Work Environments in Electronic Meeting Systems
Josefina Rodríguez and Jesús Favela
Computer Science Department
CICESE Research Center
Km. 107 Carr. Tijuana-Ensenada
Ensenada B.C., Mexico 22860
{jacobo,favela}@cicese.mx

ABSTRACT
In this paper, we describe different work environments for the Electronic Meeting System designed at CICESE Research Center.

Keywords
Electronic meeting system, CSCW, GroupWare, communication software.

INTRODUCTION
Computer Supported Collaborative Work (CSCW) is a multidisciplinary field that studies and looks for new technologies to communicate and process information. Its main goal is to achieve efficient communication, collaboration, and coordination of group activity [1].

An important issue in CSCW is the design and development of hardware and software systems to facilitate group activities that take place in meeting rooms. Such a system is an Electronic Meeting System (EMS) [4,5]. This system consists of an electronic meeting room and specialized meeting software.

The electronic meeting room is similar to a standard meeting room with the addition of specialized equipment to improve communication among participants. Although there exist different designs for electronic meeting rooms, all of them must have a minimum configuration: A set of interconnected computers (one for each participant including the meeting facilitator) controlled by a central server, printers, and audio-visual supports such as electronic boards, video cameras, and video projectors [6].

The specialized meeting software is a set of communication tools that allow the exchange of information among the participants in the meeting. This type of software facilitates the organization of commentaries, prioritization of activities, voting, brainstorming, and the creation of specific purpose documentation and reports [3].

The configuration of the system allows each participant to interactively and simultaneously exchange ideas with any other participant.

To design the different work environments in an EMS, the designer must investigate the needs of the organization to which the EMS is made for, as well as the type of meetings that take place in the organization.

Organizations and work groups are usually distributed in different locations. For such cases, the need of a system to communicate the different groups is essential. A considerable amount of time in collaborative work groups is used in meetings; thus the importance of an EMS that reduces the time of meetings and improves the presentation and exchange of information is evident.

SYSTEM DESCRIPTION
The EMS at CICESE consists of an electronic room with capacity for ten people, a speaker, and a booth operator. It also has an electronic board, three voice-activated cameras, and a multi-media projector. The control panel and the central server are in a booth inside the electronic room.

Most of the meeting and support software for the EMS was designed at CICESE [2]. The most representative software are the following: Software for remote presentation (synchronous and asynchronous), technical review of software projects, meeting administration, organizational memory[7], audio and video recording, media alignment, and automatization of the EMS.

We designed the work environment of the EMS based on the type of meetings that are most common in CICESE. We briefly describe five of them:

- **Local Decision-Making Meeting Room.** All participants get together at the same time and place to discuss and decide about specific topics.
- **Local Classroom.** The EMS works as an electronic classroom. This environment offers a new way of interaction in a classroom by using new technologies. It also improves the communication among participants and the overall quality of the class.
- **Distributed Classroom.** The EMS works as an electronic classroom with capacity of ten local
students and an attendance of virtual groups located in other buildings or campuses.

- **Technical Review Room.** Reviewers evaluate software-engineering projects using the EMS. The reviewers can be local or distributed in other buildings. They use the EMS to share ideas and exchange commentaries about the project.

- **Remote Presentation Room.** The speaker uses the room to give a presentation or seminar to a remote audience. This environment does not provide interaction between speakers and the audiences.

The user interface of the system is friendly, easy to use, and facilitates the control of the equipment. To initialize the system, the meeting facilitator activates the selected environment for the current session.

**RESULTS**

The EMR of CICESE has been extensively used and tested in most of the designed work environments. We divide the usage of the EMR in two categories: local and distributed. Some examples are the following:

**Distributed:**
- Transmission and reception of courses offered from CICESE to research institutions and Universities (Massachusetts Institute of Technology, Catholic University of Chile, among others) and vice versa.
- Presentation of seminars and conferences to remote locations.
- Presentation of thesis defense with committee members geographically distributed.
- Technical reviews of software projects with research institutes, universities, and private companies.

**Local:**
- Academic and decision-making meetings in CICESE.
- Evaluation and technical reviews of software project.
- Presentation of seminars, conferences, thesis defenses.
- Audio and video recording room of thesis defense, seminars and courses for a media-aligned digital library.

