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ABSTRACT

This study investigated a trial use of simultaneous telephone and computer (audiographics) conferencing to teach a Master of Education unit, "Early Childhood Curriculum Design Issues," at the Queensland University of Technology in 1994. Data were collected in written form from students, lecturers, and observers concerning their experiences, focusing in particular on problems they had encountered, the impact of the technology on their learning, and suggestions and advice for the future development of the approach. Results showed that overall, students rated the sessions as being at least as effective as conventional on-campus methods. Audiographic conferencing was rated most highly in terms of keeping students' attention and in developing a class atmosphere conducive to learning; it was seen to be least effective in terms of allowing students to discuss topics with each other. Lecturers' reflections suggested that their feelings progressed from an initial state of anxiety about using the equipment to an enthusiasm for its possible benefits. Observers' comments corresponded with lecturers' observations. Findings indicated that, provided the pedagogy is clearly articulated and the technology regarded as a tool in its implementation, audiographics conferencing is a promising teaching tool. (Contains 17 references.) (EV)

A TEACHING AND LEARNING INITIATIVE USING AUDIOGRAPHICS-CONFERENCING SOME EMERGING ISSUES

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ABSTRACT

This paper describes a project which trialled the use of simultaneous telephone and computer (audiographics) conferencing to teach a Master of Education unit *Early Childhood Curriculum Design Issues* at the Queensland University of Technology in Semester 1, 1994. It outlines the reasons for the selection of the technology, describes the perceptions and experiences of students, lecturers and observers, and discusses the issues which emerged as efforts were made to ensure that the technology used promoted the desired pedagogy for post graduate early childhood students.

INTRODUCTION

It's 5.30 pm on a hot March evening and Lyn, Alice and Gayle are sitting around a computer screen in the Toowoomba Open Learning Network Centre. Laurie in Nambour and Gillian in Rockhampton are in similar situations. The visual computer links have been established and it is only a short time before they will be linked by telephone with each other and with two groups of seven and eight students at two sites on-campus in Brisbane. A lecturer is with each of the Brisbane groups and they are seated around a table looking at a large projection of the same slide which is displayed on computer screens at the off-campus sites. The slide is headed Messages and students at the various sites have been typing or writing notes to each other while waiting for the audio links to be established. It's the usual pre-class chat in writing form.

The loudspeaker telephone buzzes and the telephone operator announces that all telephone links have been established.

'Hello, Lyn and Alice and Gayle ... How are things in Toowoomba this evening?' asks Gail, the lecturer.

'Fine,' replies Alice, 'although it's storming quite heavily and Gayle thinks she might need to leave early if she's to get home before the creek comes up' ... And so the class combining students across on-campus and off-campus sites begins.

A number of factors led to the trial of audiographics conferencing in teaching a Master of Education unit *Early Childhood Curriculum Design Issues* within the School of Early Childhood at the Queensland University of Technology (QUT) in Semester 1, 1994. In previous years, there had been an increasing demand from prospective students, living and working in country areas of Queensland, for access to post-graduate early childhood education. Most of these students were women. In an effort to provide equity of access to university courses for all students, a number of options was considered. The offering of traditional distance education delivery modes with the emphasis on written materials was not seen as desirable because contact between lecturers and students was limited and there were few opportunities for students to engage in critical discussion and debate. Such contact and critical discussion were seen to be important criteria for teaching and learning at the higher degree level and there was a determination by staff in the School of Early Childhood that the

quest for equal access to education would not be separated from the quest for high quality education for all students (Coombs, 1994). While some Schools introduced intensive summer and winter vacation study classes, attendance at such vacation programs was not possible for early childhood students because of family or work commitments.

In the early 1990s, with the development of instructional materials delivered via television, radio, telephone and computer directly into the home, there was growing recognition of the potential of technology to enhance equity of access to university courses (Farrell, 1994). Along with the recognition of the potential of technology to increase equity of access, however, came issues concerning which technologies are most appropriate to the preferred pedagogy for teaching and learning at the higher degree level.

As these issues were considered, it was apparent that, in spite of the occasional teleconference which brought students into contact with their peers, most models for off-campus teaching and learning were based on the assumption that packaged materials delivered to the student's home were the most desirable. Because these instructional materials could be sequentially organised, they were seen to give the student the opportunity to self-pace the study program. The increasingly sophisticated educational packages suited to the new technologies seemed to be based on a similar assumption with glossy instructional materials relying on techniques associated with behaviourist pedagogies.

