

2006

## Employing Technologies to Engage Students with Diverse Needs in Rural School Communities

Chris Forlin

*Hong Kong Institute of Education*

Graeme Lock

*Edith Cowan University*

---

### Recommended Citation

Forlin, C., & Lock, G. (2006). Employing Technologies to Engage Students with Diverse Needs in Rural School Communities. *Australian Journal of Teacher Education*, 31(1).  
<http://dx.doi.org/10.14221/ajte.2006v31n1.4>

This Journal Article is posted at Research Online.  
<http://ro.ecu.edu.au/ajte/vol31/iss1/4>

# EMPLOYING TECHNOLOGIES TO ENGAGE STUDENTS WITH DIVERSE NEEDS IN RURAL SCHOOL COMMUNITIES.

Chris Forlin, Hong Kong Institute of Education

Graeme Lock, Edith Cowan University

## ABSTRACT

*This paper considers the use of information and communication technologies (ICT) to enable students to access the curriculum in inclusive classrooms. The research considers the latest trends regarding promotion of the use of ICT in education in Australia and then considers the outcome from the perspective of one state, that of Western Australia. In particular, the focus is on the use of ICT in remote and rural school communities for supporting inclusive practices. While it seems clear that considerable financial support has been allocated to the enhancement of access to ICT across Australia by various education departments, there are several issues that are impacting on the implementation for more isolated schools. Concerns regarding staffing, cultural sensitivity, software selection and hardware maintenance are all discussed from the perspective of increasing the engagement of students with diverse needs in regular classes in remote and rural schools in Australia.*

## INTRODUCTION

The inclusivity paradigm continues to promote the view that education for all children should, whenever possible, occur within the regular classroom. There is little doubt that regular classrooms of the 21st century consist of students with an increasingly wide range of

diverse abilities (Forlin, 2004). Students with special educational needs are usually referred to as those who, in order to access and participate in the curriculum, may require a significant adaptation to, or modification of, the school program. In Western Australia (WA), for example, specific support is available for students with physical or intellectual disabilities, learning difficulties or learning disabilities, sensory impairments, or those who demonstrate significant behavioural and adjustment difficulties.

In WA, many students are educated in remote and rural community schools due to the enormous geographical isolation of many parts of the State (Lock & Forlin, 2004). Regular classrooms in these remote and rural communities have always had students with a wide range of backgrounds and abilities. While the inclusive educational paradigm has tended to focus on including students with specific disabilities, the role of more isolated school communities in Australia has always been to ensure access by students with a much broader range of needs. These classrooms include students from a range of backgrounds such as those who are culturally or linguistically diverse, those from non-English speaking backgrounds, different ethnic groups, itinerant families, those in poverty, poor medical health, those affected by glue or petrol sniffing and drug or alcohol abuse,

among others, as well as those with disabilities or learning difficulties. In addition, regular classes contain students who may be gifted or talented across a range of intelligences.

For students living in remote communities in WA, opportunities to regularly attend specialist support facilities for students with disabilities such as education support schools or centres are not available. Schools, therefore, need to rely on the support of visiting teachers from the Centre for Inclusive Schooling within the Department of Education and Training to obtain support in planning for students with special needs. By necessity such visits are infrequent and schools need to be able to support and implement intervention programs within their own communities.

## **PROMOTING THE USE OF ICT IN EDUCATION IN AUSTRALIA**

The use of ICT in education to assist students to access the curriculum is an important issue, especially in the numerous remote and rural locations across all jurisdictions in Australia. In general, the 1990s witnessed an unprecedented rate of change in the development and use of communication technologies. To some degree the adoption of ICT methods was mirrored in the field of education. While the specific area of special education has generally lagged behind other fields in the use of technology, in recent years there has been a noticeable movement towards redressing this issue (Thygesen, Forlin, Keller & Bachmann, 2000). The use of increasingly sophisticated and expensive technologies to support pedagogy is being seen across a range of educational disciplines.

