

Using ICT to enhance curriculum opportunities for students in rural and remote schools

ABSTRACT

South Australian rural and remote schools have been using a variety of Information and Communication Technologies (ICT) to enhance curriculum opportunities for students whose teachers are at a different campus or different school, or who are out of the school for extended periods of time undertaking courses, such as, Vocational Education and Training (VET). A case study approach was used to identify the strategies that have been implemented by the teachers and to examine the perceptions of students and teachers about the success of these strategies in supporting the learners in a sustainable manner. Some of the strategies that were used to connect the learners and teachers were: (i) video conferencing and interactive whiteboards (IWB) to conduct classes in real time at a local and remote school, (ii) using Moodle as a means of making class material available when and where the student needed it and (iii) connecting to remote sites to do a virtual visit.

INTRODUCTION

Students in rural and remote schools believe that they are missing out on opportunities afforded to metropolitan based students (Alloway & Dalley-Trim, 2009). This can be attributed to a number of factors. These include a lack of infrastructure support for teachers (Brennan, 2006), high staff turnover (Lyons, 2006, Alloway & Dalley-Trim, 2009) and difficulty filling vacancies, in particular specialist secondary vacancies (Lyons, 2006) any of which can lead to fewer subjects from which to choose. Also because of the remoteness there is a lack of opportunity for site visits and extension activities (Lyons, 2006, Alloway & Dalley-Trim, 2009) and fewer alternatives such as Vocational Education and Training (VET) courses (Porter, 2006). The lack of VET courses is exacerbated because often there is a large distance required to travel, meaning that students miss out on class time at the school which is a further disincentive to students taking these courses (Porter, 2009).

The recent report from the National Centre of Science Information and Communication Technology, and Mathematics Education for Rural and Regional Australia (SiMERR) (Aldous, Barnes, Clark, White, & Morony, 2006) indicated that in the areas of science and mathematics, there are a number of opportunities that are available to metropolitan based students that are difficult or impossible for remote or rural based students. Schools in the country are often not able to offer the same range of subjects, particularly in the senior years and students are not easily able to transfer schools and so often need to resort to distance delivery if they want to continue to study this subject (Aldous, 2006). Institutions such as the Museum, Zoo and the Art Gallery are not easily accessed (Aldous, 2006) and while some of these do have a travelling exhibition it is usually on a set schedule that may or may not coincide with what the school is studying at the time the visit occurs.

There is evidence that the use of ICT can reduce the disadvantages that remote schools suffer (Trinidad, 2006, White & Johnston, 2008, Reading, 2009, Anastasiades &

Filippousis, 2010). Of interest in this study, the use of videoconferencing, which has been effective in supporting distance learning (Miller, 2009, Hannum, 2009, Anastasiades & Filippousis, 2010) and also for providing extension activities such as virtual visits (McCombs & Ufnar, 2007, Ching-Huei & Howard, 2010). While the use of web based systems and networked Interactive Whiteboards can support distance and blended learning (Hannum, 2009, White & Johnston, 2008). Also newer technologies e.g. wikis, blogs, voice / videoconferencing and instant messaging by their nature have the potential to change the way that students interact with each other and with their teachers (Reading, 2009, The New Media Consortium, 2006, Miller & Williamson, 2008). The use of these tools, often described under the banner of Web 2.0 or Social Computing (Price, 2006), could be useful in an education setting (Reading 2009).

Recently there has been some discussion on the impact of a National Broadband Network (NBN) (Moo, 2009) and its ability to afford rural and remote students greater access to a wide range of educational opportunities. This paper will look at several projects that have used ICT in an attempt to address some of these issues. In particular the use of Video conferencing and Interactive Whiteboards to connect students at one school with a teacher in another school in order to expand the subject offerings in small rural schools, the use of Moodle to support students study outside of the school and with the use of videoconferencing to link students to metropolitan based institutions e.g. the Maritime Museum and Reef HQ in order to widen the education experience.

METHOD

The intention of this study was to look at the approaches used and get feedback from the students and the



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teachers involved with regard to the effectiveness of these strategies and their sustainability. A case study approach was used and qualitative data in the form of face to face interviews were collected. Students and teachers who were involved with the case studies were interviewed and their responses were audio taped. Focus groups were used for the student interviews (seven students for case study 1 and six students for case study 2) and the teachers were interviewed individually (a total of seven teachers were interviewed). The case studies were conducted in two remote South Australian schools.

Case Study 1 Local Delivery

Local Delivery is a term used within the South Australian Department of Education and Children's Services (DECS) to describe an approach where students are taught from another school in the region using some form of ICT. There are a variety of strategies used by the teachers involved in the local delivery but two common forms currently being used are Videoconferencing, and the use of Interactive Whiteboards (networked) with an audio connection. The students who were interviewed had done a variety of subjects through Local Delivery including physics, mathematics and football. The approach varied from subject to subject but all included the use of real time video or audio. The teacher in most cases was teaching a class at the remote site and the other students were joining in on that class. One teacher was running a class specifically for the remote students. This was because there were three remote groups of students.

The students interviewed were very positive about Local Delivery, and in particular they commented on the fact that if Local Delivery was not available then they probably would not be doing that subject. Some of the students also commented that Local Delivery was better than study in distance mode.

