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Remote Technology Project Evaluation
An assessment of a teleteaching environment
Revital Marom, Lydia Goldberg, Pascal Gros
Eurécom, December 1993

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Draft

ABSTRACT

PictureTel is presently considered to be the desirable technology for teleteaching purposes. In the following paper we describe the evaluation process and the results of two teleteaching sessions conducted between Canada and France using an ISDN like switch (56kb/s). Based on qualitative evaluation methods, this study was designed to investigate which factors impact the learning and the teaching experiences in a teleteaching setup, e.g. social presence, technical capabilities of the system etc. Participants in the study were twenty five students from an engeeniring school located in the south of France who were taught a User Interface course by a professor situated in Canada. The study revealed that the main problem of the teleteaching process is the lack of interaction between the professor and the students. This is a result of the inadequacy of the technology , the lack of experience by all participants in using the technology and the unfamiliarity of the participants with the new teaching/learning experience. Suggestions for improvements were provided at the end of the article.

Remote Technology Project Evaluation
An assessment of a teleteaching environment

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A) Introduction

Traditionally, face-to-face instruction has been the only option available to educators. Today, teleteaching is becoming a new option due to the rapid advance of telecommunications, combined with virtual presence technologies. Distance educators can use a variety of telecommunications technologies to reach their audience; conventional UHF and VHF channels, microwave, cable, and satellite technologies have been used for the transmission of educational programs of all kinds. Presently, the Integrated Service Digital Network (ISDN) is considered to be the "new" desirable telecommunication technology. By providing a wide bandwidth, ISDN is easing network overload strain and improving the quality of telecommunication services, making it very attractive for the purposes of distance education. Even though the most appropriate uses for ISDN remain as yet undefined, its potentials point towards a wide variety of opportunities for both teachers and students.

Currently in our research approach we are focusing on the development and evaluation of technologies designed to support remote teaching. The purpose of this study is to evaluate conventional multimedia technologies and the ISDN link as applied to teleteaching. In order to identify strengths and weaknesses within this setup, our project focuses on the overall effectiveness of the technologies utilized, set within a specific classroom and office setting. Other studies performed on the effectiveness of teleteaching have revealed that the technical capabilities of the system and the users' ability to convey presence (i.e.. the social interaction aspect) are of principle importance; this study continues to focus due to its centrality to the concerns of distance education. The results of this experiment will be incorporated into future applications of the system, providing design alternatives and enhancing the teleteaching environment.

Course Design

The study was conducted at the Institute eurècom in France. The Institute is designed to expose students to international perspectives on telecommunications, an approach that requires frequent interactions with professors and other experts from all parts of the globe. The experiment focuses on a UI teleteaching course composed of thirty engineering students. The course was specifically designed to incorporate both face-to-face and remote teaching aspects. Two real time sessions were delivered from Canada to France using ISDN like switch 56kb by a specialist in Canada; the remaining two session were conducted locally.

The remote courses were designed to resemble a regular lecture situation: the professor delivered the course material and the students were able to ask questions. The follow up labs were conducted by the local instructor. Both the instructors and the students were novice to the experience, but were given a short written description of the study and its objective prior to the course. (See appendix A)

B) Evaluation Procedure

Qualitative evaluation measurements were used in this study. The students were invited to comment on their experiences by means of timelogs and questionnaires. **Time logs,** given to each student at the beginning of each teleteaching session, were used to record comments on the lecture as it proceeded, noting the time for each comment. (See appendix B). This instrument allowed the data to be cross-referenced with the recorded video material. **A questionnaire** was distributed to all students at the end of the last teleteaching session to obtain an overview of the experience. (See appendix C). The questionnaire was primarily designed to obtain data on social presence within a teleteaching environment (i.e. peripheral awareness, feedback, aspects of student-teacher interaction, etc.)

