

Using Multi Media to Enhance a Flexible Learning Program: lessons learned

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Abstract

Central Queensland University is a well-established distance education provider with an internationally recognised reputation in flexible learning. It has a well-developed infrastructure for the preparation of quality print and multimedia learning materials. A symposium and working conference linking twelve sites, including Auckland NZ via video conferencing, and supported by print based materials and web based conferencing was held during November 1998 with the assistance of Telstra's Conferlink. This paper provides the background, organisation, and evaluation results. Our conclusions are that appropriate use of a combination of print based materials, videoconferencing and a web based classroom works well for the provision of continuing education to health professionals. In addition this symposium was able to reach clinicians and demonstrate the value of informatics to support evidence based practice.

Introduction

Central Queensland University (CQU) is a well-established distance education provider with an internationally recognised reputation in flexible learning. That is student centred learning which recognizes the diversity in learning styles and learner needs, and the importance of equity in curriculum and pedagogy. Flexible learning relies on a variety of learning resources and media and fosters lifelong learning habits and skills ^[1]. CQU has a well-developed infrastructure for the preparation of quality print and multimedia learning materials to support this. During the early 1990's a strong emphasis on the further development of CQU's role as an integrated multi-campus Regional University emerged. The infrastructure was upgraded enabling better use of modern information and communication technologies. The use of our videoconferencing facilities to teach units across up to four campuses was actively encouraged. These technologies are increasingly being used by education providers to support distance education. Telecommunication infrastructures are improving in terms of coverage and bandwidth worldwide. The use of videoconferencing for educational purposes is relatively new requiring those new to

this medium to be well informed of 'best practice' regarding the use of this medium^[2]. This casestudy contributes to this effort.

By 1998 staff at CQU had at least 12-month experience of using these new technologies for educational purposes in house. Staff from the School of Nursing and Health Studies, the School of Mathematical and Decision Sciences, our distance education and electronic media services worked together to organise a symposium and working conference using multi media and linking twelve sites, including Auckland NZ via videoconferencing. This was held during November 1998 with the assistance of Telstra's Conferlink and a major sponsorship from the Commonwealth Department of Health and Family Services. All participants were asked to complete an evaluation survey form. The return rate was 64% (n=85). This paper presents educational and technological perspectives about this event together with the results obtained from this evaluation from which valuable lessons are drawn.

Facilities

CQU's videoconference facilities include high resolution large screens and good quality audio enabling truly interactive communication between sites. Some of our teaching spaces are now truly electronic classrooms. This enables the use of a fully integrated document camera; networked computer, other audiovisual teaching aids and microphones with the videoconferencing equipment. Lights and all other equipment are operated via a standard design, touch screen user interface. Similar initiatives were undertaken by other Australian Universities and the Technical and Further Education (TAFE) sector during this period. Health care organisations also began to install video conferencing equipment to support telehealth. Consequently a fairly extensive network of videoconferencing facilities exists throughout Australia which in theory at least should support flexible education supported by high quality multi media learning materials combined with interaction between groups of learners and their teachers at places to best suit participants. This symposium set out to test this theory beyond the boundaries of CQU campuses.

Teaching, Learning and Previous Experiences

Interactive/multimedia instruction challenges teachers to develop a new facilitative teaching culture, to improve multi media learning materials and to use communication technologies to teach more effectively. It is well suited to adult learning where learners are ready, motivated and capable of self direction^[3]. However for videoconferencing to be an effective teaching medium, both the content and educational delivery strategies need to be tailored to suit.

Videoconferencing guidelines were provided to all speakers/lecturers. We were also able to provide hands-on training to our speakers in Rockhampton. Speakers at other locations did not have similar opportunities to practice. A major impediment is the fact that we can use only one screen. As a consequence the audience see either the speaker or their slides. Speakers therefore have to remember to frequently switch between speaker camera and computer when using powerpoint slides. Some lecturers at CQU overcome this problem by sending their presentation electronically to the receiving site where someone can operate the necessary additional equipment and project this onto a second screen. This permits the audience to see both the presentation and the speaker.

