Using Videoconferencing to facilitate various perspectives on teaching and learning process

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Part One

Introduction

Our session at the 'DIVERSE Conference' in the University of Derby, July 2001, was entitled, 'Integrating Videoconferencing into Educational Practice'. During the session, Margaret Farren of Dublin City University (DCU) used videoconferencing and NetMeeting to link with and Ed Tweedy of Rockingham Community College in the USA. Margaret discussed how she was attempting to integrate videoconferencing into teaching and learning at DCU, and Ed discussed projects he was involved in at Rockingham Community College (RCC).

Information and Communication Technology (ICT) in general can enable teaching and learning to take place in a flexible environment, allowing dialogue and interactivity among participants based in different geographical locations and in different cultures. This collaboration can enhance the teaching and learning process and allow for various perspectives on issues. It opens up the teaching and learning process to different points of view and can create synergy between an online community, which can lead to deeper intercultural understanding.

Videoconferencing is one application of ICT that involves using appropriate hardware and software to enable two or more people, in different locations, to see and hear each other at the same time, sometimes even sharing computer applications for collaboration. In this paper, we intend to document how we have used desktop videoconferencing in order to improve the learning of both the teacher and the learner

for the period 1999-2002. We will explore three sample collaborative projects, which are intended to show flexible features of desktop videoconferencing in the context of internet collaboration.

There are a number of different videoconferening tools e.g. Microsoft NetMeeting, White Pines CU SeeMe and ISpy. We have mainly used Microsoft NetMeeting in our collaborations. In the beginning, inexpensive videoconferencing was the only viable option for DCU and RCC. Bringing international speakers into classrooms, participating in international conferences and working on international peer collaborations can be challenging under limited budgets and time availability.

Vignette 1: DCU, Ireland and University of Bath, U.K.

The first case explores how Margaret has used videoconferencing in the Masters degree course in Computer Applications for Education programme (DCU), particularly in the context of Multimedia and Network Information Management modules. It is a two year part-time course. The teachers come from primary, secondary and further education sectors.

As part of their coursework for the Network Information Management module, teachers used an action research process as they developed multimedia artifacts for use in their classes. Each teacher kept an online journal of their own learning as s/he came to a clearer understanding of their own values and standards of practice. The very act of enquiry into our own practice brings us to a closer understanding of our own values. In the words of Rowland (2000), "the process of writing can be a way of exploring and articulating emotions and values with a view to bringing our practice of teaching into closer alignment with our values."

The knowledge generated from their enquiries was based on the following Action Research cycle (Whitehead, 1999):

1. What am I concerned about/What do I want to improve?

2. What am I going to do about it?

3. What data will I need to collect to enable me to make a judgement on my effectiveness.

4. Act and gather data.

5. Evaluation of effectiveness

6. Modification of concerns, ideas and actions in the light of the evaluations

7. Submission of descriptions and explanation of my learning in the educational enquiry,

- ' How do Improve my practice?' to a validation group.

As part of the Network Information Module, ISpy videoconferencing technology was used to link with Dr. Jack Whitehead at the University of Bath. The purpose of this live videoconferencing link up was to give teachers' the opportunity to communicate their action research with an expert in the field thus helping teachers' to move their enquiries forward.

Videoconferencing technology added an extra dimension to our communication, allowing us to use synchronous (real time) with the audio and video. This created a sense of presence, immediacy and focus to proceedings, as teachers were able to share their work with Jack Whitehead. Everyone was able to listen to one and other's research, and to Jack Whitehead's response, and make their own comments in a shared collaborative environment. The technology facilitated teachers in this shared forum to learn from each other.

An action research group based at the University of Bath have weekly validation meetings, which is an essential element of the action research cycle outlined above. I have been able to link with them and share my own work with them and obtain their feedback and comments on my current Ph.D. research enquiry. Using ISpy videoconferencing, I have been able to link with teachers at the meeting. Each is doing an action research enquiry into their own practice and trying to live their educational values more fully in practice. While living in different geographical locations we have made use of videoconferencing to link with each other in order to create a virtual and real community of practitioners who share experiences of different contexts with the goal of improving the quality of education for our students.

Vignette 2: DCU, Ireland and Rockingham Community College, U.S.A.

