A SYNCHRONOUS GROUPWARE AND SOME SCENARIOS AS AN EXAMPLE FOR NEW MEDIA IN EDUCATION

S. Werner, A. Hunger, C. Schütz and M. Jung

University Duisburg-Essen (UDE), Oststrasse 99, 47057, Duisburg, GERMANY,
swerner@uni-duisburg.de; hunger@uni-duisburg.de; c.schuetz@uni-duisburg.de;
markusjung@uni-duisburg.de

Keywords: Computer Supported Collaborative Working, Groupware, Software Engineering Education

INTRODUCTION

The motivation for the usage of new media in education can differ. The University of Duisburg-Essen (UDE) is involved in several projects such as “eCampus”, “Minerva”, “OFFSHORE” and “Bridge”. All of them aim at the development of innovative contributions to university education from various points of view, especially internationalization. Most of these projects form the basis for the usage of new media and communication technologies, especially those using groupware technology in university education. This article describes the efforts which have been made at UDE and the experiences up to now concerning new media and communication technologies, taking a software engineering lab as an example, especially the usage of a synchronous groupware to support software engineering education with spatially distributed student teams.

SOFTWARE ENGINEERING

Software engineering education at universities includes project oriented labs. The experiences with software engineering student projects at UDE pointed out, that the teams cooperate in different ways in the separate phases of the software life-cycle. Early stages of the development require numerous group meetings with a high proportion of cooperative work. Coding during the implementation phase employs less cooperative work because of its strong individual work character.

Because of its high portion of cooperative work, early design stages can be conducted by spatially distributed teams. Therefore, software engineering is very often cited as a proposed application field for groupware. Groupware systems are developed within the interdisciplinary research field Computer Supported Collaborative Working, that “… looks at how groups work and seeks to discover how technology (especially computers) can help them work.” [1].

THE SYNCHRONOUS GROUPWARE PASSENGER

Most available tools, which can be used within software engineering education, are proved to be unsuitable [2], [3] and [4]. On the other hand, actual research is concentrated on possibilities to integrate existing tools, commercial or freeware, in the first line. The development of suitable problem oriented tools takes place only in exceptional cases. At the Institute of Multimedia and Software Engineering (IMSE) at UDE a synchronous groupware called PASSENGER has been developed. This tool was developed inline with the
requirements and relationship aspects derived from several investigations of the traditional software engineering lab. The main advantages of the synchronous groupware PASSENGER approach are:

- Combination of video, audio and whiteboard
- Support during the discussions, e.g. avoid communication breakdowns
- Guaranteed fairness concerning the floor assignment
- Awareness functions, e.g. history of document or display of actual roles
- Support for setup of partner images
- New concept for the organization of private and public workspaces
- Enhanced data streaming for higher robustness against data losses
- Reduced network bandwidth while using IPv6-Multicast

An overview on the basic concepts can be found in [5].

USAGE OF PASSENGER

The first experiments with the synchronous groupware PASSENGER took place in 2001. Since the summer semester 2003 it is used in software engineering labs for undergraduate students. During the lab, the students work in teams on a close-to-reality task that is chosen in such a way that it can not be solved by an individual, so that the students are forced to divide the problem into subtasks.

The first experiments (2001) took place in a local area network and aimed at getting first experiences on the implemented measures and their acceptance by the users. An overview of the results of these experiments is given in figure 1.

Prior to the usage in long distance applications, such as distance learning, the implemented measures concerning data streaming have been measured in additional experiments in early 2003. Experimental sessions include clients in Europe (Duisburg, Leipzig and Craiova) and Southeast-Asia (Kuala Lumpur). The implemented measures, such as additional services on application layer that are not available so far, have been proved to be suitable and to contribute to the reliability of the tool and also to the enhancement of the user acceptance.