The use of videoconferencing for teaching can be very stressful to lecturers when using this medium for the first time. Not only is the teacher responsible for dealing with and responding to a dispersed audience, but in addition there is an assumed responsibility for the quality and content of images being transmitted. However there is no way of telling if the images are seen at other sites with a similar degree clarity as is indicated in the preview unless viewers provide feedback. Working with the technology at CQU requires the use of our touch screen control panel to preview and then send images and swap the camera between image and visual aids. Other authors have described this new teacher's role as being the producer, director, script writer, floor manager and camera operator all in one for a show that is presented live to air for possibly several hours per week^[4] ^[5]. Bigum and Appleton^[6] noted that teaching skills used with working on the 'stage' of a lecture theatre were not directly transferable to the 'screen' of interactive videoconferencing. The use of this technology plus time delays due to getting everyone connected, waiting for responses to questions, and occasional system failures, means that one cannot cover the

same amount of material in a given timeframe then is possible in a conventional lecture situation.

It is not easy on students either, as they need to use the microphone when interacting with the lecturer so those students at other campuses can hear them. Furthermore as soon as they press the button the camera zooms in on the speaker so that others can view the speaker as well as hear them. Many students find this off putting. Such reluctance makes it more difficult for the teacher to promote interactivity involving the remote sites as well as well as the home site. This is where adult learners and especially health professionals are a far better group to teach using this medium. They are more confident and hence are more willing to interact. However student expectations and individual preferred learning styles also influence their perceptions of what is good teaching. Some prefer the use of a teacher centred model such as didactic lectures, others find a student centred model which includes interactivity and peer learning more beneficial. The latter is well suited to adult learners as a rule.

About the Symposium

The chosen topic of Evidence Based Practice was one of relevance to the everyday practice of health professionals. It was therefore well suited for use as a vehicle to create an awareness of the need to know about informatics and to introduce participants to vocationally based education using multi media and adult learning principles as described by Knowles^[3]. The program was designed to expose health professionals to technologies used for telehealth, and to create a greater awareness about the value of health informatics to support evidence based practice. Dr Kathleen McCormick provided the informatics orientation to evidence based practice and Dr. Martin Dawes presented the more traditional approach to this topic. Additional speakers provided the Australian perspective.

Our objectives were achieved by means of:

- a print based workbook containing instructions for small group work and resource materials,
- the use of multipoint video conferencing linking 12 sites around Australia and Auckland, New Zealand, for lectures and group interaction and
- the use a web based conferencing facility where participants were able to upload files containing the results of their discussions, post individual messages and download power

point presentations provided by our invited speakers.

Our choice of media to be used meant that each venue needed to be able to support small groups, video conferencing and computers with Internet connections. Participants also needed access to refreshments and meals. The videoconference facilities at a number of sites needed to be capable of both receiving and delivering lectures. Thus these sites required access to audio and visual facilities which could be transmitted via the video link to all sites. To assist with conference organisation a conference organiser was appointed to handle all administrative and logistical matters. The use of multiple sites in effect means a number of separate mini conferences running simultaneously from an organisational point of view.

Site Selection

Technically we could have more than 20 sites connected simultaneously. We set out to identify the location of possible participating sites for this conference by conducting a web search in the first instance. Most educational organisations have their own web site and many of these provided detailed information regarding their video conferencing facilities. We began by identifying the location where we considered potential participants to be located with a belief that we would find a suitable video conferencing facility nearby.

The technical team produced a survey designed to identify the degree of compliance with our preferred standards to ensure that acceptable image projection, resolution; audio and interactivity could be achieved. It soon became evident that we would be able to use only 128-Kb bandwidth. Also a number of potential sites could not meet our equipment specifications and thus alternative sites were sought. To our surprise a number of technicians had little or no knowledge about the need for technical standard compliance nor were they familiar with the standards identified.

Required Technical Standards

Our recommended videoconference equipment standard was H320 compatibility. All chosen sites were compliant with this standard. Our survey revealed that only five sites were able to support the H263 video standard, fifteen sites supported H261, ten SG3 and nine SG4. Most sites (21) were G711 audio standard compliant, seventeen sites supported G722, nineteen G728 and twelve PT724. Several

sites supported multiple standards. We explored the possibility of using 'continuous presence' for multipoint video conferencing to enable four or more sites to remain in view simultaneously but this proved not to be technically possible.

