

## **INTERACTIVE TELEVISION AND PROBLEM BASED LEARNING: VIABLE DELIVERY 'TECHNOLOGIES' FOR RURAL TEACHER EDUCATION**

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### **INTRODUCTION**

Traditional approaches to teacher education have incorporated on-campus face to face instruction, complemented by occasional forays into schools for classroom practice teaching sessions, demonstration sessions or a combination of microteaching, child studies or associated activities. Many researchers and students believe that participation in teaching experience is the most important source of pre-service knowledge about the teaching profession.

To make teacher education courses as meaningful and relevant as possible, the project described in this paper used interactive television (ITV) to present real-life, rural teaching situations as examples of best practice and integrated them with problem based learning (PBL) scenarios focussing on day-to-day dilemmas faced by practicing teachers in multigrade rural classrooms. In past offerings of this class, student research and discussion of these scenarios has integrated the theory and practice from previous study in their teacher preparation course.

The incorporation of ITV increased both the real time involvement of student teachers in their chosen profession and enhanced their understanding of concepts and skills central to effective teaching in rural multigraded classrooms. The approach described in this paper encouraged collegial analysis of problem situations and sharing of solutions and allowed various perspectives on a single teaching situation to be analysed and discussed on a professional basis with experts in the field.

### **Literature Review**

While there is an immediate need to prepare teachers for the technological age (Le Baron & Bragge, 1994), more and more institutions of higher education are making use of telecommunication technologies in delivering instruction to on-campus as well as off campus learners. (Egan, Sebashan & Welch, 1991) As Dewulf, Biery and Stowietscheck (1987) state, "...feedback systems provided through telecommunications ... have advantages of being simple, inexpensive and effective, ... and have great potential for helping teachers acquire new instructional techniques". (p.178)

There are many benefits attributed to the use of ITV in instructional situations. According to a variety of researchers, the benefits of ITV lie in the potential of unifying theory and practice (Le Baron & Bragge, 1994), in providing students with immediate talkback capability with the instructor (Whittington, 1987), and in improvement in student-teachers' observation skills (McDevitt, 1994; Merkley & Hoy, 1985; Merkley & Jacobi, 1993). Moreover McDevitt (1994) suggests that technology-mediated observations, collaboratively planned by college faculty and classroom teachers, can provide more opportunities for pre-service teacher education students to observe veteran teachers implement educationally sound pedagogical practice than the traditional in-person classroom observations where students travel to local elementary and secondary schools. (p.5)

Further positive outcomes focus on the interactive exchanges that follow televised broadcasts, suggesting that the use of ITV may promote an element of quality control among the early field experiences of pre-service education students. (McDevitt, 1994)

In a study by Merkley and Hoy (1985), video technology was used to allow pre-service teachers to view teaching techniques and classrooms interaction without attending the class in person. Lessons were broadcast live from a selected elementary school classroom to an observation centre. In a similar study in 1993, Merkley and Jacobi evaluated three different types of teacher observation processes. One of these processes included ITV. The results of this study revealed that the knowledge of teaching behaviour for those student-teachers who observed via the live television broadcast was significantly higher than the other experimental groups. These findings suggest that students who participate in live telecast laboratory experiences in addition to didactic course work become more perceptive of the subtleties of teaching behaviours than do students observing via other modes.

It is the type of project which does much to counter the suggestion that pre-service teacher education coursework offers limited knowledge about the day-to-day life of a teacher or a teacher's professional problems and supports the need to increase day-to-day content relevance in pre-service courses (Feletti, 1993).

### **Project Description**

Incorporated into a standard university semester, this project combined ITV links with small rural schools, and problem based tutorials in order to consolidate the concept and skill development of final year pre-service teacher education students in the area of curriculum planning and preparation for teaching in multigrade rural classrooms. Using ITV, students observed the teaching, problem solving and decision making activity of rural teachers and then discussed with them the activities observed. Discussion related directly to general planning and program objectives and included reference to grouping techniques, teaching strategies, classroom management, resource organisation and utilisation, approaches to and selection of content to be learned, assessment and record keeping techniques, utilisation of teacher aides and/or parents in the classroom and references to the politics of small school community involvement. Associated problem based tutorials using scenarios common to multigrade teaching contexts reinforced targeted concepts and skills.