The remote professor submitted a written evaluation for each teleteaching class, and an overall course evaluation at the end of the teleteaching section of the course. An unstructured interview was conducted with the system engineer at the end of each teleteaching class to obtain information on problems and suggestions for improvement for the technical component of the study. The system engineer submitted an overall course evaluation at the end of the teleteaching section as well.

The researchers participated in the lessons as non-participant observers, with their comments recorded throughout the sessions. A formative evaluation based on all the recommendations obtained after the first teleteaching session were used to modify the second session. A report describing the results was distributed to the students and the professor prior to the second class. (See appendix D)

C) Lecture #1

I) Description of Setup:

EURECOM classroom (France):

The students were seated in four rows diagonally facing a 27" monitor featuring the professor. The monitor was on a stand 1.2 meter. high and 3 meter away from the first row. The audio-visual connection was made through an ISDN like switch 56kb using a PictureTel. A regular lens camera was placed on top of the monitor to send the image of the classroom to the remote site. Sound was distributed through the monitor speakers. The shared workspace software used was Timbuktu, and a modem link connected the two sites. Its control was by the professor at the remote site. The shared screen display was projected onto a 1.5x1.5 meter screen, located diagonally across from the television monitor. The students were also able to see their own images on a Picture in Picture (PIP), allowing them to perceive on the television monitor what the professor saw. (ISWYS)

Professor's office (Canada):

The professor was seated at a 120cm 300cm table. A 50x66" television monitor was placed 21 cm from the desk. A large 150x180" projection screen was placed by the TV monitor. The images from the remote site were projected onto both screens. A Cameraman, (a mounted video camera which follows whoever is holding the

"wandering" microphone), was mounted on top of the monitor to provide the office view to the students . A PIP was used on the TV monitor for the ISWYS effect.

II) Results of Evaluation:

Technical Problems:

Throughout the first lecture we faced several technical problems. However, the causes for these problems were identified during the course of the session:

A) **Shared Software:** The use of the shared screen was well received, but technical difficulties diminished its success. There was a ten second delay between the time that the remote professor changed the slides on his Mac and the time that he was able to see the results on his screen. Thus, effecting his orientation of the course material. As well, the telephone link for the Timbuktu connection was repeatedly disconnected, affecting the flow of the course. The makeshift solution was to have a local "slide operator" which manually changed the slides. This solution temporarily solved the problem.

B) **Video Link:** There were a number of problems associated with the audio/video link

Image Quality-: An initial bad quality of image (redness and blurriness primarily) was more or less rectified with a simple adjustment on the monitor. yet, due to problems with the image compression the blurriness of the image remained.

*Room Illumination:-*As the control of lighting was difficult, details were hard to distinguish. The ideal would have been to have the front of the classroom, where the projector was set up, to be completely in the dark but have the area where the students sat, in the light, so that the remote professor could identify the students clearly and the students could read from the screen. This arrangement was not possible under the physical constraints of the classroom. As such, the poor room illumination affected the quality of both the projected video and Timbuktu images.

PIP (Picture in Picture): The position of the PIP on the classroom monitor was distracting for it obscured the professor's image.

C) Audio Link: Principally the audio link suffered in quality. Since the echo cancellation device could not be used the students experienced a lassen effect during the lecture. This problem was eliminated by controlling the sound manually: it was transmitted one way each time and was switched manually. Under these conditions interaction between the sites was nearly impossible as the professor could not be interrupted for questions and comments and vise versa.

D) Social Presence:

Interaction: Overall, the course lacked any true social interaction. The students were reluctant to ask questions during the allotted period. The participants described the experience as static rather than dynamic. The following factors were reported by the participants which helps explain the causes for the lack of interaction:

Camera Control : Due to the breakdown of the CameraMan at the students' site the professor had no camera control over the classroom's site. He was unable to see individual students. Ideally, the professor should have control over the remote site camera, which would replicate normal selective vision in the classroom. The absence of this option didn't allow him to focus on individuals and get a feel for their responses.