In Australia, a plethora of government reports have focused on enhancing the use of ICT in schools. In 1998, the Commonwealth government released a Strategic Framework for the Information Economy (National Office for the Information Economy, 1998), which emphasised the need to develop the skills and education that would enable all Australians to participate in the knowledge economy. The response to the strategic framework from the education and training industry by the Commonwealth Department of Education, Training and Youth Affairs (DETYA, 2000b) and the School Advisory Group and Education Network Australia (EdNA, 2000), identified a number of areas that required attention, including people, infrastructure and on-line content, applications and services.

In 1999, DETYA funded a study of the level of technology skills among Australian school students. The Adelaide Declaration on National Goals of Schooling in the Twenty-First Century subsequently included a statement that when students leave school they should 'be confident, creative and productive users of new technologies, particularly information and communication and communication technologies, and understand the impact of those technologies on society' (Ministerial Council for Education, Employment, Training and Youth Affairs, 1999).

This report was followed in 2000 by a DETYA-commissioned project entitled *Technology for Learning: Students with Disabilities*, the aim of which was 'to contribute to the body of knowledge about the impact of computer-based technology on students with disabilities in Australia' (DETYA, 2000). This identified the critical factors of equity and a

supportive ethos, support and access to appropriate technologies and staff training regarding the use of learning technologies to assist students access the curriculum and improve their learning. Similarly, the Commonwealth Department of Education, Science and Training, through the publication of a series of brief reports, reviewed the status of research into the use of ICT for teaching and learning. For example, in 2001, DEST funded the *Innovations and Best Practice Project* that evaluated the impact of school innovations, including the use of ICT, on the learning outcomes of students. As a product of these reviews and reports, the need for further research on the use of ICT identified teacher development, learning outcomes, curriculum, whole-school reform and school management as well as issues of equity and access across the diverse Australian continent.

## **THE USE OF ICT IN WESTERN AUSTRALIA**

In WA there are, similarly, a number of specific State government policies on education that have focused on promoting the use of ICT in schools, especially for students with disabilities. These include *IT in Education; Investing in Our Children; Investing in Our Schools and Education: the Country is Special* (Department of the Premier and Cabinet, n.d). Other pertinent government policies include *A Fair Go for Rural WA* and *A Focus on Young People* (Department of the Premier and Cabinet, n.d.), which refer to the availability and use of ICT to enhance skill development, widen career choice, increase the retention rates of students in post-compulsory schooling and upgrade public schools. This commitment to support students with diverse

needs is further evidenced in the *Plan for Government Schools 2004-2007* (Department of Education and Training, 2003b). One of the four key objectives of this plan focuses on ensuring that schools support and provide for the learning, physical, emotional and behavioural needs of all students by building inclusive learning environments, ensuring supportive environments and building, and refurbishing and maintaining facilities for the future.

To support the enhanced use of ICT in schools in WA, DET has initiated several major projects since 2000. It has allocated A\$120 million to provide all WA public schools with fast telecommunications access and begun the rollout of laptop computers available for lease by all government teachers. It has also provided increased funding for children with disabilities and learning difficulties of \$9.4 million over four years and established the \$1 million *First Click* fund to provide learning materials and grants to community groups to run computer training sessions (Department of the Premier and Cabinet, n.d.). As part of DET's Education to Community (e2c) strategy, the 100 Schools Project (2003-2006) was initiated. This targets the professional development of teachers to enhance student use of technology and to further develop staff competencies in the use of ICT to enhance student learning (DET, 2003a). In addition, DET has initiated a project to replace high-frequency radio with satellite technology for students who are enrolled in the School of the Air programs in WA, at a cost of \$9 million over three years. Through these policies and the provision of funds, the WA government has indicated a commitment to both increasing the use of

learning technologies in schools and to providing for the needs of all students.