Previously, the concept of distance education incorporated the dissemination of information away from a central location and the provision of instruction from one teaching location to multiple remote sites where student learning was to occur. The unique aspect of the Windows Into Classrooms project was the concept of using distance education technology for the instruction of internal, on-campus students. That is, by simulating a window of a classroom, students experienced the realities of day-to-day teaching in several rural classrooms through a process of distance education in reverse.

### **Project Limitations**

The technology used in this project had physical limits. Initially, 'line of sight' transmission restricted both the distance possible between sites and the variety of remote schools able to be incorporated into the project. Additionally, dependence upon sensitive video and audio linkages over long distances carried with it the possibility of both human and technical malfunctions. Appropriate training for those involved in broadcasting was a prerequisite to successful transmission and to legal access to the particular frequencies acting as signal carriers.

Despite the fact that this technology had been successfully trialed elsewhere in Queensland and in other parts of the world, alternative arrangements were made to substitute video taped teaching sessions and telephone links for the live, two way video interactive component of the project in the event that technical difficulties interrupted the learning program of the student teachers.

The expected nervous and curious reactions of both school teacher and pupils to the presence of cameras and monitors in the classroom was viewed as a possible limitation. To reduce this effect, an intensive program of 'video equipment exposure' was used during the two weeks preceding the broadcasts in which both teachers and pupils were taught to use the equipment installed in their classrooms for their own purposes and encouraged to develop their own 'video masterpieces'.

### **Monitoring and evaluation procedures**

Project evaluation data were gathered from all participants including university students, cooperating school teachers, technicians and media specialists. Feedback was requested on both PBL and ITV components of the project.

Students analysed the effect of the technology on their understanding of rural schooling and the contribution of the problem solving approach to the practice of teaching competencies in the area of teacher decision making, classroom management, preparation and analysis. In addition, PBL sessions provided frequent opportunities for assessment of students' abilities to analyse and reflect on teaching situations.

Teachers involved in the video transmission of their own teaching activities evaluated their professional comfort with the technology, the perceived effectiveness of their contribution to the education of their pre-service colleagues, the resulting enhancement of their teaching skills, the impact of the intrusion of the technology on their own classroom effectiveness, and the effect of the project on their own student's learning environment.

Technical personnel considered the viability, ease of use and replicability of the ITV sessions.

### **Analysis of Results**

Data for the evaluation of the PBL activities were obtained from two questionnaires completed by student teachers participating in the project. The first questionnaire sought to establish their receptiveness to PBL and the positive benefits derived from participation in such an approach, while the second questionnaire assessed the positive effect of PBL on teaching competencies and the degree of relevance of the PBL activities to their practicum experience.

Findings from the two questionnaires indicated a high degree of receptivity to PBL as an effective learning and teaching tool. This was apparent with more than 80% of the students strongly agreeing that they had developed an understanding of situations that might be encountered in small, rural schools and that scenario use helped to promote a positive attitude towards the subject being studied. The questionnaires also revealed that PBL facilitated students' confidence in their learning, and that the use of the PBL scenarios promoted student initiative in and responsibility for their own learning. 89.6% of the students indicated that most of the topics addressed in the PBL sessions would be of benefit in their final practicum and in their future teaching career.

Questionnaires were also used to evaluate the ITV component of the project. Feedback concerning the learning benefits of ITV was extremely positive from all participants. More than

90% of the student respondents identified four particular benefits. The most significant of these was the unification of 'theory' with practice'. In the words of one student, "It makes theory 'real' by linking it to real life class situations".

Another benefit identified was the acquisition of valuable insights into teaching in rural, multigraded classrooms. 90% regarded the opportunity provided by the ITV sessions to be either excellent or very good. Of the remaining 10%, many remarked that several lessons were not enough to gain a complete picture, despite the fact that those insights gained were valuable. When asked to identify teaching behaviours observed, the following 15 behaviours were nominated; check for understanding (81.5%), effective group work, knowledge of multi-grades, and teaching skills (81.5%), classroom management (77.7%), arrangement of desks and independent work habits (70.4%), grade level content and sequencing of activities (66.6%), student work patterns and teacher strategies (63%), travel patterns and room decorations (59.3%), self organisation skills (55%), and use of other personnel (51.9%).

A third benefit mentioned by most respondents was the unobtrusive nature of the observation process. One student wrote, "It was really good to see how the teacher and classroom ran without us being in the room".