Spatial Orientation: The lack of camera control created a lack of spatial orientation. The professor had no knowledge of the classroom layout and the number of students present, and the student could not orient themselves to the professor's environment. A contextual orientation is needed for a successful remote interaction.

Field of View: The use of a regular static lens camera in the classroom limited the professor's field of view. He received only a partial view of the classroom, which was due in part to the size of the class (25 students). Yet, the use of the CameraMan in the professor's office provided a good view for the students.

Interpersonal Distance: The students received only a long shot image of the professor. His desk created a spatial barrier between him and the students. The use of the long shot image created an "interpersonal distance" between the two locations, resulting in alienation of the students from the professor.

Image Resolution: The image resolution quality was poor, preventing a clear, detailed image of the participants, with negative effects on interaction.

Verbal Cues: Due to the screen size, the camera positions and the image resolution, the students were unable to perceive the non-verbal cues that enhance a conversation. This was compounded by the fact that the lecture was conducted in English, a second language for most of the students, making them more reliant on other ways of communicating. In order to understand the lecture, the students relied more on the slides projected from the computer screen and the lecture notes rather than the actual verbal lecture itself.

Familiarity with the Technology: The lack of experience for both the professor and the students affected the effectiveness of the lesson. They all faced difficulties in adjusting to the technology involved in teleteaching. For example, the professor spoke too quickly and had a static style of presentation. The students on the other hand were reluctant to use the technology to interact with the professor and relied more upon the printed material instead.

III) Suggestions for Implementation

Overall Student Remarks:

While a few students had quite negative reactions to the process and few were indifferent (i.e. not bad for a Friday afternoon), many thought with a lot of improvements, the course might actually prove to be a fruitful experience. Some suggested it was a question of getting used to the new setup while others suggested that a thorough introduction to the new teaching/learning environment would be necessary in order to orient oneself properly. Most found that the technical problems overwhelmed any possibility for learning during the lecture. As well, they found interactivity to be completely lacking, the language problem to be a hindrance to comprehension, and the overall experience as being a dead and static one. Many thought that a videotape of the lecture would have been much more effective.

Technical and Spatial Orientation

Professors and students who are novices to the use of the teleteaching technology should be provided with an informal technical training on the use of the technology involved, its capabilities and limitations. As well, all participants must be given a spatial orientation to the physical layout of each others environment via a virtual tour. The students and the professor should be aware of each others' points of view, how they appear on screen and how their presence is felt in the other context.

Interaction

As the interaction between professor and students was very poor, if not non-existent, definite changes would have to be made. The questions that we faced were how to improve interaction between the two locations? Why is it that the students were quite reluctant to ask questions? Likewise why was it hard for the professor to get any reaction from the students when he asked them questions? Although the answer to these questions might, in part, be related to the overwhelming technical difficulties experienced, this still does not explain for instance why the Professor felt that he was "talking to a blank wall" and the students felt they were "watching a bad video".

The following are our recommendations in order to increase the dynamic of the course:

1. Camera (s) position- The setup of the camera in the students' classroom should be arranged so that the students might get some semblance of direct eye contact with their professor, as well as a sense of distance.

2. Camera Control- the professor, through a camera control device might allow himself to move virtually across the room and concentrate on particular students.

3. Feedback mechanism- Using a feedback mechanism, all participants would also be able to view how they are being seen on the other side.

4. High Image resolution- A wider bandwidth should be used in order to elevate the image quality

5. High quality of sound- An Echo cancellation device should be utilized in order to eliminate the lassen effect and to increase the quality of the sound.

D) Lecture # 2

I) Description of Setup:

Based on our formative evaluation of the first lesson, the environments for both sites was redesigned. The main objective was to create a teleteaching environment that enhances interaction and social presence with limited technological impediments.

