, realtime meetings work best.

On the other hand a group decided to only meet once physically and restrain themselves to work online during the three weeks. This group only gets together to prepare the presentation of the final meeting of a session and to this date this group shows good results.

Mentoring

The e-learning environment requires new skills of the tutors. Their workload shifts from preparing content to evaluating acquired knowledge. In this course the role of the tutors, who analyze and evaluate the ongoing work of the students is separated from the role of the experts. The experts mostly work as established architects and engineers in the construction industry and introduce a new session or make contributions to the virtual library.

In addition to the construction specialists we have also invited experts in pedagogy and group coaching, who helped us design the pedagogical scenario and offer support on interpersonal aspects within the course.

The combination of these different levels of mentoring proved to be efficient in this course, to help us achieve the goal we have also "sought solutions in pedagogy, rather than in smart software."[4]

CONCLUSIONS

The new approach of problem based e-learning for a postgraduate course in economics and construction management is a first step towards an emerging form of collaborative work in virtual environments. In this context we found it helpful to give the participants a great degree of flexibility for their online work and to clearly define the required milestones.

The necessity of regular face-to-face meetings is an absolutely vital component to intensify the relationship between students and tutors. Does this imply that e-learning communities should not be geographically dispersed to work efficiently together? Further research is warranted in this area. Especially when considering the example of one group who only met to prepare their presentation but used online communication to elaborate their project. By sharing the key elements of this course, we hope to contribute to the establishment of tomorrow's best practice.

ACKNOWLEDGEMENT

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