ADDITIONAL SCENARIOS

Apart from the usage within the software engineering labs at UDE, the synchronous groupware PASSENGER shall be used in several other projects, which focus on different aspects of the application of new media in education.
The goal of the eCampus project (funded by BMBF [6]) is to move classical, typically non-digital, university services to the internet, e.g. schedules, exam dates and exam results, date changes, jobs or practical training offers and information about events on the campus itself. Further aims are to provide an intelligent gateway between wired and wireless services and to combine services, which are unlinked until now. The practical aspect of this improvement becomes obvious, when we look at a distributed lab: Due to organizational requirements, each lab needs to be placed on the same day for all students. Assumed that 60 students are participating and each group will be formed by three students, this would result in 20 groups, which need to accomplish the lab at the same day. Therefore, there will be five slots with 90 minutes for four groups maximum. Additionally, each group per slot needs a tutor. This would require 16 different rooms. This number of rooms cannot be occupied for realizing one single lab. Including the eCampus project, any room with wireless access can potentially be involved in the lab.

Minerva/“ViReC e-Initiative”

The project “ViReC e-Initiative” – University Virtual Resource Center is funded by the European Community [7]. Within the project MINERVA/ViReC the synchronous groupware PASSENGER will be used as a communication tool for project-coordination and later on for open distant learning (ODL) and communication between the students themselves or students and tutors. Therefore, first communication tests took place between the University Craiova, Rumania, and UDE (2500km). Focused on the technical aspects, this represented one of the greatest tested communication distances of the synchronous groupware PASSENGER up to now. In frame of the Minerva project the advantage of the synchronous groupware PASSENGER compared to other common communication tools like MS Netmeeting is obvious, if there are more than two communicating participants. Here synchronous groupware PASSENGER can prove its advantages in video communication, since it is technically not limited to the number of displayed video connections aside from the aspect of group awareness in CSCW.

The OFFSHORE- and the BRIDGE-PROJECT

Referring to the internationalization of university education, a great number of international oriented degree courses supported by the German Academic Exchange Service (DAAD) have been established since 1997/98 [8]. Today six international oriented Bachelor Degree Courses and five international oriented Master Degree Courses are offered by the Faculty of Engineering at UDE. Beyond that, one of the next steps will be the development of a double degree program with partner universities in Southeast Asia, the Universitas Indonesia and the Universiti Kebangsaan Malaysia is under development. In addition, the establishment of two UDE-Offices at the partner universities in Southeast Asia is funded by “Stiftung Mercator” within the “BRIDGE”-Project. The implementation of these offices took place in early 2003. Both offices are run by staff members of the UDE. Within this project the synchronous groupware PASSENGER is used for regular project meetings of the IMSE – members at UDE and the UDE-Office in Kuala Lumpur. In the frame of the planned double degree program the above mentioned software engineering labs shall be conducted with students teams at all of the three partner universities.
CONCLUSION

This paper discussed the usage of groupware technology in software engineering education. It was shown that groupware technology in principle can be used in education for tasks with a high proportion of cooperative work. This paper also introduced the synchronous groupware PASSENGER, which was developed at the Institute of Multimedia and Software Engineering at the University Duisburg-Essen for a software engineering lab with spatially distributed teams. It was discussed that this software can be used in additional scenarios:

- In a wireless network environment this software can lead to new approaches in using the university campus for labs.
- Beyond labs the software can be used as a communication tool which proved its reliability even for long distance communication.

The usage of the synchronous groupware PASSENGER in the above mentioned scenarios also showed, that:

- from a technical point of view a lot of innovative applications are possible with today’s available technique, including the Internet, web cams, wireless networks and notebooks.
- from a didactical point of view a mixture out of classical and new kind of learning is possible to keep the efforts of students admissible for marking.
- from an organizational point of view a lot of hardware is required, which can not be expected everywhere, and administration of such systems must also be warranted.

Therefore, if the hardware is available, these new approaches can lead to new ways of learning.

REFERENCES