Eurècom Classroom (France):

The students were seated in four rows facing a 27" TV Monitor and a 1.5 x 1.5 meter screen as before. The monitor and the screen were repositioned to be in line with each other. The audio connection was enhanced by placing an HI-FI amplifier and

speakers next to the monitor and an echo cancellation device was added. To enhance interaction, a CameraMan gave a dynamic front view of the classroom to the professor and automatically focused on every person who was speaking. The camera's movement was controlled at the students' site, not by the professor. A second camera was placed at the back of the classroom and was operated by one of the technician to provide the professor with an alternative back view on a regular intervals of time. Timbuktu was used again as a shared software using the modem as the connection link.

Professor's Office (Canada):

The only difference to the setup in the office was the addition of a camera located on meter behind the professor which provided a back view image of the office to the students on a regular time intervals.

Orientation:

Prior to the lesson, the students and professor received a short, hands-on training on the use of the technology involved in the teleteaching session. During this training both the students and the professor interacted with each other while exploring the technology. A five minute "walk-through" of each environment was provided prior to the lecture. Using the CameraMan each student introduced him/herself to the professor. The success of this short orientation session points to the fact that one needs to find ways in which to make all participants comfortable with the technology and in some ways make it their own.

Method of Evaluation

The method of evaluation was based as in the first lecture mainly on the students' time logs (see appendix E and 1E) and on a series of eleven questions which the students answered immediately following the lecture. They were also given a handout before the lecture which described in brief detail the results of the first lecture and what they should expect in the second. We also relied on the Professor's written evaluation describing his experiences during the second lecture and his reactions to the changes that were made. The researchers describe their impression of the session as non participant observers.

Results of Evaluation:

In spite of the modifications, the interaction between professor and students was only slightly improved.

CameraMan:

Interaction: The use of the CameraMan in the classroom improved the interaction only to a certain degree. Our hypothesis is that despite the orientation and the introduction session before the lecture, the students were not interested in interacting or were reticent to ask to use the CameraMan. The professor found it difficult to interact as well. The hesitance to use the new technology, the language problem, and the natural resistance of people to interact with strangers remained a significant barrier to the interaction process.

Field of View: The use of the CameraMan and the back view camera in both locations increased the field of view for both professor and students, enabling an ongoing image of the other's environments. The professor was able to focus on individual students as well as enjoying different views of the room, but found that there was too much camera switching, resulting in an unstable view of the classroom.

Camera Control: The use of the CameraMan at both sites increased the field of view for all participants but did not solve the camera control problem. The professor did not use the camera control over the remote site and didn't virtually wander around the classroom at will. Instead a "camera operator " at Eurècom acted as the professor's eye.

Orientation:

Spatial : The spatial awareness of all participants at both locations improved due to the short orientation session at the beginning of the lecture. The professor felt more comfortable teaching the course to identified participants. The students reported that it was easier to interact with the professor after an orientation to his environment, but both participant groups commented that it would have been easy to become disoriented if the person presenting the environment had not been careful in their virtual tour.

Technical: The technical orientation was reported to be very useful for both parties. Yet, we observed that the students still felt embarrassed by the technology and were reluctant to use it.

Technical Issues:

Image Resolution: Due to problems with the compression of the image , its resolution remained poor although the color problem had been resolved. All participants found the image resolution to be a hindrance, as neither could perceive a clear image of the other.

Audio: As a result of the HI-FI system and the echo cancellation device, the lassen effect had been eliminated and the audio quality improved.

PIP: The professor chose not to use the PIP option while the students found the PIP to be too small to be used as an effective feedback mechanism.

Timbuktu: The problem with the 14khz telephone line remained the same and the line kept breaking . A decision, was made at the middle of the course to use a "manual device"- a person who will change the slides at the French side while following the professor comments.

E) OVERALL RESULTS:

The final student questionnaire and professor evaluation summarized their reactions to the whole experience of teleteaching. The following results were reported by the participants:

Interaction:

The lack of interaction was the main problem of the teleteaching process. Poor image and sound quality, static presentation of the material, lack of eye contact and body language, video transmission delay, inexperience with the technology, language barriers, and a natural shyness towards strangers were cited as reasons preventing better interaction. The low level of interaction reduced the students' attention span, affecting the learning process.