Since 1999 Farren and Tweedy have used desktop videoconferencing Netmeeting for joint videoconferecing presentations at international conferences. The main enhancement brought about by videoconferening has been the synchronous sharing of work in an interactive environment and the audio and video features. We have used Microsoft Netmeeting for our communications as it is free and works well in Windows environment. Through desktop videoconferencing, such as Netmeeting, both participants have been able to share applications in a synchronous manner.

For example during a session at the DIVERSE Conference, Farren shared powerpoint on her computer with Tweedy, allowing changes to be made on powerpoint and then the revised version being sent back to the host computer. This powerpoint presentation was then saved and printed where it was created. The file was then be sent to the remote PC for printing and further use, if and when required. A useful feature of NetMeeting is the chat room. It allows participants to meet online at a planned time. For example, we used this feature with the Travel Abroad class based in Rockingham Community College, comprising thirty U.S. participants who were taking a travel/study trip to Ireland and four Irish people who were located in DCU and other parts of Ireland. Using the chat facility of NetMeeting, the participants in the U.S. were able to ask questions about Ireland, and delegates in different locations in Ireland were able to answer them. Live video and audio could also have been used, but in this particular case, the group used the chat facility. Each typed

question was labelled by speakers. The session was saved for possible future class use in class discussions.

Groups of teachers on the Masters in Computer Applications have been able to link with teachers from Rockingham Community College and share their practice with each other. They meet up in a live environment and discuss how they are integrating technology into their practice. This always stimulates lively exchanges and discussions. The group in Ireland can find out about practice in USA and vice versa. In addition, these sessions have given teachers insights into how they could make use of inexpensive desktop videoconferencing and integrate it into their practice.

In 2002 teachers from the Masters in Computer Applications for Education course gave a presentation to teachers at Rockingham Community College. As part of the Masters course, these teachers had developed multimedia curriculum artifacts. The purpose of this was to allow them use these artifacts in class in order to improve student learning e.g. use of Macromedia Flash to animate mathematical concepts; use of Web sites and Hypermedia features to engage students in more active style learning. These multimedia artifacts are currently posted on our web site. Through use of NetMeeting, teachers were able to show their work and explain the rationale underlying its design.

Vignette 3: Rockingham Community and University of Ulster, N. Ireland and Seiryo Commercial High School, Japan

Professor Paul Arthur of the University of Ulster, Magee College, Derry, Northern Ireland, presented a History class to RCC, using videoconferencing, in 2000 He 'visited' a History class using CU-SeeMe. Professor Arthur, a prominent political scientist in Ireland, spoke to a Western Civilisation History class about the Northern Ireland peace process. This session was organised by Margaret via ICT. The group from North Carolina was able to ask questions, which included visitors from a neighbouring high school history class. It is clear from the above examples that videoconferencing is one use of ICT that can facilitate teachers and learners from different political and cultural backgrounds 'meet' and gain various perspectives on issues relevant to learners' curriculum needs and issues relevant to teacher' ongoing professional development needs.

RCC also had a series of links with Japan during that time. This originated due to a partnership between the Rockingham County, North Carolina High school Japanese classes and a class at Seiryo Commercial High school in Japan. The group collaboration initially started as pen pals and they sent emails and photographs electronically. They heard about RCC video conferencing activities and decided that an interesting addition to the current relationships between her classes and the classes in Japan would be live video and audio. A video conferencing using NetMeeting was set up, and the USA students came to RCC in the evening, which was the next morning in Japan due to a 14-hour time difference.

Similar videoconference sessions followed during the semester and the school year. Each time the students were so enthusiastic about their performances and seemed to have a good time. Obviously, there was significant educational value to these sessions.

As a result of the video conferencing sessions, three students and the Japanese teacher were invited to go to a conference in Japan. They raised the necessary money and went to Japan for two weeks, traveling and participating in the conference, in Nagoya, Japan. They met and interacted with their Japanese counterparts during the visit, enriching their already strong relationships and giving them valuable international perspectives.