### **SUPPORTING SCHOOLS TO MEET THE DIVERSE NEEDS OF STUDENTS IN RURAL AND REMOTE SCHOOLS IN WA**

Promotion of the use of ICT in Australian schools has been highlighted in almost every national and State report during the past decade. Simultaneously, the need for schools to better address the increasingly diverse student populations has also been a major focus in recent years. The value of early identification of students who may be at educational risk has also been reported continuously in the literature (for example, DETYA, 2000a; Loudon, Chan, Elkins, Greaves, House Milton et al., 2000). Once identified, it is essential that funding be available for support programs to function effectively (Crowther, Dyson & Millward, 1998; Rivalland, Rohl & Smith, 2001; Rohl, House, Loudon, Milton & Rivalland, 2001). Different jurisdictions in Australia have introduced a range of models to support students identified as being at risk in schools because of their diverse and special needs. It is evident from the literature that the needs of students with learning difficulties or disabilities are being addressed in various ways (Forlin, 2001).

In order to support students with diverse needs, isolated schools have had to adopt a strong intra-school focus, due to the difficulty in accessing outside support. As access to additional specialist support staff in remote school communities is limited, schools have adjusted by developing and adopting varied programs to suit their own context and specific needs. In WA, DET has implemented a Statewide *Students At*

*Educational Risk* (SAER) program to identify and meet the needs of students at risk in government schools (Education Department of WA, 1998). SAER coordinators are appointed from the school staff and schools create and manage their own programs on an individual basis, although each education district coordinates an area SAER team (Forlin & Milton, 2003). The SAER Policy and Guidelines state that 'in providing for students at educational risk each level of the system must take responsibility for its contribution to improving outcomes' (Education Department of Western Australia, 1998: 6). In addition, some schools have introduced a Support Officer Learning Difficulties (SOLD) model that provides increased ownership and has the potential to provide appropriately for needs of students experiencing difficulties with learning.

The SOLD model also works within a school's existing staff, providing additional professional development for one nominated teacher, who can then assist other staff in the process of establishing and implementing an interactive, peer-directed support program. In WA, where many schools are located in rural or remote areas with limited access to specialist support staff, this model seems to be well suited (Milton & Forlin, 2003). Both the SAER process and the SOLD model are increasingly focusing on the use of ICT to supplement them, as this provides immediate access to personnel when on-site access is often difficult.

### **IMPLEMENTING ICT IN RURAL AND REMOTE SCHOOLS IN WA**

In order to achieve quality learning outcomes, students with diverse needs may

require support, programs, services and other resources that are complementary and additional to those which are provided to students in general (Forlin, 2004). For many of these students the use of appropriate ICT assists greatly in enabling them to better access the regular class curriculum by providing a range of different physical or educational supports. The main aim of this investigation was to document and film the use of ICT by students with diverse needs living in remote and rural communities in WA. Teachers' beliefs and practices regarding the use of ICT in enabling students to better access curricula was also documented and this is reported elsewhere (Lock & Forlin, 2004).

### **Method**

Four district high schools in the Kimberley district in WA formed the focus schools for this investigation. The Kimberley district is a unique area located approximately 3,000 kilometres north of Perth, the capital of WA, and above the Tropic of Capricorn. Each school was the only public school provided in each township and all schools were located in rural or remote communities. The schools were at least four hours by air north of Perth and were often inaccessible by road during the wet season from November to March. The schools catered for children from kindergarten (aged 5 years) to Year 12 (aged 17 years) with enrolments ranging from 150 to 800 students. All schools had proportions of Indigenous students ranging from 40 to 99 per cent. One school reported a significant proportion of students from Asia. No alternative special school facilities were available for students with special needs, so all students attended the same public school in their local community.

### **Procedure**

Schools were contacted prior to the on-site visits and the principals were asked to identify teachers who were using technology to engage students with diverse needs. On arrival at each school a list of teachers who had agreed to be interviewed was provided. At each of the schools, once teachers started to talk about their own experiences they began to identify practices by other teachers that they considered to demonstrate good use of technology. Each school subsequently provided a wealth of information regarding the use of ICT. For many of the teachers the visits became a learning experience. The interviews stimulated much discussion in staff rooms and teachers reported that they were made aware of uses of technology that they had no idea were occurring in their schools.

### *Sample*

The four principals and 21 teachers who were using different technologies in their classrooms were interviewed.