Video Presence:

The students reported that they did not believe the professor was aware of their presence. The poor sound and image quality coupled with the delay in transmission affected the visual presence of both parties. Attracting the professor's attention to ask questions was considered to be difficult if not impossible. The delay in transmission caused the students to believe that the professor had not noticed them attempting to speak. Although the use of the CameraMan increased the interaction aspect of the lesson, several students suggested that they would only use it if they were highly motivate to ask a question. Students responded that they were comfortable being on camera as they could see themselves on the PIP monitor. The professor, however, felt quite distracted by his own image, and preferred not to use the PIP.

Shared Workspace:

The shared workspace was well received by all students, but the professor found it difficult to use. He felt disoriented by the delay of slide presentation on his screen, becoming unknowingly unsynchronized with the slides. He was preoccupied with the technology, trying to verify if the correct slide was on. The lecture lacked "flow" as a result and made it difficult for the students to maintain their interest

Class Size:

The class size was too large at a 25-30 student. An ideal class size for teleteaching interaction seems to be between five and ten students, or, ironically a lecture for over 50 students where class interaction between professor and students is usually not a requirement.

F) Strengths and Weaknesses:

According to the surveys, the two main benefits of teleteaching are the savings on travel expense and the ability to access expert knowledge in the classroom without the inconvenience of physically transporting the lecturer to the classroom site. The two principle disadvantages of teleteaching are the lack of interaction and the inadequacies of the technology. The students general reaction to the experience was feelings of passivity and difficulty in concentrating on the lesson.

The following improvements were suggested by the participants:

- Personal microphones should be given to each students to encourage interaction.

- Screens should be bigger to allow the professor's image to dominate classroom.

- The image and sound quality need to be improved. The video image should be clear and the voice should not be distorted.

- The delay in transmission should be eliminated for the video images and the shared computer workspace.

- A feedback mechanism for both the students and professor is needed.

- The technology should be "hidden" so that it doesn't interfere with the learning process.

G) DISCUSSION

Recommendations and Conclusions:

In spite of its promising capabilities, the ISDN based technology is not yet adequate for the demands required for an active teleteaching sessions: e.g. sound and image quality. For example , in a teleteaching environment students have a limited access to environmental cues. They require nonverbal cues such as voice intonation, body posture and facial expressions, to a greater extent than they would be in a face-to-face classroom situation. When the sound and the image quality are poor these kind of audio: visual infromation can't be perceived by the teleteaching participants and it prohibits interaction.

Interaction is an extremely important component in a teleteaching experience. It is the element that separates the teleteaching experience from simply passively watching a television program. In our study, despite the attempts to ease the discomfort and the unfamiliarity of the new teaching experience, the changes to the setup did little to provoke interaction. Our study shows that teleteaching is a new way of instruction which requires adaptation to be made by both the instructor and students. The instructor cannot simply transpose traditional teaching methods onto a teleteaching context. They (instructor and students) must be aware of the advantages and limitations of this new set up for teaching and learning and should take them into consideration while preparing and participating in the teleteaching course. For example, the subject matter and the teaching style must be match to the capabilities of the technology and the specific setup that is used. We strongly recommend that the instructor and students be familiarized with the requirements of teleteaching as a new way to learn and to teach , so that all participants may feel more comfortable with the entire process.

To replace face-to-face instruction, an optimization of verbal and non-verbal interaction must be designed. Courses must be planned for a maximum information transference and acceptable level of presence must be experienced by all participants. Perhaps a re conceptualization of what distance teaching is, would be necessary rather than attempting to duplicate a normal classroom situation. We should begin to think of

new ways video transmitted data and images can be used for distance instruction. For instance, the system could be ideal for a one-to-one tutoring between a student and a teacher where the shared workspace is used in conjunction with the audio/ video link.