With this forging of new links between education and information technologies, some educators (Bigum, Fitzclarence & Kenway, 1993) suggest that the point is being reached where the rhetoric of market forces threatens to turn universities into institutes of 'edutainment'. This can result in the passive consumption of information produced by ever more distant knowledge centres that aim to achieve a market size commensurate with covering the costs of production.

This trend has been noted with some disquiet (Lundin, 1991; Stacey & Turner, 1993; Smith, 1991; Evans & Nation, 1992) and is of concern to staff in the School of Early Childhood who hold the view that high quality higher degree teaching and learning involves students and lecturers collaborating in examining ideas and searching for new understandings and improved practices. Such a view requires sustained interaction and debate among students and lecturers providing opportunities for developing critical thinking skills and generative processing (Hannafin, 1992), problem-solving abilities needed for research (Renshaw, 1992; Bynner, 1986; Wells, 1993) as well as opportunities for learner control (Steinberg, 1989).

It was against this background in September 1993 that Early Childhood lecturers became aware of a new audiographics conferencing system installed in 42 Centres of the Queensland Open Learning Network (QOLN). This system had the potential for teaching off-campus students in way consistent with the collaborative and dialogic pedagogy valued by Early Childhood staff. Two lecturers felt motivated to trial such an approach and, with the offer of technical advice and support from QOLN staff, together with QUT's support for new initiatives in open access modes of delivery and the award of a QUT Teaching and Learning Development Large Grant, the trial in Semester 1, 1994, was made possible.

THE PROJECT

The aims

The particular aims of the project were to:

* promote equity of access to higher degree study through the use of interactive telephone and computer technologies;
* trial the use of audiographics conferencing to create teaching and learning situations where groups of students studying off-campus could engage in critical analysis of ideas;
* evaluate the trial, with a focus on student and staff experiences in using the technologies, and their perceptions of effectiveness of the teaching and learning that occurred; and

* disseminate findings of the trial in forms that would assist QUT staff and others investigating effective open access modes of delivery for higher degree courses.

Commencing the project

Enrolment of students:

Given that there was little time to advertise for off-campus students, contact was made with students who had previously enquired about external status and led to three students enrolling and attending the QOLN Centre in Toowoomba, while one student attended in Rockhampton and another in Nambour. Enrolments of 15 students in the on-campus class necessitated the use of two sites, one on the campus and the other at the QOLN Centre in Brisbane. A maximum group size of eight students was seen to be optimal for discussion and the use of the technology.

Equipment required:

Each of the QOLN Centres had the necessary equipment available: 486 computer; modem; conferencing software (Vis-A-Vis); graphics software (PowerPoint); scanner; printer; and high quality loudspeaker telephone. This equipment had to be purchased for the on-campus site.

Technical and production assistance:

With the part time employment of a production assistant who was responsible for advising on the use of software and assisting in the production of resources, many of the initial problems and fears of the lecturers were overcome. Basic techniques for establishing conference links, for using the scanner to prepare slides from photographs and other colour images, for preparing slides with Microsoft PowerPoint and for sending the slides 'down' to all of the sites had to be learnt. Lecturers, too, had to consider which of their normal class strategies could successfully be translated into the technology. Even becoming familiar with the use of the touch sensitive screen to display the slides and the centrally located loudspeaker telephone required practice.

Teaching staff:

The two lecturers who shared the teaching load allocated for the unit had no prior experience with audiographics conferencing although one had considerable experience in teleconferencing. The production assistant was an important member of the teaching team providing support not only with the preparation of the graphics but also assisting with the use of the technology during classes.

Unit content:

The aims of the unit were to foster critical reflection on appropriate knowledge sources for early childhood teachers and to stimulate critical inquiry into the knowledge teachers use as they work in Early Childhood programs. Consideration of the enduring themes, key ideas, recent research and debates surrounding and influencing Early Childhood curriculum theory and practice were important components. Examination of teachers' own personal and practical knowledge was another important component.