### **Data analysis**

All interviews were recorded on videotape or audiotape and notes were taken by one of the interviewers during each session. The research questions were open ended and related to participants' current use of ICT; the outcomes for themselves and their students; how technology was embedded within their curriculum; their previous and current experiences in using ICT with students with disabilities; and their future expectations regarding the use of ICT in schools. Written data were transcribed and supplemented by reviewing the recordings. A constant comparative method was employed to analyse the data (Strauss & Corbin, 1990). Categories were coded by

comparing each new incident encountered in the data to incidents coded previously. Thus new categories, themes and hypotheses emerged. These categories and sub-categories were, therefore, generated and reviewed systematically from responses to the research questions.

## **Results**

The first category identified related to supporting the individual needs of students. When asked about the use of technologies to engage students with diverse learning needs it was clear that the use of ICT was generally carefully embedded within the teachers' pedagogy and that the focus was on the needs of an individual to access the curriculum rather than the child's individual special needs, disability or ability. The use of ICT was considered from a social perspective of disability, with the only mention of category of disability being given when identifying hardware that was designed to overcome a specific physical problem. As one teacher suggested, 'If kids come out at Year 12 and can't handle a computer they'd be really handicapped' (K1). The focus on the needs of the individual, together with the consideration that all children in their schools required special attention or modification, meant that teachers perceived that they were constantly using different technologies to help all children, but in different ways. A consistent comment was similar to this teacher's 'I think schools have an obligation to provide access to up to date technologies for all students. It's the future for them to access their world' (K2.)

### **Use of specialised software**

The use of ICT included an array of approaches that employed different software and hardware to meet the requirements of students

with a range of needs. For example, students were using alternative keyboards, tracking balls, headphones, big screens, audio output devices and laptops. The provision of specialised software for those working well below the general class level was, however, generally confined to the use of simplified games and educational activities that were available in each school. These were mainly suitable for students working at Foundation Level or Level 1 and mostly in the area of language and mathematics. These were accessed by the students during regular class time when they were supported by an educational assistant. Such software tended to focus on simple directions, repetition, reinforcement and responding using a key board. Additional software was employed by teachers working with students identified as being gifted or talented. For example, in one school students had designed and built their own mechanical robots. These students were using various programs to create, edit and produce original and remixed music that was synchronised to movements that they programmed into their computers to enable their robots to 'dance'. According to their teacher, 'These students have responded extremely well to this as it was a considerable jump in their expertise as they have done nothing like this before' (K4).

Most students appeared to be familiar with the use of Word®, Paint®, Publisher® and PowerPoint® within Microsoft Office XP for producing and presenting their work. The use of computers was particularly encouraged when students were writing, to enable them to access the spelling component of Word and other writing programs.

### **Use of specialised hardware**

A third category highlighted the alternative types of hardware employed. Each school had an allocation of computers, which were used in different places. Most classrooms contained at least one computer and this was usually linked to the Internet. The only school not to be linked was being connected on the day of the visit. It was noted that in each of the schools where they already had an Internet connection, teachers reported that frequently the links were not available and could not be relied upon so they had to ensure alternative back-ups were offered. This seemed due mainly to recurrent power problems or hardware breakages that required shipping equipment back to Perth for repairs. Many classrooms had at least three computers that were used frequently by students working on publishing or editing final drafts. In addition, all schools had a dedicated computer room that was accessed by whole classes for specific lessons that involved using computers. Two of these rooms had presentation screens that enabled the teacher to demonstrate the work as the students followed on their own computers. The teachers voiced concerns about the need to ensure that students in remote locations were able to access technologies: 'Kids who don't have the opportunity to access technology are disadvantage in the long term when it comes to employment' (K6). One school they had just received 24 new iMac® as part of the State upgrade of equipment and these were waiting to be installed. Some teachers proposed that having access to Tablet PCs, thus enabling them to use write-on screens that were interfaced with digital projectors, would

further enhance their teaching. Digital cameras and scanners seemed readily available and many teachers reported that students were familiar with using them to embed pictures in their presentations.