It seems clear that the wide bendwidth of the link link is not sufficient enough of to be used for a teleteaching situation. Even when we will improve the image resolution and the sound quality, it is not until we learn to incorporate it into an environment which encourages interaction at a distance that we will be able to benefit from its technical potential.

ACKNOWLEDGEMENT

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<u>Appendix A</u>
Evaluation of remote teaching technology

Module d'Orientation Multimedia: User Centre Design
Marilyn Mantei, Dick Dillon
May 28, 1993-June 25, 1993

Evaluation team:
Revital Marom, Pascal Gros, Lydia Goldberg

An important research thrust of the Multimedia Department is the development and evaluation of technologies to support teaching at a distance. During this course we will be testing out a number of different methodologies for interaction at a distance. For this purpose, we will be looking at the following teaching scenarios:

- virtual lectures (using a video link),
- laboratory demonstrations at a distance,
- team teaching (virtual and real),
- informal student- professor discussions,
- remote student-professor consultations.

We have planned a series of evaluation sessions which will investigate the appropriateness of the remote teaching technology as a teaching tool. The following techniques will be used to carry out this investigation:

- log recording, in vitro evaluations,
- post-class questionnaires,
- video recordings and analysis of sessions,
- unstructured interviews with students and professor.

Videotaping will only be used to evaluate the technology. It would not normally take place if the technology were to be adopted. The results of this evaluation will be published in a report and will be made available to all participants.

Thank you for your co-operation.

APPENDIX B

Student Comments
Module d'Orientation Multimedia: User Centre Design
Lecture number 1
Prof. D. Dillon
June 5, 1993

Video-based technology is being used as a delivery mechanism for this course. Different evaluation methods will be used to determine the effectiveness of this technology. For this first class we are asking you to record throughout the session your spontaneous impressions and commentary on the video based technology. Please record both positive and negative impressions. In order to cross-reference with other students' commentaries, we would like you to indicate the time and the context for each comment. (Please do not write you name. We prefer that the comments remain anonymous.)

Time/ Context   **Positive Comments**   **Negative Comments**

Appendix 1b
Student Course Evaluation Results # 1: June 11, 1993

1

14:55   (-) sound not comfortable to listen to. Why not use stereo?

15:00   (+) we get used to poor quality of sound.
            (+) improvement of zoom on the speaker.
            (-) image is too dark, all we see is a "dark shape" speaking, no facial
                  expressions.

15:05   (+) good quality for slide system.
            (-) the lecturer should be able to act on his slides with a painter.

15:10   (-) nothing happens...

15:25   (+) the image is much better and thecourse goes on.., but not for a long
                time!

16:30   (+) not so bad...

***

2

14:50   (-) setup problems!

14:55   (-) the sound is not very good quality

14:57   (-) saturation
            (-) it's difficult to follow the presentation due to poor quality of sound.

15:00   (+) zoomed image is better
            (+) still too much orange, maybe more light is needed in room in Canada.

15:02   (+) good having transparents on the projector.

15:08   (+) I'm getting used to the sound.

15:11   (-) an interruption. Too bad, we were starting to follow.
            (-) one should make small papers with messages to say: continue, stop,
                speak, do you hear us.

15:20   (-) continue please...

15:23   (+) good image quality.

15:35   (+) image now ok, important to see the face.

15:40   (-) I was more convenient with "automatic" slide range.

16:30   (+) image and sound now okay for discussion.

Over all remarks:
- without setup problems the course would be interesting.

Appendix C

Evaluation of Remote Teaching Technology

Module d'Orientation Multimedia: User Centre Design

Marilyn Mantei, Dick Dillon

June 25, 1993

Teleteaching Final Evaluation

In this questionnaire we would like you to answer specific questions related to your experience in this teleteaching environment. As a participant, we would like to get you feedback on the process. Please take the time at the end of this class to fill out this questionnaire.