In all these work environments the EMS performance have been satisfactory.

**FUTURE WORK**

After using this EMS for three years, we are have detected certain parts of the system that need to be improved. The goal of the improvements is to guarantee the quality of service of the system and add new features. We briefly mention some of the proposed system enhancement:

- Maintaining and improving existing meeting software, performing a comprehensive study of needs of work groups in CICESE to define new work environments for the EMS, developing new software tools to support the existing and new EMS work environments. Using the EMS to test software tools designed to support the development of CSCW and distributed software.

Furthermore, some physical features of the EMS such as illumination, control panel distribution, and furniture (to be ergonomic) need to improve to provide a more comfortable work environment. Updating computers and increasing the network bandwidth is essential to support new and more powerful software tools.

**CONCLUDING REMARKS**

The EMR of CICESE is a low-cost, functional room, equipped with specialized hardware and software to carry out collaboration of local and distributed groups. The creation of the EMR of CICESE has contributed to support some important research areas in the Department of Computer Science such as software engineering, collaborative work, and information retrieval.

The EMS is also a useful tool for presentation of long distance courses, seminars, thesis defense and many other similar situations that requires a speaker, an audience, and the interaction between them.

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**REFERENCES**

PROPOSAL
Josefina Rodríguez & Jesús Favela
CICESE Research Center

Josefina Rodríguez received a BS degree in Physics from the Universidad Autónoma of Baja California in 1987 and the MS degree in Computer Science from CICESE where she currently works in the Department of Computer Science. She has sixteen technical publications; six of them are in the areas of software engineering and CSCW with emphasis in HCI. She has participated in several national and multinational projects. In the project “Cooperative Systems”, several Latin American countries such as Mexico, Brazil, and Chile participated and its purpose was the development of software collaborative tools. She also participated in the project “Information Retrieval to Develop Collaborative Software”, that was supported in part by the NSF. Her research interests include software engineering in distributed groups, software processes, and organizational computing. She is currently working in the development of software tools, techniques, and methodologies to facilitate the communication of distributed work groups. She emphasizes the use of modern computer technology to achieve this goal.

Jesús Favela is a Professor at CICESE in Ensenada, Mexico. He holds a BS degree from UNAM, and MS degree (1987) and a Ph.D. (1993) in Computer-Aided Engineering form MIT, where he worked as a research assistant at the Intelligent Engineering Systems Laboratory. He has more than fifty technical publications in Computer Supported Cooperative Work, Multimedia Information Retrieval, Software Engineering, and Digital Libraries. He has been very active presenting seminars and tutorials to universities, research institutes, and private companies. He also has worked as advisor, consultant, and evaluator in diverse project in public and private sectors. He has participated in nine national and multinational projects in the areas of CSCW, information retrieval, distance learning, neural networks, and digital libraries. He is currently working in designing support techniques to facilitate communication and collaboration of distributed work groups.
Project Proposal

There are few research centers in computer science in Latino-American countries and they usually contain small groups of researchers that work on different areas. The long distance among the centers and the limitations of resources makes difficult collaboration among these groups.

We propose to develop new methodologies and software tools to facilitate the collaboration of groups distributed in different locations. These tools are based on the work that we are developing at CICESE. The idea behind these tools is that people can work together in spite of their location. By using these tools they can communicate, exchange ideas, review documents, and perform presentations, and other applications. Using this collaboration scheme, gather specialists from specific areas is not a problem. The required communication equipment is affordable by most research centers. It basically consists of a personal computer, a camera, a connection to the Internet, and specialized software. We briefly discuss the benefits of this project in the research, educational, and industrial sectors.

This project will support universities with reduced faculty members by using the concept of distance learning. In this scheme, a professor can offer on-line and videoconference courses, seminars, and thesis advising to students in distant universities. Some of these applications can be extended to other levels of education.

In the research area, the collaboration of distributed specialists working on common projects will improve. The main goal of the proposed system is to give researcher the feeling that all participants are working together in the same place, although the participants are actually in remote locations.

The benefits for the private sector are a combination of the above. On the one hand, companies can hire training courses in specific areas for their employees. On the other hand, companies can reduce costs by choosing a distributed group collaboration scheme for big projects and long distance project consulting