Teaching strategies:

The set topics were presented in ways designed to promote group discussion and were linked to issues raised by students. From the outset, the lecturers employed a discourse style they wanted students to use with each lecturer questioning points raised by the other, to foster debate and promote the notion of collaboration in learning. Humour, anecdotes of personal experiences and dilemmas were also used to highlight points. The aim was to promote a risk-taking environment where students felt able to voice uncertainties and scrutinise ideas and

assumptions enshrined in Early Childhood theory and practice. Reflective journal writing was encouraged as a means of assisting students to build connections and knowledge between the set topics and readings and their own practical and theoretical knowledge about curriculum.

Class formats:

Eight sessions of three hours duration (5.30–8.30 pm) were offered in place of the usual 14 weekly sessions per semester in order to assist those who had long distances to travel or who had heavy after school commitments. In the non-class weeks, students were required to fax or otherwise deliver reflective journal entries based on required readings. Although the general format for the three hour session varied, a typical session involved:

* a lecturer leading a discussion based on an overview of points from students' journals
* students raising issues, dilemmas from their own work situations or items of general interest for discussion
* prepared input from a lecturer on the topic set for the session presented in a way that evoked discussion and student input
* a coffee break
* the undertaking of a task separately at each site such as viewing a video forwarded prior to the session
* a 'coming together' for shared discussion stemming from the task.

In three classes towards the end of the Semester, students made presentations based on work for their final assignment. All the presentations were illustrated with computer slides designed by the students and produced by the production assistant.

Resources:

At the first session, students received a booklet (under 200 pages) containing a unit outline, the schedule for classes, details of required readings for each session, an annotated reading list and a set of required readings. The print materials were regarded as supplementary to the teaching program which was a reversal of the tradition of using audioconferencing to supplement print-based teaching materials.

Experiences and perceptions

Data were collected from students, lecturers and observers concerning their experiences. Students were invited to submit written reflections on their reactions after participating in selected sessions. In particular, they were asked to focus on problems they had encountered, the impact of the technology on their learning and suggestions and advice for the future development of the approach. Responses were received from eighteen students after Session 3, eight students after Session 6 and ten students after the final session. The two lecturers also provided written reflections after each session highlighting problems encountered, the impact of the technology on their teaching and their perceptions of student responses. Five observers who sat in on classes also submitted comments regarding the effectiveness of the teaching processes and the use of the technology.

Students' reflections

Feelings:

Most students reported positive feelings about their participation using words such as exciting, interesting, enjoyable, relaxed, friendly and productive. The opportunity to interact with other class members, both in their own and other locations, was noted as an enjoyable feature by a number of participants. The respondents off-campus were extremely positive about their experience in the unit. They were excited and enthusiastic about the technology and felt that the benefits they received outweighed the slight technical difficulties encountered. Students on-campus were also positive but not to the same extent. In the first

few weeks of the trial, some students reporting feeling 'intimidated' by the equipment and nervous about having to use the technology.

Problems:

Once the technical difficulties encountered at the Kelvin Grove site in the first session were overcome, there was little mention of technical problems apart from an occasional difficulty in hearing a speaker. The students in Rockhampton and Nambour each noted that, as they were the only students in their location, they were unable to participate in informal discussions during the allotted time for this. By Session 5, however, the facility to link two sites for small group discourse was discovered and the problem resolved. A Toowoomba student reported that having to travel an hour to reach the QOLN Centre was a problem for her, whilst recognising that without the audiographics conferencing facilities participation in a seminar class would not have been possible at all. One student reported problems in understanding the content and one found using the loudspeaker telephone a problem.

Impact of the technology on participation and learning:

Overall, students felt that their understanding had been broadened and significant learning had taken place. In particular, the opportunity to interact and discuss ideas and issues with others was valued. The audiographics technology was seen as having both positive and negative effects on participation and the effectiveness of the learning experiences.

Positive effects:

* The visuals were seen to be helpful and their preparation and presentation appreciated. Students felt that the technology had resulted in lecturers being better prepared and more information being presented in an interesting way.

* While the on-campus students appreciated having a lecturer present with them, off-campus students felt 'welcomed' and 'drawn in' to the discussions. The informal atmosphere and warmth of the lecturers were seen to contribute to this.

* One off-campus student reported that, when compared with other external study modes, the audiographics technology allowed for more active involvement and understanding of the topic through communication with others.

* One student felt that the technology made the student presentations both easier to give — 'It's actually good to be separated from other students — It's not so nerve racking' — and to listen to — 'It is also easier to concentrate on what is being presented, rather than the person.'

