

Title of paper: Teaching and Learning using Interactive

Videoconferencing: Screen-based Classrooms

Require the Development of New Ways of Working ®

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Abstract

Since 1997 Central Queensland University (CQU) has extensively used interactive videoconferencing facilities to teach students located on its Queensland based campuses. Very little training was available to staff who used the interactive videoconferencing facilities. It was assumed that face-to-face teaching skills would be directly transferable to the medium of videoconferencing. An internal report commissioned by the Deputy Vice-Chancellor indicated considerable staff dissatisfaction with teaching via the interactive videoconferencing facilities .

This paper describes the results of a research project that analysed the process of teaching via interactive videoconferencing. This project used a two-day staff development workshop and a curriculum redesign process to develop a model of teaching using the interactive videoconferencing facilities that encouraged interaction between students and between staff and students. The videoconferencing model has some similarities to both the internal and external models of teaching. It also has some aspects unique to the communication medium.

Data were collected in the form of student comments, student focus groups and staff observations and reflections. The data was analysed using Sproull and Kiesler's (1991) two-level perspective of communication technologies. They argue that technologies have both efficiency effects and social system effects and that management tends to concentrate on the efficiency of a new technology and ignore the social system effects.

Sproull and Kiesler (1991) state that, the most significant effects of adopting a new communication technology may be not to let people do old things more efficiently but rather to do new things that were not possible or feasible with the old technology. Therefore, this paper argues that in order to maximise the benefits of the interactive videoconferencing facilities, the university needs to exploit the characteristics of the interactive videoconferencing that are not present in other communication media available to the lecturing staff.

Introduction

Facilitating student learning in units in which both internal and external students have been enrolled has meant that the lecturer has had to cope with two quite separate groups of students. The internal students cover the content area of a unit when they meet in a classroom setting each week with their lecturers and or tutors for a set number of contact hours. They can interact with the teaching staff both within and outside class time. Other interaction occurs when they discuss the unit material with other students. For most external students, the study experience is more solitary. They rely on written materials (study material and textbooks) for their content and their communication is usually one to one with a member of the teaching staff. Though the advent of computer mediated communications has the potential to increase opportunities for interaction with staff and to be able to interact more easily with other students.

In 1987, Central Queensland University (CQU) began to develop constituent campus sites, first at Mackay then Bundaberg, Gladstone and finally Emerald. Until 1996 these sites supported face-to-face teaching for first year classes only. Students, who wished to complete second and third year, either moved to Rockhampton or changed to external mode. CQU's Vision '97 policy stated that beginning in 1997, students would be able to complete some degree programmes at their campus of origin. The interactive videoconferencing facilities were implemented to support multi-campus teaching.

The introduction of the interactive videoconferencing mode of teaching has created a third type of student group, the interactive videoconferencing class. These students are not really external as they expect to attend and participate in classes, albeit through a system of television monitors and microphones. It can also be argued that they are not really internal, as in most units the lecturer in charge is located in Rockhampton, therefore, the students enrolled at the constituent campuses can not attend face-to-face lectures.

The presence of students in the interactive videoconferencing rooms at the constituent campuses being linked electronically to the running of lectures in Rockhampton, has created a new teaching and learning environment. This videoconference model of teaching and learning has some similarities to both the internal and external models of teaching. There are also some features that are unique to this communication medium.

This paper reports the results of a research project that analysed the process of teaching via interactive videoconferencing. The data was analysed using Sproull and Kiesler's (1991) two-level perspective of communication technologies. Sproull and Kiesler (1991) state that, the most significant effects of adopting a new communication technology may be not to let people do old things more efficiently but rather to do new things that were not possible or feasible with the old technology. Therefore, this paper argues that in order to maximise the benefits of the interactive videoconferencing facilities, the university needs to exploit the characteristics of the interactive videoconferencing that are not present in other communication media available to the lecturing staff.

Context

The videoconferencing environment introduces role conflicts for the lecturer. The lecturer is responsible for everything to do with the quality and content of the images being sent to the other campuses. The lecturer is the producer, director, script-writer, floor manager and camera operator for a show that goes out live to air two hours a week! (Ostendorf 1994). Unlike a television show, the lecturer also has a geographically dispersed interactive, video-based audience as well as the studio audience. Bigum and Appleton (1997) referred to this experience, as moving from stage to screen. Teaching skills used with working on the 'stage' of a lecture theatre were not directly transferable to the 'screen' of interactive videoconferencing.