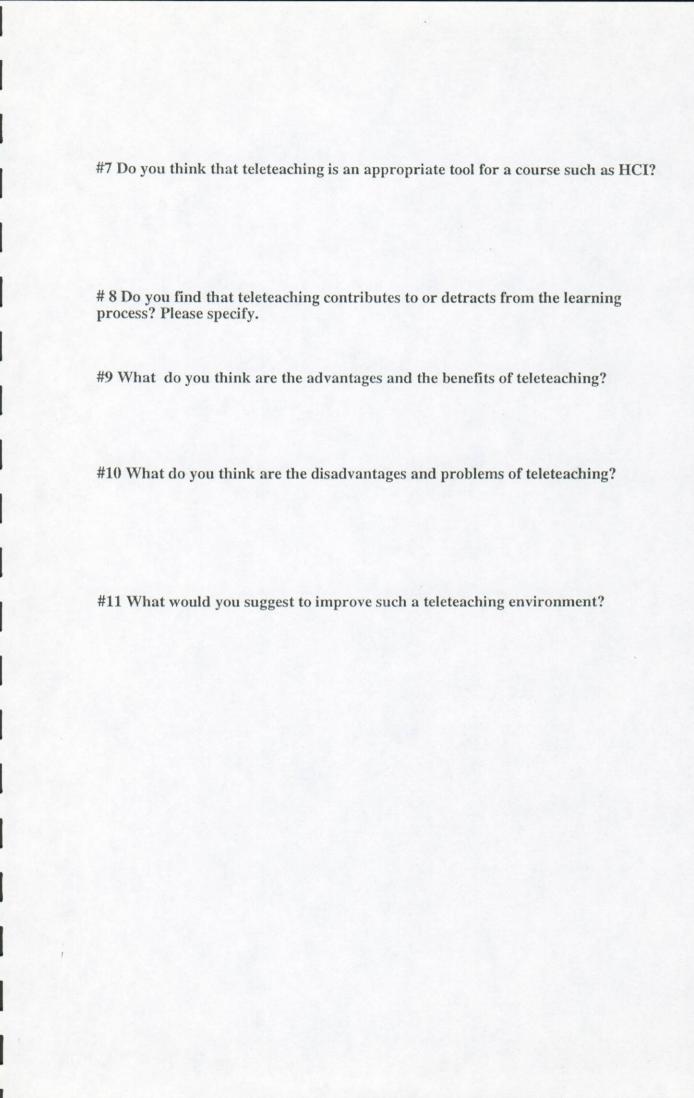**#1 Did you like this form of professor-student interaction? Why?**

#2 Did you feel comfortable with the use of video for learning purposes?

#3 Did you feel that the professor was aware of your presence? Why?

#4 Did you find it difficult to get the professor's attention when you had a question?

#5 The professor was able to see you during the lesson, did you feel comfortable being on camera? Please specify.

#6 What do you consider to be the ideal class size for teleteaching, and why?

#7 Do you think that teleteaching is an appropriate tool for a course such as HCI?

8 Do you find that teleteaching contributes to or detracts from the learning process? Please specify.

#9 What do you think are the advantages and the benefits of teleteaching?

#10 What do you think are the disadvantages and problems of teleteaching?

#11 What would you suggest to improve such a teleteaching environment?

Appendix D
Evaluation of Remote Teaching Technology

Module d'Orientation Multimedia: User Centre Design
Marilyn Mantei, Dick Dillon
May 28-June 25, 1993
Evaluation Team: Revital Marom, Pascal Gros, Lydia Goldberg

Results and proposed changes

As we mentioned in the introduction to the course, an important research thrust of the Multimedia Department is the development and evaluation of technologies to support teaching at a distance. During this past lecture we asked you for a personal perspective on your experiences as a student within the teleteaching experiment as presented here at Eurecom in conjunction with Professor Dillon in Ottawa. In investigating the acceptability or appropriateness of the remote teaching technology as a teaching tool we strongly held into consideration your comments and observations which we divided into two sections; *technical* and *subjective evaluation*.