In particular, a sub category emerged that focused specifically on the use of ICT in teaching music. The use of computers in recording, editing and producing musical CDs was employed with many students. For example, one of the teachers who were making full use of computers suggested that 'Computers in music are powerful learning and motivational tools, particularly for students with learning problems' (K9). A teacher employing music in another school considered that not all teachers were prepared to be so proactive, suggesting that 'the more traditional purist music teacher needs to get into the 21st century and embrace technology' (K12).

The teachers felt that 'there is always something appropriate for students' (K14) and computers enabled all children to access them, regardless of their ability, as they were able to work at their own rate and at a pace that suited their capability. The very visual approach used when students accessed information via the Web and the readily-available pictures and even video clips at various educational sites catered well for the more visual learners. The teachers considered that the computers were very appealing to all students, particularly as many did not have access at home. The bright colours, graphics and immediate access to information (when the links were working) were seen as highly motivating, engaging and tempting to all students, particularly those who



tended to be alienated from school. For those who were oral learners, the teachers encouraged them to record their work onto the computer, whereas others used word processing software.

Another sub-category was the use of augmentative devices for children with physical disabilities. Technologies were being used in a range of ways with children from as young as pre-primary. For some students, devices included tracking balls, various switches and big-keys keyboards. These were deemed particularly useful for students with fine motor control problems and were provided by DET on request, usually following consultation with a visiting teacher from the Centre for Inclusive Schooling. Headphones were also used for a student who had a hearing impairment. In rural and remote communities, there is a very high incidence of children who have had otitis media. In the general population it is estimated that approximately 25 per cent of children under the age of 10 years will have at least one episode, whereas for Indigenous children this can be as high as 98 per cent ([www.sign.ac.uk](http://www.sign.ac.uk)). The lack of health support leaves many of these children with hearing deficits that require augmentative hearing devices to enable them to access the curriculum. Obtaining lapel microphones for general class teaching was considered a real problem in schools in which there was a high incidence of hearing problems, as was that of installing appropriate sound systems in all rooms. One school reported that it had been waiting for a sound system for an extended period of time and that this was still on 'back order' from Germany. Another school utilised a concept keyboard (a device that plugs into the COMM port of a PC

using overlays that can be linked to a pre-recorded sound and/or picture) to enable easier access to the computer for another student. Many used programs that provided oral feedback, which was especially useful for those who were unable to read. Another teacher was able to produce text that was supported by COMPICS, an Australian-designed library of pictographs that provide visual representations of words or concepts, enabling students who could read to work alongside those who were able to understand COMPICS instead.

A third sub-category recorded the use of ICT hardware by Indigenous children. In addition to computers, other technologies for engaging students with diverse needs were frequently cited. Many teachers reported that they had mostly Indigenous students who found it difficult to distinguish between standard English (that was expected in schools) and 'camp English' that they learnt in their communities. By taping conversations, they were able to let students review their oral language and to role-play the use of more standard forms. In a reciprocal arrangement, taping students talking in their own dialects was also seen as a way of enabling teachers to learn their students' language. Similarly, taped books were being used for high school students who were reading at Levels 1 and 2, using headphone sets for up to four students simultaneously. Students of all ability levels undertook photography and developed and printed their own photos. They also produced their own videos, undertaking the filming and editing of the material. In one school, students had completed an induction video for the staff and they also took on the onerous task of the final editing and production of the video produced for

this project (Forlin & Lock, 2004, videorecording). In another school, the education assistant, who was also a local musician, had formed a band and the students wrote, played, recorded, edited and cut their own music CDs, using a range of input devices and management software. In these instances technology was being ‘...used as a tool, not a subject’ (K17). For students in these communities, career opportunities were very limited. A large proportion of students in every school was considered at risk of not being able to find local employment. Some students were being given on-site opportunities for work experience in a school office, which was seen as helping them better prepare for their future. As one teacher put it, ‘... the world is technology and it gives them a better understanding of how technology works at a higher level’ (K.19). For other students, the ability to produce their own videos and music CDs provided a potential work opportunity or enhanced job prospects. Such opportunities, while motivating students during school, unfortunately did little to alter the high truancy rates, as these were caused by cultural influences outside the control of the staff.