The opportunity for and satisfaction with the immediate feedback gained from the interactive discussions with teachers was the fourth significant benefit identified by students. 63% of the students asked questions during the interactive stages of the broadcasts. Of the students who did not ask questions, a few students indicated that their questions had been raised by their peers. Most students who did not ask questions indicated they felt nervous with the technology and found the idea of being televised rather daunting. 85% of the student-teachers indicated that they were satisfied with the ways in which classroom teachers answered the questions raised.

Although all students indicated that they were satisfied with the level of preparation they received prior to participating in the sessions, many suggested that a physical plan of the room and individual profiles of the children would assist them in the observation process. Further, some students suggested a need to become acquainted with the technology in order to gain maximum benefit from the process.

Both participating teachers and the principals of the schools believed that the ITV process was an effective way for student teachers to observe multigrade classrooms in rural schools. Both teachers felt that they were able to satisfactorily demonstrate general aspects of teaching as well as aspects of teaching which are particular to a rural, multigrade classroom. They felt that participating in the ITV broadcast had positively affected their own teaching skills. Benefits they perceived included personally experiencing and learning about the new technology, and being able to reflect constructively on one's own teaching skills and the level of pupil learning.

The principal, both classroom teachers, and almost all of the student teachers indicated the main emphasis for future improvement was concerned with the expansion of the classroom broadcasts and the interactive sessions at the end of each broadcast. They felt that this would create a wider view of life in a multigrade classroom and include a greater variety of curricula and social aspects of multigrade teaching.

Additionally, both teachers suggested that prior to broadcasting, videos of the children at different stages during the year should be taken so that student teachers could gain insights into the childrens' prior learning experiences. They suggested that this would also enable student teachers to see how the broadcast lessons articulated with the overall teaching program for the year. Similar to this suggestion was a request from student teachers that more information be provided about the children being observed.

Each of the technicians involved believed the concept of the project to be worthy of further development, rating the trial project "a complete success". However, despite extensive testing and strong signals at both receiver sites prior to live transmission, the quality of sound during the first session of broadcasting was at about a 60% level. This was remedied prior to the second broadcast and no further difficulties in either video or audio signal was experienced during the remainder of the project. The first broadcast session also presented some difficulty with insufficient communication links between the director of the project at the university receiver site and the camera operators at the school site. Camera operators employed a guess work approach to the type of camera angles desired and so the view of the classroom received at the university was often punctuated by wild sweeps of the camera from one shot to the next. Again, however, this problem was rectified prior to the second session. No further technical or procedural difficulties were evident for the remainder of the project.

Technical respondents raised certain issues which, if addressed, would enhance future development of this innovative educational process. Central to these improvements was the concept of an uncluttered approach to the use of the technology, reducing personnel, emphasising simplicity of operation in order to maintain the educative value of the project rather than allowing the technology to take-over. The use of commercial microwave links rather than amateur band frequencies was suggested in order to emphasise the advantages of high broadcast quality, stereo sound, and low maintenance, despite the higher, initial establishment costs.

All evaluations produced data supporting the inclusion of both the PBL and the ITV component of the project as standard features of the teacher education program and supported the development of the ITV component as a standard delivery technology for all teaching areas of the university.

## **Conclusions**

As a consequence of the project, pre-service teachers were more thoroughly prepared for rural teaching experiences, displayed competence in skills related to effective teaching in multigrade classrooms, and exhibited control and comfort during involvement in the decision making and problem solving aspects of teacher behaviour. Student respondents identified four particular benefits: the unification of theory into practice; the acquisition of valuable insights into teaching in rural, multi-grade classrooms; the unobtrusive nature of the ITV sessions; and the opportunity for immediate feedback during the interactive discussion.

The classroom teachers saw the ITV process as a highly effective method by which pre-service teachers might view and learn about rural, multigrade teaching. They also identified personal benefits such as gaining knowledge about the new technology and encouraging reflection on one's own teaching. Both teachers, and pre-service teachers indicated a desire for longer classroom broadcasts and interactive discussions.

The technicians and media specialists were pleased with the trial project outcomes. They believed the concept worthy of further development and research.

Overall, reactions to this project indicate a positive future for this application of ITV and PBL in both pre-service teacher education programs and other site based programs at this university.

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