'I would prefer to be taught face to face but if not doing local delivery would mean having to do open access then the local delivery is much better.' (Student comment)

They also commented on the accessibility of the teacher even when they were at the remote school. The students indicated that they liked the ability to interact and ask questions in real time and one group who used the Interactive Whiteboard liked the ability to draw a diagram that their teacher could see and respond to. Some students were involved in a videoconference with their teacher and were also able to see the other students in their "class" at the remote sites. These students indicated that they felt like the teacher could see them and what they were doing, just like a face to face class. None of the students had experienced Local Delivery through the use of videoconferencing and a combination of Interactive Whiteboard with audio and so it was not possible to draw comparisons between the various models used.

However, from observing a number of Local Delivery classes, and drawing upon the students and teachers

comments it is possible to highlight some indicators of good practice. Organisation appears to be a key element, with materials being prepared and made available to the students before the class, being a common approach that the students valued. A structured approach to asking the students questions so that none of the remote sites was missed was also important. It would seem that the students responded better to the teacher when video conferencing was used, but in most cases were able to see the material the teacher was working on better when using the Interactive Whiteboard that was connected and so ideally the combination of video conferencing and interactive whiteboard would provide the best environment. Unfortunately, a bandwidth limitation does not allow this currently but should the bandwidth issues be overcome then this would be a powerful learning environment.

Case study 2 Use of videoconferencing to connect rural students to metropolitan based facilities for a virtual visit.

A trip to the museum for most students would mean a bus trip, however for some students this bus trip could take up to 10 hours one way. In order to overcome this travel time videoconferencing can be used to provide a similar experience, a virtual visit. In one experience the year 6 and 7 students visited a museum and in another they worked with a marine biologist on a scuba dive. The students who were involved in these experiences were very positive about what they did and saw.

'Pretty interesting to learn about what jobs they do and how they find shipwrecks.' (Student comment)

'Had to guess what the shipwrecks were' (Student comment)

The students and teachers commented on the ability to ask questions in real time and to hear what they were seeing being described as important aspects of the experience.

'Better than a video, the person is there ...the fact that they can answer the questions' (Teacher comment)

'It was good because it was, like interactive' (Student comment)

This was reinforced by the teachers who had been involved in similar projects previously, in one it was someone talking about sharks with some video footage that was not live and another where once again the video was live but technical difficulties meant that it did not work.

'Shark one was someone with video and answering questions but was not the same' (Teacher comment)

'On tuna boat while they were at sea and talking to fishermen. Weather interrupted the broadcast' (Teacher comment)

In the museum visit, the teacher had sent over some hands on activities for the students before the videoconference that the students indicated was a very useful addition to the whole experience. While there were some technical difficulties the

students and the teacher indicated that the overall the quality of the video was good enough for the students to get a clear look at the objects being viewed.

'It was slow and you could see the lips moving and then the talking, but it didn't, matter' (Student comment)

These types of experiences offer students the opportunity to engage with people and material that has previously been limited to images or pre-recorded videos. The ability to engage and interact with the presenter changes the experience and while these opportunities are limited, as the technology improves they will become more commonplace and accessible. Comments from the students indicated that the event had an impact on them, they were very animated when talking about what they had learned and able to recall a lot of information several weeks after the event. The students wanted to do more of these, one student suggested with professional skaters, and the teachers indicated that they were keen to do others and were looking out for further opportunities.

The students gave some suggestions as to what was effective in these types of events. They said that they were okay for 30-45 minutes of information and questions, but after that it would get boring. They suggested that if they would have been more engaged if they had to look for things and engage a bit more with what they were seeing. The students indicated that most of the class involved asked questions and that engagement was greater because they had made the connection with what they were doing in class and the videoconference experience. The students liked to see the presenters, and that the event needed to be something that they normally would not be able to see and do. Technical difficulties did detract from the experience but not enough to put the students off from wanting to do more of these events.

Case study 3 Using Moodle to support students outside of the classroom.

The intention of this project was to develop a Moodle site for senior level classes to support students who were either absent from class because of VET courses or through illness etc. The teachers involved in this project were initially very enthusiastic about the potential that this technology provided and attended several professional development courses to learn how to use this technology. The teachers had also investigated the recording of classes in conjunction with capturing IWB screens to provide a more realistic experience for the students who were not there. Unfortunately the teachers, when interviewed indicated that there were technical difficulties that meant that the project did not work. The audio from the recording was not clear. The load time on to the Moodle site for even a relatively small word processed document was several minutes that meant that even uploading text material was not feasible. The intention of using large multimedia files was therefore not possible. While the teachers remain confident that these technical issues will be solved and that they will be able to use it in the future. This highlights the need to additional technical support and a more reliable high speed connection into the school.

CONCLUSION

These case studies add to the increasing evidence that ICT can be used to overcome the educational disadvantage faced by students in rural and remote schools. They can broaden the educational opportunities for these students by providing access to subjects and sites that would not previously have been possible. While the educational advantage has been clear in these case studies, they have been instigated by the schools and at times individual teachers and additional support is required if they are to become more widely available and part of the mainstream offerings. Suitable events and people willing and with the required skills to run these events need to be supported. The technical issues must be addressed, in the form of bandwidth restrictions, and the availability of equipment.

In addition teachers need to be given the opportunity to develop the skills required to adopt these new pedagogical approaches. These would include the technical skills to operate the equipment, the skills required to develop materials suitable for an online environment and the facilitation skills to work at a distance.

BIOGRAPHY

BRUCE WHITE is a lecturer at the University of South Australia in mathematics and science teacher education. His research interests are the integration of Information and Communications Technologies in science and mathematics teaching and the use of blended learning in secondary schools.

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