The author's first experience with the use of interactive videoconferencing for teaching was in 1997. She observed that though the videoconferencing facilities had the capability to allow the audience to interact, the students at the constituent campuses used the microphones rarely; they felt that they did not need to speak as, "knowing we can ask questions is important" [Mackay student, 1997]. The Rockhampton students in general would not use the microphones when speaking to the lecturer, "but you can hear me without the mike, can't you repeat the question?" [Rockhampton student, 1997]. For most Rockhampton students, this was their first experience with the videoconferencing facilities. This experience of being uncomfortable with the new teaching and learning environment is not an uncommon one. It is not unusual for students to feel inhibited by the presence of the camera and to feel reluctant to interact in what for many of them is an unfamiliar situation (for further discussion, see Comeaux 1995).

There were many adjustments to what was essentially a new teaching and learning environment (Daunt 1997). Videoconferencing slowed down the lecture due to a number of technological factors. There was a delay before starting as you waited for all the sites to come on line. This was caused by the technician building an electronic bridge to link the four sites and then dialing the telephone numbers of the receiving sites. There was a time delay when asking questions and another waiting for replies. The compression process caused these delays. Working with the technology took time, as you had to use the control panel to preview and then send images, as well as having to swap between your image and your visual aids. Additionally, there were sometimes delays due to system failures. A conservative estimate was that you could only cover approximately two thirds of the material in a videoconferencing session compared to a face-to-face class. Andrews, Klease and Lim (1998) also found this experience of considerable loss of class time through technological challenges in their report on the Virtual Faculty project.

While attempts were made by the author throughout the teaching term to adjust her teaching style, little success was experienced in becoming more comfortable with the medium.

"...when considering instruction via distributed learning systems, the element of clarity is often missing from the decision making process, due to a lack of understanding of which options, exactly are the genuine ones, and which are not."

(Bronack & Riedl 1998, p 163)

The lecturer became increasingly aware of a need to make changes to improve the teaching and learning process for all involved (see also Luck 1997).

The author formed a research team which applied for and were successful in attaining, a University Teaching Development Grant. This money funded a project aimed at identifying,

exploring and evaluating innovative methods of developing and improving interaction and communication between the staff and students and between students involved in multi-campus teaching using the videoconferencing facilities at CQU.

The project focused on the teaching of a unit called Object-Oriented Analysis and Systems Design. It is part of the second year of study in the Bachelor of Business (Information Systems) degree program. The main CQU campus is located in Rockhampton. Internal students enrolled in the unit were located in Rockhampton, Mackay, Bundaberg and Gladstone.

Videoconferencing and teaching in higher education in Australia

There have been very few critical analyses of the process of teaching using interactive videoconferencing. Most studies compare videoconferencing with face-to-face lecturing. Researchers seem delighted if they can demonstrate that teaching by videoconferencing is 'as good as' face-to-face teaching or that there are 'no significant differences' in the results for students taught by videoconferencing and those taught face-to-face. Other papers just describe the technology.

A literature search of Australian Education journals for uses of interactive videoconferencing in higher education in Australia revealed several case studies of trials using videoconferencing, for example, . These studies tend to describe what they observed or compare student results or the student responses to a survey. None of these studies attempted to analyse the pedagogical use of interactive videoconferencing as a new model of teaching. Some studies such as just describe the technology itself. In this respect the literature on interactive videoconferencing is similar to literature in the area of other "new" technologies, such as computers.

A study by Burke et al (1997) reported the results of using a dialogical approach to support distance education students who lived in Hong Kong. The teaching model used in this case study was of a mixed mode of delivery. The students started the semester as internal students and attended internal classes for six weeks before returning to Hong Kong where they completed their subject commitments via open learning and were supported by three, 90 minute videoconference sessions. The results of this report focussed on student perceptions of the technology.

The only paper to focus on the teacher's approach to teaching and learning was by . They conclude that research into the use of new educational technologies should focus on the critical relationship between a teacher's previous experience of, and approach to, teaching and learning rather than the teacher-technology relationship, which has dominated previous research.