Ed gave a presentation to the conference about the activities with the schools over the past school year. The PowerPoint presentation was transmitted over the Internet to the audience in Japan. The Japanese audience had three screens active at one time: one for the PowerPoint presentation, one for the video picture of the presenter, and one for a Japanese translation of the PowerPoint. The audio was also successfully transmitted over the Internet. All in all this was a very successful presentation to a country 10,000 miles and 14 hours away.

This work has led to further short links to Japan for RCC classes and there should be more in the future. One such link was between an RCC office systems class and an office class in Japan. Students from both sides introduced themselves and their classes through PowerPoint presentation across the Internet. They also saw and spoke with each other. All the RCC to Japan videoconferences have generated student enthusiasm and involvement, as have Ireland-US collaboration. These collaborations provided students and teachers the opportunity to experience a different culture, preparing them for the global workplace of the 21st century.

Part 2 - Software Features and Technical Requirements

Summary of Software Features of NetMeeting participants join a videoconference or meeting, any two participants can share video and audio. Chat room sharing allows participants to chat with each other by typing their comments to everyone in the meeting, or privately to one participant. Chat messages can be saved or printed for documentation of the discussions. Participants can contribute to drawings and text on a whiteboard at the same time. Images and text can be pasted on the whiteboard by any of the participants. The contents of the whiteboard can be saved or printed.

We have made use of videoconferencing software programs in our collaborative link ups, such as CU-see me and ISpy, but especially NetMeeting.

Shared Applications: applications can be shared with participants in the meeting, under the control of the presenter. This enables the participants who join a meeting to view a PowerPoint presentation.

Collaboration on Applications: all participants can contribute to the development or modification of an application. Each can gain control of the mouse in turn to add their own comments to take their turn. Collaboration requires some discipline among users, and is aided by a good meeting facilitator.

Ease of Use and Connection to Other Users: meetings can be easily set up with one participant hosting a meeting at a predetermined time, and allowing others to join. Connection can be via servers using familiar addresses, or directly to another user's IP (Internet protocol) address.

File Transfer: files can be easily transferred to other participants in the meeting.

User Control and Security: participants can see what they are sending, whether it is video, chat, text, or shared data and can control who views the data.

Easy Installation of Software: software can be downloaded easily from the Internet, or is available with Windows '98, or with many of the camera devices.

Technical Features

Videoconferencing comes in two types: Full-room video conferencing and desktop videoconferencing. Full-room video conferencing provides additional capabilities and flexibility but with an additional cost. Desktop videoconferencing provides somewhat limited, but adequate basic capabilities at almost no cost.

Desktop video conferencing uses multimedia personal computers with inexpensive cameras and microphones and free or inexpensive software to communicate with other personal computers. Recommended hardware for the PC used in videoconferencing is based on our experience:

- Pentium processor with w clock speed of 300Mhz or better
- 32 MB to 132 MB of RAM memory
- Modem or network card connectivity
- Good sound card, microphone, and speakers
- Good monitor and video card
- Good quality camera and video capture card
- Speakerphone audio backup system

The above hardware requirements have been adequate for our videoconferencing activities. In our experience faster processors with more memory, better audio and video equipment, better Internet connections will yield better videoconferences using desktop software

Connections between users can be direct connections using expensive ISDN lines for optimum quality or dial-up lines for lesser cost but with poorer quality. For our videoconference sessions we tried to balance the cost and quality and chose to use transmission over the Internet from w PC connected to local area networks. There is a minimum cost for such. Internet transmissions and the quality of audio, video and shared applications are quite acceptable.

Full Room Video Conferencing at Rockingham College

RCC has now started to explore the use of full-room video conferencing over the Internet. The Internet was chosen over a direct line as this is most affordable option and it seems that the internet will be used more frequently in the future. With better equipment, including cameras, which zoom in and focus, better microphones, and better software, most of the same functionality still exists.

Collaboration between Rockingham Community college and Rockingham County Public Schools technical and business school already existed. This is called the Tech-Prep program. A Tech-Prep grant became available for a joint venture between these High schools and the College. The grant project was called "Do_It!' (Digital Opportunities in Information Technology). The objectives of the grant were:

- To integrate videoconferencing and video technologies into the Rockingham Community college and Rockingham County Public schools curriculum.
- To provide increased opportunities for students in the articulated programs to use videoconferencing and video technologies for collaborative projects
- To provide staff development for teachers in the articulated programs in the use of videoconferencing and video streaming equipment/software and curriculum integration
- To provide assistance to other secondary and post secondary schools in replicating the Do_It! Project.
- To provide opportunities for local businesses to use the facilities and RCC for video conferencing and other activities.