* Lack of eye contact was also seen as an advantage by some students: 'I find the lack of eye contact may in fact enhance concentration and intake of knowledge. Without the distractions of classmates, it's easier to concentrate on the spoken word and therefore simply take in and retain more.'

* A number of students commented on the motivational value of the use of the technology: 'I find the whole interactive process between scattered students and lecturers so stimulating and enjoyable I can only say for me — it works!'

  'I travel to Brisbane weekly for on-campus lecturers so can compare. While I enjoy the face to face contact with students lecturers, I know I've worked much harder in this unit simply because I wanted to be prepared for the inevitable '... and what does Nambour think?' The whole unit has taught me far more than my initial expectations — I've found it highly motivating seeking out further information on topics.'

Negative effects:

Students highlighted a number of factors which they saw as inhibiting or distracting to their learning.

* Having to use a loudspeaker telephone made some students nervous and hindered their participation.

* Some students reported being reluctant to contribute because they did not know the students at the other sites.

* Lack of eye contact with lecturers and other students, not being able to detect non-verbal cues and not being able to put a face to a voice were reported as negative aspects by some students. Finding difficulty in 'butting in' to a conversation to make a comment or ask a question was also reported to be a problem.

* Off-campus students missed the opportunity to develop rapport and friendships with lecturers and other students. In particular, they commented on the need for feedback after their presentations to compensate for the lack of 'nods and smiles to affirm our statements'.

* Having to check that they were being heard, having to repeat comments and not hearing some contributions distinctly were listed as minor irritations by some students. Because of such problems, these students felt they had to make more of an effort to participate.

* Two on-campus students felt that the technology 'limited group discussions and communication with the lecturer' that a 'classroom lecture could have been more stimulating and lively' and that 'inevitably, to discuss and debate through teleconferencing hinders our efforts in expressing ideas with others.'

Overall, however, students rated the sessions as being at least as effective as the conventional on-campus methods. Audiographic conferencing was rated most highly in terms of keeping students' attention and interest and in developing a class atmosphere conducive to learning and was seen to be least effective in terms of allowing students to discuss topics with each other.

Lecturers' reflections

The lecturers' reflections suggest that their feelings progressed from an initial state of anxiety about using the equipment to an enthusiasm for the benefits possible with audiographics conferencing. Initially, lecturers likened the use of graphics to overhead transparencies and found it reassuring to use a familiar teaching tool in an unfamiliar situation. The shared graphic also helped unite the students at the various sites and focus the discussion in a way not possible in teleconferencing alone. Initial technical problems with the equipment left the presenters feeling rushed and fatigued on occasions and the need for adequate technical support and infrastructure was strongly emphasised. As well, the need to develop and refine teaching strategies appropriate to audiographics conferencing was recognised. Whilst a pedagogy based around dialogue and the critical analysis of ideas was the aim, it was felt that technical constraints and inexperience had tipped the balance between giving information and promoting discussion in favour of the former, particularly in the early sessions. Although this concern was redressed to some extent towards the end of the Semester, more training, experience and understanding were seen to be needed if the potential of the technology was to be fully tapped.

Observers' comments

Comments made by observers were consistent with many of the lecturers' reflections with one observer noting that the teaching was tending towards the presentation of information rather

than stimulation of discussion. Observers of later sessions, however, commented on the high level of interaction being achieved and 'the good group feeling' across the sites, with the technology 'being experienced as a tool and not as a dominating influence'. Practical suggestions on how to increase the use of the interactive facilities such as the use of show-hide boxes and on-screen writing were also made.

EMERGING ISSUES

The reflections and comments of participants raise a number of important issues for consideration if audiographics conferencing is to become a more widely used mode of delivery in higher degree study.