A fourth sub-category related to the use of ICT by the teachers for their own personal access. Almost every teacher had a laptop leased from DET. Teachers used their personal computers for a variety of activities. Some used them to publish students’ work and to prepare digital records. These were printed off and sent home for parents to view and also formed part of the students’ portfolios. As the material was available electronically, it overcame the problems on many occasions when work was not returned or became lost once it was sent home. In one

school, teachers were also using their computers on their desks to access an intra-school communication system enabling them to engage with their colleagues during the school day. Teachers reported that having their own laptops enabled them to prepare or modify work at home more readily in preparation for students who were achieving at different outcome levels.

## **DISCUSSION**

### **Issues impacting on the use of ICT in remote school communities**

The four schools had all established their own unique school communities, cultures and ethos that reflected the individual strengths of the staff and the students who attended them and the communities within which they were located. Programs utilising ICT were initiated mainly according to the particular strengths of individual staff, but sometimes these were difficult to maintain when staff left. For example, in one school, 30 Apple® laptop computers were in a storage cupboard and not being used. They had been purchased the previous year when the school had a teacher familiar with the Apple platform. Since the teacher had left the school, other staff did not feel competent in using this platform so the computers were not being utilised. Another school had expensive video editing software, but no staff member able to use it.

The transient nature of the staff and the students was apparent in every school community, with much of the casual talk during the visits reflecting on who had left and who had joined the schools. The turnover of staff at the end of each school year in rural

communities was generally high, in some instances being up to 90 per cent, but there was no evidence that staff were not fully engaging in the schools while they were there. Indeed, many staff had lived and worked in the Kimberley region for at least five years, with some staff staying up to 25 years. All of the education assistants were employed locally.

In some schools, a proportion of students enrolled only during the wet season as their families moved to places less likely to be isolated by flooding. At other times, students went with their families to visit relatives for extended periods of time. There were also extremely high levels of truancy among some students. While each school had a core group of students who attended regularly, there was a similar group that came only occasionally and who could be absent for weeks or months at a time. For example, following pension day, after a special occasion or during mourning for the death of a relative, many Indigenous students did not attend. Education assistants were often absent for the same reasons.

Power outages were a major concern. Sudden surges or intermittent supplies often led to hardware damage that required shipment to Perth for repairs. In one school, major works were being undertaken to install new fibre-optic cabling to enable a more reliable and consistent use of computers in all classrooms. Another school kept a spare generator and other parts on hand to enable access by students while bits were sent away for mending. As all classrooms were air-conditioned, system failures also frequently required doubling up of rooms by students and teachers, thus making working conditions more cramped and access to computers limited.

Although this had an immediate impact on access to facilities, such challenges were accepted in good humour by staff and students, and there was a strong camaraderie that presented staff as very cohesive teams.

The selection of appropriate software to meet the different needs of students was also raised as a concern. Being isolated from mainstream shops where software is easily available to view and select meant that while teachers were often aware of the needs of some children for material that was, for example, high impact level and low reading level, they were not aware of the choices of suitable software to support these students. They proposed that they needed better opportunities to explore alternative software and adaptive hardware and in particular, to identify age- appropriate materials and visual software suitable for the large numbers of children with hearing problems due to otitis media.

## **CONCLUSION**

*'Give it a go – its fun. You learn and the kids learn' (K.22).*

It is clear that the Commonwealth has given a high priority to the enhancement of the use of ICT in education across Australia. Similarly, in WA, this direction has been supported by the enactment of policies and practices that will further these aims. DET in WA has allocated extensive funds to provide appropriate hardware for schools and has commenced the upskilling of teachers by initiatives such as the 100 Schools Project. With this emphasis, the government has indicated a commitment to both increasing the use of learning technologies in schools and to providing

for the needs of all students. In the four rural or remote schools that were the focus of this investigation, there was visible evidence of the increased provision of hardware in the schools and improvements in access and speed for Internet connections. A range of ICT was being used to support the engagement of students by catering for their individual needs. Classes appeared to reflect a very inclusive philosophy, with teachers employing ICT among other options to enable their diverse student clientele to access the curriculum. It is also clear that pre-service and in-service teachers must be encouraged and supported continuously in their use of technologies if they are to enable their students to be kept up to date in a rapidly-changing and increasingly technological world.