Full Room Videoconferencing Equipment

The distance learning room at Rockingham Community College (RCC) already contained the following equipment:

- Document Camera to display documents
- Students Camera to focus on the students in the class or meeting
- Teacher Camera to focus on the teacher or presenter
- Microphones at each student desk and at the teacher/presenter desk
- Equipment to integrate these video and audio inputs and outputs
- Large TV screens to project the images transmitted and received
- VCR equipment for playing tapes and recording video and audio presentations

The necessary equipment and a control panel is in place to allow the presenter to choose which video source s/he would use to display and transmit, as well as to control the microphone. Images from a connected PC could be chosen as well as video images from the cameras for display and transmission.

The videoconferencing room had not been previously used due to lack of funding. It had been used to produce videotapes using the cameras and microphones and was

occasionally used as w classroom. The College decided to purchase VCON Media Connect 8000 Pro to be integrated with the above

The basic equipment consists of a custom PC supporting video and audio conferencing and MeetingPoint software. The system currently runs under the Microsoft Windows NT Operating System. The VCON system collects the video and audio inputs and transmits them over the Internet. The software also provides for application sharing and collaboration similar to NetMeeting software on desktop videoconferencing. Transmissions can be done to any videoconferencing system that meets the H.323 standard for video conferencing over the Intenet. Transmission can be done to any video conferencing system that meets the H.323 standard for video conferencing over the Internet. The initial equipment installed provides for input video from either of the following; student camera, teacher camera, document camera, personal computer monitor and VCR Player/Recorder. The audio input comes from the microphones on the teacher and student desks. The microphones may be individually muted if desired.

The video and audio signals may be recorded to the VCR (if it is not playing) and they may be transmitted to another location with compatible video conferencing equipment.

The high school equipment consists of w VCON Falcon and a VCON Vigo Pro. These two devices are compatible with the VCON Media Connect 8000 and other H.323 devices over the Internet. The VCO Falcon consists of w full-room camera and microphone and seems to be the preferred device for transmission of audio and video. The VIGO Pro uses a simple web camera but is PC based and supports shared applications and collaboration. The latter is the preferred device for transmitting PowerPoint presentations and other shared applications. Grant funding will enable the school to get one of the above devices.

In Autumn of 2001, RCC implemented remote video on one TV, local video on another TV, and shared applications on the main screen in the front of the classroom. There are plans to provide for recording of incoming video and audio. At present only outgoing video and audio can be recorded. Video from the remote or local site will be able to display on the projection screen or the TV sets in the room. Proposed enhancements will provide increased flexibility for displaying both local and remote video in the RCC distant learning room.

Future plans also include the purchase of a VIGO Pro unit, similar to those in the High schools, for use for in-housing testing and to have available as a video conferencing device to set up at remote locations for transmissions of speakers and presentation to our video conferencing room from remote locations. In addition, we intend to purchase and install software to permit transmissions to more than one remote site in a single session.

Future Plans for Full room Videoconferencing

Over the next year, RCC intend to transmit business lectures to the High schools and students at High school will make presentations to the Community College. Also it is hoped to start collaboration between the High schools.

Also, it is planned to use videoconferencing in other disciplines. RCC will continue to link with international partners and collaborate and continue to benefit from the cultural diversity which videoconferencing can bring to the class, as evidenced in Part One of this article..

Conclusions

In this paper, we have presented cases of how we used inexpensive videoconferencing technology in order to link with experts, peers and students. The specific technologies, their benefits and their technical features have been described. The specific technologies were chosen because of their flexibility and potential in addressing our needs of sharing our research enquiries as a process of discovery through reflection on practice. Video conferencing, we discovered, was very useful in facilitating this process and added a sense of presence to our international collaboration. The purpose of our collaboration was to explore how ICT could enhance the learning and teaching process among teachers and learners in an interactive environment, by allowing us to share perspectives. We are pleased that our ongoing collaborations show evidence of improving our teaching practice

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