Because of the scarcity of literature on using interactive videoconferencing for teaching and given that it is clearly of growing interest and significance there is a need to investigate the use of interactive videoconferencing as a new model of teaching.

Conceptual model

The conceptual model used for this study is that of the videoconferenced class being a new model of teaching that is neither internal nor external, though it incorporates aspects of both those models.

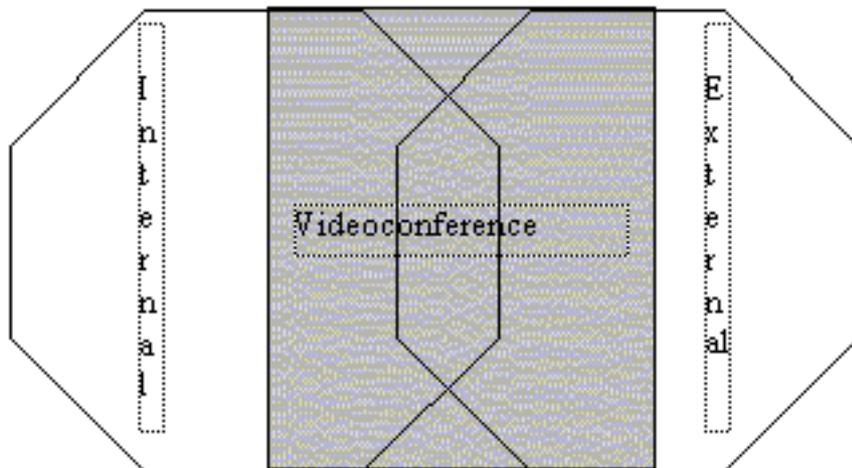


Figure 1 -the videoconferenced model of teaching and it's relationship to internal and external teaching

The videoconferenced teaching model can be thought of as spanning both the internal and external student modes. Internal and external modes of teaching have some attributes in common, such as unit profiles and assessment requirements, and the videoconferenced model also incorporates these common attributes, see figure 1. The videoconference model also has aspects that are not present in either the internal or external modes of teaching, for example, the technology that allows the videoconferencing to happen. Interactive videoconferencing also allows the lecturer to do things not possible in either the internal or external modes of delivery, such as, allowing students to see and talk with a person who could be located anywhere in the world where there is the capacity for a video link.

Research Method

The research team was comprised of the lecturer-in-charge, who was located in Rockhampton, and three lecturers who were located at Bundaberg, Gladstone and Mackay, plus a flexible learning advisor.

Two weeks prior to the beginning of term, the research team met for a two day workshop where the assessment was rewritten, teaching plans were created for the first four weeks and the teaching staff role-played some new teaching strategies using the interactive videoconferencing facilities.

It was decided that each week the class would focus on the main concepts and not on trying to cover all the content every week. Students would be encouraged to read the material prior to the class so that they could use class time to seek clarification of study material and be able to contribute to discussions held during the class. To make the class more interactive it was decided that a group of students would need to present material each week as a stimulus for discussion. These seminar presentations would be done as group work to try to develop some synergies within the class and to remove the glare of the camera on an

individual. When the students have completed their presentation, staff would add to the discussion or move onto to other concepts as appropriate. A member of the teaching staff was available on each campus to assist students prepare for their presentations and to contribute to the discussion.

To avoid the problems described above in the context section, it was decided to split the internal class into two separate groups. The Rockhampton students were to be taught in a "normal" classroom. The interactive videoconferencing class would be facilitated by the lecturer-in-charge, who would sit in the Rockhampton-based videoconferencing studio by herself. A multi-point link would be made to Bundaberg, Gladstone and Mackay. All students in the interactive videoconferencing class would then be in a similar position, that is, they each have access to a local lecturer and they have to use the microphones to communicate with the lecturer-in-charge. At a separate time during the week, students at each campus had a one-hour, face-to-face tutorial session with their local lecturer.

During the first class, the lecturer explained to the students that the interactive videoconferencing facility as a lecture delivery mechanism would be the object of a research project throughout the term. The students were asked to sign a consent form to allow the staff to use their comments and feedback. If the students did not want to participate in this study, they could still attend and participate in lectures, but their comments and feedback would not be used for the research project. Data were collected in the form of student comments, student focus groups and staff observations and reflections.