Augmentative devices were employed to support students with specific disabilities and teachers were modifying or differentiating their teaching to improve student access to the curriculum. For students who have limited communication, augmentative communication devices (such as speech synthesisers and continuous and discrete voice recognition software) have been found to enable them to interact with their teachers and their peers. Their use as cognitive prostheses (Lewis, 1998) is important, although access to such programs and their ability to be differentiated by accommodation are, according to Stewart (2002), at the heart of the appropriate utilisation of electronic assistive technology. The teachers in these schools were very concerned that they lacked knowledge about the availability of suitable augmentative devices and selection of appropriate software. And where such devices are available, their full use is limited by the

opportunities available in remote areas to investigate, view and select them.

The use of ICT has been seen as highly beneficial for students, particularly, as suggested by Harris, for children with disabilities:

*The laptops were credited with improving the engagement of students with disabilities with their school work; increasing their motivation and ability to work independently; and improving their class participation, interaction with other students, interaction with teachers, and class preparation.* (Harris, 2004)

This engagement with the curriculum was, similarly, alluded to by the teachers in the schools visited, although it tended to be highlighted in relation to specific children or classes rather than across all Year levels and student groups.

Many educational computer programs have increased in complexity and fallen in cost in the past few years. It is critical, though, that technology not only responds to learner needs, but is also responsive to cultural inclusivity and community-based learning and incorporates culturally-contextualised learning activities (McLoughlin & Oliver, 2000). This was clear in these communities, where cultural issues impact enormously on school access. The highly-transient nature of the staff also affected the smooth continuation of newly-introduced programs and the understanding or sensitivity of new staff in selecting materials that considered the cultural needs of local school communities. The use of a range of musical technologies related to the computer was a good example of how schools were tapping into a motivating learning experience that was culturally sensitive to enable students to enhance their ICT skills.

While it is evident that considerable financial support is in place to provide the hardware for schools to enhance their use of ICT, the actual implementation still relies heavily on the individual expertise and dedication of staff. The proposed use of ICT appears to be firmly entrenched within the direction of DET in WA, although the use of ICT in schools is still finding its place. What is now required is the continuation of this initiative to ensure that staff are able to utilise the extensive hardware to its maximum to further the consistent engagement of all students regardless of their individual needs. While this is to some degree constrained by external cultural influences and by the transient nature of staff, the opportunity exists to embed the use of ICT firmly into curriculum and pedagogy. While the government has provided wide support to establish the necessary infrastructure, the outcome will depend in large part on the continued support of staff to ensure consistency of use and, in these isolated schools, the maintenance of constant and stable access to programs. Consideration needs to be given to the more efficient use of these expensive resources, supplementing them with appropriate software and dealing with ongoing maintenance issues in a more efficient way.

## REFERENCES

Commonwealth Department of Education, Training and Youth Affairs (2000a). *Technology for learning: Students with disabilities*. South Australia: Ministerial Advisory Committee, Students with Disabilities.

Commonwealth Department of Education, Training and Youth Affairs (2000b). Education and training action plan for the information economy. At <http://www.dest.gov.au/edu.edactplan.htm>.

Crowther, D., Dyson, A. & Millward, A. (1998). *Costs and outcomes for pupils with moderate learning difficulties in special and mainstream schools*. Department for Education and Employment Research Rep. No. 89. Newcastle upon Tyne: Special Needs Research Centre.

Department of Education and Training (2003a). *Project ID 278. Professional learning approach: 100 Schools Project*. Perth: The Department.

Department of Education and Training. (2003b). *Plan for government schools 2004-2007*. Retrieved 8 August 2004 from [www.eddept.wa.edu.au/stratplan/pages/engaged.htm](http://www.eddept.wa.edu.au/stratplan/pages/engaged.htm).