Other Site Details

To assist our organisation we also wanted to know the seating capacity, seating style, extent of computer and internet access, telephone and fax access, number of microphones, document camera availability, image projection facility, parking arrangements, contact name and details for technical staff, caterers and a site coordinator. We appointed the latter courtesy of our professional network of people. We approached those whom we knew would make good facilitators and who could handle the technological and organisational complexities.

Organisation and coordination of sites during the symposium

Communication was maintained between the Telstra Conferlink staff who operated the bridge, our conference manager who was at the Master site and technical staff at each of the sites via separate telephone lines or mobile telephones. These numbers were obtained together with the numbers for ISDN connection and technician names by means of the survey sent to all sites. A running sheet detailing the order of presenters, the originating site and planned videoconference interactivity was sent to all site facilitators and technical staff. This was invaluable for the Telstra Conferlink staff to assist their management of the bridge and the switching between sites.

Outcomes and costs

Although participants save in travel and accommodation costs by participating in this type of event, the cost of staging the event, consisting primarily of ISDN charges, is equivalent to hiring the Sydney convention centre. This means that contrary to some participants' expectations, registration fees cannot be any less than what is normally charged for a more conventional conference. From an organisational and conference management perspective the use of multiple sites in fact means the organisation of a number of mini conferences which need to be coordinated simultaneously. The use of a number of public hospital based video conferencing facilities did

reduce hiring charges. This had the added benefit of ease of access by their staff.

Evaluation survey forms were distributed to all participants with a 64% return rate (n=85). Questions were divided into sections about delivery methods and technologies used, whereas the final section assessed the extent of learning that had taken place relative to the symposium objectives. Overall comments were constructive and favourable, 80% were satisfied with the content, 81% reported that their learning was enhanced by the method of presentation and 79% indicated that the video conferencing presentations worked well for them.

Web based conferencing worked well for 68% of those participants who responded, however not all participants had equal access to a computer and the WWW. Some reported having received some valuable training in the use of this technology. Some difficulties were encountered due to knowledge deficits amongst some of the participants. One non computer literate person had been made aware of this technology and is now motivated to learn more about it. Another admitted to a phobia about 'such issues as the Web' but is thinking about learning more about it. Another first time user noted the enormous potential of web based conferencing.

Around 80% found the workbook and readings interesting, appropriate and able to facilitate their learning. Symposium skill based learning objectives were met by between 68% and 86% of respondents.

As many as 86% reported that their knowledge regarding data collection and the generation of information and knowledge had improved as a result of their participation and 88% felt that they learned to appreciate the use and benefits of information technologies. A better understanding of the efficiency and effectiveness of data usage for day to day decision making was reported by 82%. As a result of participating, 88% reported being able to identify existing obstacles to the implementation of EBP, 80% are now able to identify data collection and information processing requirements to support EBP.

A total of 34% indicated they would not attend another conference offered in a similar way. Reasons given were:

- a preference for being at the venue where the presentations are being delivered,
- insufficient time for interaction,

- only if technology is of better quality, and
- provided all presenters adhere to video conferencing procedures and PowerPoint presentations are sent to all sites prior to presentation.

It was evident that the colour scheme chosen for background in PowerPoint presentations directly impact upon clarity. There was also a problem with a lack of clarity resulting from cluttered slides. The invited speakers from Rockhampton made better use of the technology than speakers from other sites did. This reflects the fact that they had some practice, the others did not. Presenters also need to remember to speak into the microphone and to look at the camera rather than the audience.

The camera angle was another issue. The size of the screen was a problem at one site and apparently the reception was out of focus at times, which was distracting. Some overheads were off centred as the presenting site did not have the capacity to switch between speaker camera and computer projector. A clear sign identifying each site was also found to be useful. Presenters should wear plain colored clothes. Backgrounds should be simple but not white to make watching for long periods of time easier.