The method used to analyse this research was to use grounded theory to examine the data and develop a theme for discussion. The theme that developed was the difference in social interactions that occurred in the interactive videoconferencing class. These differences came about due to the development of new ways of teaching in order to exploit the interactive nature of the videoconferencing.

Two-level Perspective of Communication Technologies

Sproull and Kiesler (1991) describe a two level perspective on technological change, which emphasises that technologies have both efficiency effects and social system effects. Most early adopters of technology focus on the efficiency effects (first level effects) of the new technology, for example, a voicemail system for the telephone has the potential to increase the efficiency for handling telephone calls. The introduction of a new communication technology into an organisation, also has what Sproull and Kiesler call second level effects, social and organisational changes. To continue with the example, using voicemail, people who do not like talking to a machine might just hang up and take their business elsewhere.

Efficiency effects

The design, implementation and use of the videoconferencing facilities was promoted as a way of making the teaching of students across campuses more efficient. The videoconferencing facilities were built to support implementation of the Vision '97 policy to allow students at the constituent campuses to complete their degrees at their home campus. From the university's perspective the main objectives were; to slow down or stop the leakage of students to other universities after completing their first year at CQU; and to increase the EFTSU loading at the constituent campuses. The videoconferencing facilities were seen as a method to achieve these objectives by allowing students at the constituent campuses to participate in Rockhampton-based lectures.

The efficiency of the interactive videoconferencing was not part of the project. This paper will focus on the second level effects, the social and organisational changes that originate from

introducing new communication technology into the classroom. What follows is a discussion of the social and organisational effects of the interactive videoconferencing model and how it affected both the staff and students during the project.

Social and organisational effects

Sproull and Kiesler state that, "the most important effects of a new technology may be not to let people do old things more efficiently but instead to do new things that were not possible or feasible with the old technology", (Sproull & Kiesler 1991, p. 4). Therefore, the challenge was to exploit the characteristics of the interactive videoconferencing that were not present in other communication media available to the lecturing staff.

One of the objectives of this project was to develop a model of teaching using the interactive videoconferencing that allowed students to fully participate in the class regardless of their location. It is acknowledged that an important part of the teaching process is interaction between staff and students and between students. Hence, the assessment and teaching strategies developed for this unit were designed to encourage interaction between the sites. The new teaching strategies encouraged more discussion between staff, between staff and students and between students, regardless of location.

Staff were not the only people to learn a new way of working. Those students who had completed their first year at the constituent campuses of CQU had only interacted with their fellow students on the local campus. Therefore the students had to learn new ways to interact with their colleagues at the other sites. Interaction was encouraged in two ways; in an informal manner, by asking people to demonstrate examples and give short impromptu presentations; and through the formal presentations which formed part of the students' assessment.

Staff and students commented on the extra workload this model of teaching required. Some of this was as a result of unpaid product development. The research team was developing a new model of teaching as the teaching term progressed. Students were adapting to a new model of teaching and learning as well as a new model of assessment. More work was required of staff and students during the teaching term as the assessment items required preparation and marking during the term, as opposed to the bulk of assessment resting with the final exam.

Sproull and Kiesler state that events can happen that bear little relationship to what was predicted, "... people pay attention to different things, have contact with different people, and depend on one another differently." . Analysis of this project showed that there were several unexpected events that occurred during the teaching term.

The first significant, unanticipated event was the difficulty in giving feedback to the presenters while their presentation was being delivered. The staff could not make verbal comments during the presentation as that switched the video to the staff member. It was impossible for the lecturer-in-charge to give the students non-verbal feedback. Therefore new methods of giving feedback had to be discussed with the students. For example, explaining to them before they start why you cannot give them feedback during their presentation and assuring them that you would stop them if there was a problem with their presentation and allow them to start again so as not to disadvantage them.

The one-hour tutorials are intended to build on the work done during the videoconferencing class. During the teaching term the conduct and timing of the tutorials at the local campuses changed dramatically. The students did not want to complete the prepared tutorial exercises. They only attended the tutorials to use their local lecturer as a resource to gain information

to complete their assessment. Once the students had the information they needed to complete the assessment task they were working on, they left the tutorial. This was viewed as a positive aspect of this class. When you are in the work force and you encounter a problem the normal practice is to seek out the information you need and then continue to work on the problem. The local lecturer is just another resource for the students to access in order to gain the information needed to complete their assessment.