Department of the Premier and Cabinet (n.d.). *Policies*. Retrieved 8 August 2004 from <http://www.premier.wa.gov.au/policies>.

Department of the Premier and Cabinet (n.d.). *Accountability*. Retrieved 8 August 2004, from <http://www.premier.wa.gov.au/Accountability>.

Education Department of Western Australia. (1998). *Making the difference: Students at educational risk*. Perth: The Department.

Education Network Australia (2000). *Learning in an online world: school education plan for the information economy*. Adelaide: Finsbury Press.

Forlin, C. (2004). Promoting inclusivity in Western Australian schools. *International journal of inclusive education*, 8, 183-200.

Forlin, C. (2001). The role of the support teacher in Australia. *The European journal of special needs education*, 16, 121-131.

Forlin, C. & Lock, G. (2004). *Embracing diversity: Using technologies in remote school communities* [videorecording]. Perth: Edith Cowan University.

Forlin, C. & Milton, M. (2003). *Supporting primary students with learning difficulties: a collaborative problem solving team approach*. Perth: Centre for Applied Language & Research, ECU, Online e-Journal.

- Forlin, C., Thygeson, R. & Keller, (2003). Educational applications for interactive desktop videoconferencing. *The journal of international special needs education*, 6, 37-42.
- Harris, W.J. and Smith, L. (2004). *Laptop use by seventh grade students with disabilities: perceptions of special education teachers*. Maine Learning Technology Initiative Research Report #2. Orono, ME: University of Maine.
- Lock, G. & Forlin, C. (2004). Teacher beliefs about the use of information communication technologies in remote school communities. in Smith, L. & Riley, D. (eds). *Checking the pulse: Selected papers from the 2004 National Educators Conference Perth: A yearbook compiled by UNE*. Armidale, NSW: University of New England, 131-146.
- Louden, W., Chan, L. K., Elkins, J., Greaves, D., House, H., Milton, M. et al. (2000). *Mapping the territory - primary students with learning difficulties: literacy and numeracy*. Canberra: Department of Education, Training and Youth Affairs.
- McLoughlin, C. & Oliver, R. (2000). Designing learning environments for cultural inclusivity: A case study of indigenous online learning at tertiary level. *Australian journal of educational technology*, 16, 58-72.
- Milton, M. & Forlin, C. (2003). Supporting students with learning difficulties in a secondary school. *Special education perspectives*, 12, 31-43.
- Ministerial Council on Education, Employment, Training and Youth Affairs (1999). *The Adelaide declaration on national goals for schooling in the twenty-first century*. At <http://www.mceetya.edu.au/mceetya/nationalgoals/index.htm>.
- National Office for the Information Economy (1998). *A strategic framework for the information economy*. Retrieved 22 March 2005 from [www.noie.gov.au/projects/information percentFeconomy/strategic percent5Fframework/dec98\\_strategy.htm](http://www.noie.gov.au/projects/information%20cent%20economy/strategic%20framework/dec98_strategy.htm). See also [http://www.dcita.gov.au/\\_data/assets/pdf\\_file/20457/New\\_SFIE\\_July\\_2004\\_final.pdf](http://www.dcita.gov.au/_data/assets/pdf_file/20457/New_SFIE_July_2004_final.pdf).
- Rivalland, J., Rohl, M. & Smith, P. (2001). *Supporting students with learning difficulties in a School of the Air*. Perth: Edith Cowan University.
- Rohl, M., House, H., Loudon, W., Milton, M. & Rivalland, J. (2001). *Successful programs and strategies for children with learning difficulties*. Canberra: Department of Education, Training and Youth Affairs.
- Stewart, W. (2002). Electronic assistive technology for the gifted and learning disabled student. *Australian journal of learning disabilities*, 7, 4-12.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications .
- Thygesen, R., Forlin, C., Keller, C. E. & Bachmann, K. (2000). Internationalizing special education through interactive desktop videoconferencing. *The journal of international special needs education*, 3, 34-38.