A. Technical Evaluation

Problems

1. *Image*

The image was of poor quality. It was both too dark and too red.

2. *Sound*

The poor audio quality was as a result of a feedback problem and thus there was the need to control the sound manually.

3. *Shared Work space*

As a result of a linkeage problem Professor Dillon was not able to control the slides himself. Thus Professor Mantei had to change them locally. As well, Professor Dillon could not make use of the remote pointer as there was a problem with the mouse.

Solutions

1. *Image*

As most students noted the image quality greatly improved once Pascal Gros was able to make a few minor adjustments to the monitor. Thus, the quality of image should be equally good the next time around, if not better.

2. *Sound*

The feedback problem will be solved with the use of the echo cancellation. Thus the sound quality should be quite good.

3. *Shared Workspace*

If the telephone line doesn't get broken repeatedly there should be no problems with the Timbuktu.

B. Subjective Evaluations

Problems

1. *Orientation*

The students felt quite disoriented by the lecture and its setup. Not only did they have a difficult time both seeing and hearing Professor Dillon (due to the many technical problems), but there was confusion it seemed as to the organization and layout of both the professor and student teleteaching environments. This, incidentally, was a feeling shared by Professor Dillon in Ottawa. He felt that a lack of orientation aggravated the fact that he was unfamiliar with this particular classroom set up.

2. *Interaction*

Another problem as expressed by many was the fact that very little if not any interaction took place between the professor and the students. Part of the problem was due to audio and image difficulties, lack of orientation, language barriers, as well as classroom set ups. The conclusion we have come to is that the actual setup of the class as it is presently layed out appears not to be conducive to professor-student interaction. As a result, as some students mentioned they might as well have had a prerecorded videotape of Professor Dillon, which would not have required any form of interaction.

Solutions

1. *Orientation*

What will be necessary to do at the outset of the next lecture is what some of you suggested; that is, give the participants a proper introduction to the course, its various elements, functionings and dynamics. That is to say, it would be helpful to all participants in this teleteaching experiment to be given a tour of not only the physical layout of the technology here in Eurecom, but as well how things look from the professor's side. As mentioned before Professor Dillon also experienced disorientation and felt that a thorough introduction to the setups on both sides of the Atlantic would have made things a lot more comfortable for him as well.

2. *Interaction*

Although there are no simple ways of increasing interaction between the two locations, one thing that can be done is to improve camera control on the professor's side so that he might become more aware of individual students. As such, Professor Dillon expressed concern over the fact that with only a stationary camera in the past lecture he could see very few of the students and felt as if he were talking to a blank wall. Thus,

Professor Dillon should be able to roam the room as he would in a normal class situation and zoom in much closer so that he may at least be able to see when students have questions or queries and thus respond to them quickly. As it is not yet possible to give the professor a remote control over the cameras, our solution will be to have a camera person in the students' classroom roam for the professor across the room in order to simulate a more natural approach to teaching.

Appendix E

Student Comments
Module d'Orientation Multimedia: User Centre Design
Lecture number 2
Prof. D. Dillon
June 25 1993

For this second class we are asking you to record once again throughout the session your spontaneous impressions and commentary not only on the video based technology, but as well your general feelings overall about the experience of teleteaching. We certainly appreciate any recommendations or suggestions you may have and we hope that you will be encouraged to write openly. As well, in order to cross-reference with other students' commentaries, we would like you to indicate the time of each comment.

Your class will be formatted as follows: There will be a one hour lecture given by Professor Dillon from Ottawa followed by a lecture given by Professor Marilyn Mantei, followed by a joint consultation. We ask you again to write down your comments, only this time there will be two separate sections for the remote teaching; one for Professor Dillon's one hour lecture at 2:30 and one for his consultation at 5:30.
(Once again please do not write you name. We prefer that the comments remain anonymous.)

Thanks again for your help and cooperation.

LECTURE TIME LOG

Time / Context   **Comments**