Clarifying the pedagogy

The stated goal of the preferred pedagogy for the teaching of this unit was that students engage in the critical analysis of ideas through discussion with colleagues. It became apparent during the project that if the technology was to assist in achieving this goal there was a need to make more explicit some of the values, theories and assumptions upon which the goal is based. As outlined by Oliver and Reeves (1994a), from the early work of Piaget (1954), Bruner (1960) and Ausubel (1960), there has come the recognition that learning is enhanced in environments where students are actively engaged and are reflecting on their actions throughout the learning process. In keeping with this, the contemporary view of constructivism suggests that knowledge is gained through a knowledge building process. When faced with new information, the learner's intentions, past experiences and metacognitive strategies all play a part in determining what becomes of that information (De Vries & Kohlberg, 1987). It is this constructivist perspective that underlies the goal of promoting the critical analysis of ideas, for this kind of critical thinking requires students to consider, to compare, to make inferences, to determine implications and to reason (Hannafin, 1992). The kind of learning environment at the tertiary education level likely to promote this type of constructivist thought is one in which a variety of perspectives is shared, discussion moves beyond the reflexive and experiential level, risk taking is encouraged in a warm and accepting atmosphere and motivation is high. The importance of these factors is confirmed by the students' responses which highlighted aspects such as collaboration, warm and friendly lecturers and motivation as being important contributing factors to their learning in this unit.

In the light of this clarification of the pedagogy, a number of important factors can be identified which should be taken into account when considering the use of the technology and the development of teaching strategies.

* The provision of warm, accepting 'conference' environments and the establishment of a protocol to ensure positive relationships are enhanced and no group or person dominates.
* The use of teaching strategies which create an appropriate mix of student-initiated, lecturer-initiated and group-initiated discussion, reflection and collaboration.
* Effective communication skills and content knowledge on the part of lecturers enabling the kind of discussion which leads to the critical analysis of ideas through fostering students' abilities to move beyond anecdotal accounts and to compare, make inferences, determine implications and reason.

Using technology as a tool

Experiences in this trial suggest that it would be very easy to let the technology become the master and not the tool of the pedagogy. Although the need to access technical advice and support was acknowledged from the outset with links established with the QOLN staff and the employment of a production assistant, there were times, particularly in the initial stages, when the enthusiasm and time for teaching preparation by the lecturers were in danger of being swamped by the difficulties encountered in gathering equipment and ensuring adequate technical functioning.

In the initial planning of class formats and resources, a decision was taken by the lecturers that, where possible, previously used teaching and learning strategies consistent with the preferred pedagogy were to be adapted to the technology. The technology was not to dictate the strategies. Although at times the domination of the technology seemed unavoidable, such as when visual links broke down, at other times, this decision led to the use of the technology in ways which would not have been recommended in any training program! While success was not always assured as a result of this decision. the lecturers' explorations were guided more by the pedagogy than the technology and valuable insights gained.

Again, as a result of this project, factors can be identified that need to be taken into account in any future delivery of higher degree study using audiographics. These are:

* The provision of appropriate hardware, software and equipment well in advance of the starting date of the project so that successful functioning can be established.

* The availability of technical assistance in the preparation of materials and the use of the technology during classes.

* High levels of preparation and planning prior to sessions as well as responsive flexibility within sessions.

* Adequate technical skills on the part of lecturers and students and a preparedness to implement alternative strategies if technical 'glitches' occur.

CONCLUSION

In essence, the findings from this trial of teaching an early childhood higher degree unit using audiographic conferencing technology indicate that, provided the pedagogy is clearly articulated and the technology regarded as a tool in its implementation, the potential exists for the creation of effective learning environments and the enhancement of learning outcomes.

The combining of on-campus and off-campus students to form one class, while requiring further investigation, appears to have both benefits as well as benefits for students. Drawn from a wide variety of locations and workplaces across the State, students come together bringing with them differing perspectives and experiences. The fact that on-campus and off-campus students experience similar teaching formats, strategies and class resources aimed at high quality learning and teaching advances the notion of equity of access for all students. As more off-campus students reach the research phase of their course, however, new challenges concerned with ways of using technology to provide students with supervisory support and opportunities to become members of scholarly communities must be met.

If the audiographics mode of delivery is to be continued and extended, there will need to be a considerable realignment of support services within many institutions with less support being required in terms of print materials and more support and technical assistance from audio-visual and computing services. Although the use of audiographics conferencing is regarded by some as expensive compared with other interactive approaches in open learning, such as video conferencing and personal visits, it is economical and likely to become more so as the costs of basic equipment and charges fall with newer technologies and wider use.

In 1995, all units in the early childhood area of interest of the Masters program will be delivered using audiographics conferencing and an extended evaluation undertaken. For the early childhood profession, this initiative holds the promise of an increasing number of higher degree graduates living and working in various geographic locations, who not have in-depth knowledge of early childhood curriculum and policy matters, but who also have developed skills in critical analysis, enquiry and debate which enable them to deal with complex early childhood professional issues.

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