One site reported transmission interference resulting in unstable pictures with delayed voice. Also one respondent reported that body movements by some presenters were at times almost causing 'motion sickness'. The picture quality was better for single person shots compared with the use of a wide camera angle. A desire to see more switching between speakers and overheads was also expressed as the sight of only overheads makes concentration more difficult.

Three hours proved to be too long a stint for most to watch a TV screen despite our short breaks with exercises. More frequent and longer breaks were desired. Another commented that they could chat amongst themselves when a speaker was boring without embarrassing them. One person commented that 'it was an experience to attend a conference presented this way, although it wasn't perfect, I thought it was a good idea'. Another noted it was a 'great way to link up' as it 'saves accommodation and airfare costs'. Also 'format and presentation grew on me', and 'an excellent way of sharing and learning in the future, for a working conference', 'a great learning experience'. One person noted that 'the teleconferencing was well run, it became more

relaxed as it progressed and the use of the technology did not detract from the conference.

The local media man at one site was praised for his ability to make some adjustments locally to improve reception. Telstra and its bridge facilitation were also congratulated. Greater bandwidth than 128 Kb is preferred to enhance the quality of the reception. Three people at least were very impressed with the technology used and the demonstrated organisational skills, another commented on an 'excellent demonstration of technology and communication' although one person found that the quality of the transmission and resolution made it difficult to appreciate all aspects of the presentations. The need for better instruction at each site on how everything works so that each end doesn't fiddle was also pointed out, although 'considering this was a first, people did well'. One person found the conference 'innovative' showing how technology can be used to aid learning. Another noted that all remote areas need the IT equipment used during this conference and the necessary communications network. Finally one last comment 'potentially this style of conference could cater to thousands not hundreds!!'

Conclusions

From the Organising committee's perspective this experience in pioneering the use of multipoint videoconferencing supported by additional print based resource material and a web based classroom has been most valuable. It is well suited to adult learners. We have learned about the enormous amount of teamwork, the organisational skills and technical knowledge required to stage such an event.

Lessons from this experience and useful for others contemplating the use of these technologies indicate that the audience expects near broadcast quality video and good audio at all times. Also

- There is a need for all audio visual aids to be integrated with video conferencing equipment.
- Standards compliance and the use maximum bandwidth possible to ensure highest possible video and audio quality is essential.
- Coordinating times across five time zones was obviously problematic. Maximum connection time at one time should be around two hours with a five min break and at least a one hour break between such sessions.
- Use two screens or continuing presence if possible. Limit use of document camera, if used do not move image during transmission.

- Each site needs a facilitator who is in charge of all site related matters.
- Conference chair has specific duties to engage all sites, communicate the ground rules and ensure all runs on time and in accordance with plan.

A request has been received from Queensland Health to assist them is staging another multipoint video conference on another topic and plans are underway to establish additional industry partnerships to make use of the available infrastructure for continuing education purposes.

References

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- [1] Dekkers J, Hunt A. 1998 The Evolution and Future Use of Distance Education in Australia. Paper presented at the 7th National Open and Distance Education Student Network Annual Conference, *Distance Education: Past, Present and Future*, Rockhampton, Queensland 6-9 July.
 - [2] Watson J, Timmerman L. 1998 Enhancing Continuing Professional Education for allied Health Professionals in Rural and Remote Locations. in *Open Learning '98, Proceedings of the 3rd International Conference on Open Learning*, held 2-4 December in Brisbane, Australia.
 - [3] Knowles M. 1990 4th Ed. *The Adult Learner, a neglected species*. Gulf Publishing Co., Houston p.57
 - [4] Ostendorf V., 1994 *The Two-way Video Classroom*, Littleton, Colorado: Virginia Ostendorf Inc
 - [5] Luck J., Andrews T., Jewell R., Schlotzer A., Madsen M 1998 New Technologies: New Skills Development in *Open Learning '98, Proceedings of the 3rd International Conference on Open Learning*, held 2-4 December in Brisbane, Australia.
 - [6] Bigum C., and Appleton M. 1997 *From stage to screen: learning to teach with ISL at CQU*, report to Deputy Vice Chancellor, Central Queensland University, Rockhampton, Australia

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