During the latter half of the term, the Gladstone lecturer chose to schedule 15 to 20 minute interviews with each student rather than have a formal tutorial. She reasoned that this was the best use of both her time and the students' time. She had ten students and most of them responded well to this model. One student had difficulties as he thought he was "missing out", on some content.

A humorous example of student interaction that was not anticipated was the very public "flirting" when a male student in Mackay asked a female student in Gladstone for her telephone number.

Sproull and Kiesler state that these second-level effects, "... stem mainly from how communication technology changes what and whom people know, what and whom people care about and system interdependencies" (Sproull & Kiesler 1991, p. 3).

The interactive videoconferencing model developed in this project demonstrated a new model of working with the staff and students on CQU's constituent campuses. The creative use of the videoconferencing facilities was essential to the success of this model. CQU is in a unique position in the Australian tertiary system. It has the opportunity to be a national leader in the development and promotion of new models of teaching using videoconferencing networks.

The social and organisational effects are not caused by technologies operating autonomously on a passive organisation. These effects are constructed as technology interacts with, shapes and is shaped by the educational policies, teaching models and a supportive environment. It is up to us as educators to affect the technology design and educational policy and therefore influence the social aspects of our teaching. This should be done in a way that is sensitive to students doing the same thing and other systems operating in concert with or in opposition to what you are trying to achieve. In the words of Sproull and Kiesler:

"From the history of prior technology we can glean four points useful in thinking about the potential consequences of new communication technology. First, the full possibilities of a new technology are hard to foresee. Therefore inventors and early adopters are likely to emphasise the planned uses and underestimate the second-level effects. Second, unanticipated consequences usually have less to do with efficiency effects and more to do with changing interpersonal interactions, ideas about what is important, work procedures, and social organisation. These changes may profoundly alter how each of us works and even the work we do. Third, these second-level effects often emerge somewhat slowly as people renegotiate changed patterns of behaviour and thinking. Fourth, second-level effects are not caused by technologies operating autonomously on a passive organisation or a society. Instead they are constructed as technology interacts with, shapes, and is shaped by the social and policy environment. Although as humans we decide our own cultural responses to technology, an initial technological change can set the direction of a deviation-amplifying spiral. We can affect technology design and policy and therefore influence the second-level effects as well."

(Sproull and Kiesler 1991, p.8)

Teaching and learning using the interactive videoconferencing model

When the interactive videoconferencing facilities were implemented, each individual lecturer had to decide how to use the interactive videoconferencing. They were not given any pedagogical guidance other than to reproduce their face-to-face lectures. It was assumed that lecturing staff were using efficient and effective teaching strategies and that these strategies would be replicated in the interactive videoconferencing class. Because of this mindset, it is assumed that when people have problems using the interactive videoconferencing that the technology is the problem and not the teaching strategy. To change this mindset the university needs to create a supportive climate for interactive videoconferencing teachers using strategies such as:

- the university's best teachers sharing their teaching experiences with others to develop models of best practice in the use of interactive videoconferencing for teaching;
- examining the relationship between a lecturer's previous experience of, and approach to, teaching and learning and the context in which it takes place ;
- staff practicing new teaching strategies in front of their peers who would act as critical friends;
- staff development workshops run by experts in the use of interactive videoconferencing;
- training students how to use the technology;
- use of techniques to overcome the students' fear of the camera;
- encouraging student comments and feedback on the use of the interactive videoconferencing for teaching and learning.

To take advantage of the unique aspects of interactive videoconferencing, the university should investigate new ways of working such as:

- using interactive videoconferencing to support teaching and learning in ways other than just straight teaching. For example, in large classes you could use interactive videoconferencing to meet with the tutors and plan lessons, prepare assessment and discuss marking criteria. This would ensure that the tutors would be bettered prepared for their face-to-face classes; and
- using the interactive videoconferencing facilities to complement other forms of communication technology available to the lecturers and students, such as, the Internet, email and the telephone.

In conclusion, it must be noted that other lecturers with different personalities, teaching styles and work ethics may not find this model suits their needs. All staff should be encouraged and supported in the development of an interactive videoconferencing model that suits their own teaching styles and the needs of their students.

References

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