Strategies for Enabling Teachers to Utilise ICT for Addressing Educational Disadvantage Resulting from Prolonged School Absence

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Abstract
In this paper we report on collaboration between researchers and teachers from a university school of education and the education department at a children’s hospital to assist students who miss extended periods of schooling as a result of serious illness through novel applications of information and communication technologies (ICT).

A considerable number of Australian students are absent from school for extended periods of time as a result of hospitalisation, convalescence, rehabilitation or chronic illness. Predictably this disrupts students’ academic work as well as presenting them with an array of complex social challenges. A team comprising staff from the Melbourne Graduate School of Education (MGSE) and the Education Institute of the Royal Children’s Hospital in Melbourne (RCH-EI) have been investigating ways in which ICT can be used to connect such students with school and their studies.

We know from previous research that technology makes it possible to take learning beyond classrooms and timetabled periods, and Passey (2000) noted that establishing ICT links between home and school enabled autonomy and individualised learning for students and encouraged parental involvement in the student’s education. The establishment of such links are considered to have special value for pupils who are unable to attend school on a regular basis (Dfes/Becta 2001). ICT can enable absent students to communicate with their peers and teachers (Detheridge 1997, Waddell 2000), improve independent access to people and learning materials (Moore and Taylor 2000), and increase the learners’ technological confidence, which can motivate them to use online technology for both educational and leisure purposes (Waddell 2000).

Pre-service teacher education students from the Melbourne Graduate School of Education began working online with school students having a chronic illness in the Back on Track program in 2006. Back on Track was a pilot study that involved using ICT to link chronically ill students with teachers. The first group of participating teacher education students were preparing to become secondary teachers of Information Technology and one other subject, and provided online support in this second subject area. In July 2007 researchers from the MGSE and the RCH-EI commenced a three year research project funded by a grant from the Australian Research Council, extending the work done in previous years. This paper reviews the concepts behind these projects, with an emphasis on their implications for teacher education.

Key Word Teacher Education and Professional Development of Teachers
Strategies for Enabling Teachers to Utilise ICT to Address Educational Disadvantage Resulting from Prolonged School Absence

Introduction

Many Australian students are absent from school for long periods as a result of hospitalisation, convalescence, rehabilitation or chronic illness. This inevitably disrupts their academic work as well as presenting an array of complex social challenges for these students. The project described in this paper is investigating ways in which information and communication technologies (ICT) can be used to connect such students with school and their studies and thus facilitate optimal academic and social development for this group of young people.

Researchers are working with approximately 30 school students from years 4 to 12 who have a chronic illness and are referred from a major children’s hospital, teachers from each student’s school, and hospital educators to develop, implement and evaluate communications strategies, support structures and continuing professional development programs for effective elearning. We are investigating the use of a range of ICT including notebook computers, video conferencing, chat and online learning to maintain academic engagement with school for a group of secondary school students who are unable to attend school for prolonged periods. The major questions to be addressed are:

1. How do the students themselves experience participation?
2. What demands are made of each of the key participants in this new educational environment — student, teacher, tutor, hospital staff, parents?
3. What support and infrastructure are required from (a) the hospital, and (b) the school, to facilitate effective student participation in online learning for continuing study?
4. What support, including professional development, is required for teachers whose students are participating in such a program?
5. Could similar approaches be applied to assist other non-attending (marginalised, rural, remote) student groups?

A novel use of existing information and communications technologies, building on current practice and extending understanding of roles for technology use in mitigation of distance and isolation will be investigated. The cohort for the study will be students associated with the Royal Children’s Hospital in Melbourne (RCH), but findings from the project may have applicability to other groups within Australian society such as students in rural and remote communities, and those distant or disconnected from school for a range of other reasons. In this paper we focus on a range of issues associated with the professional development relating to information and communications technology (ICT) for the teachers, both practicing and pre-service, who are participants in this project.

Background

Previous research shows that technology makes it possible to take learning beyond classrooms and timetabled periods, and Passey (2000) notes that establishing ICT links between home and school enables autonomy and individualised learning for students and encourages the involvement of parents. Such links are considered to have special value for pupils who are unable to attend school on a regular basis (Dfes/Becta 2001). Studies suggest that disengaged and de-motivated students can be re-engaged through online learning (Duckworth 2001,
Harris and Kington (2002), and that students who are disaffected with schooling can show increased self-esteem, confidence and motivation when ICT is used (Passey 2000). ICT can enable communication with peers and teachers (Detheridge 1997, Waddell 2000), improve independent access to people and learning materials (Moore and Taylor 2000), and increase learners’ technological confidence, motivating them to use online technology for both educational and leisure purposes (Waddell 2000).

Two programs piloted in recent years by the Melbourne Royal Children’s Hospital Education Institute (RCH-EI) have provided functional prototypes for our current project. In April 2004 the WellCONNECTED-Studying VCE from home project was launched at the Royal Children’s Hospital. Twenty students in their final years of secondary schooling participated; all were absent because of prolonged illness. Funded by the Victorian Government and supported by Telstra, the project used ICT to enhance communications links between the students and their teachers and peers at school. The project focused on the structural and organisational changes necessary to support these students effectively within the school system. Nineteen schools were involved, nine of which were in rural or regional Victoria.

In 2005 the RCH-EI launched the Back on Track program funded by the Bone Marrow Donor Institute. The Back on Track program is designed to assist students who are diagnosed with cancer and are in either the final years of secondary schooling or the transition from primary to secondary school. Students who meet these criteria and are experiencing prolonged absence from school can be referred to the RCH-EI to become participants in the Back on Track program. A draft report prepared for the Bone Marrow Donor Institute and the RCH-EI (Campbell & St Leger 2006, p.6) noted that because it relies on new and emerging technologies for learning exchange and communication, the Program requires a shift in thinking and working for many teachers and clinical staff. Such cultural shifts may be considerable in some settings and changes of this nature take time.

A combination of factors, including increased medical knowledge and improved information and communication technologies, have resulted in a dramatic reduction over the past decade in the amount of time children and young people with chronic conditions spend in hospital (Lam et al., 2003). Data from a 2005 RCH-EI database indicates that 1,248 students required educational support, with almost 72% (897) requiring less than three weeks in hospital (Author 2006; Author et al., 2005).

While advances in medical treatment have reduced the time students with a chronic health condition are hospitalised and require for recuperation at home, these students do incur extensive periods of absence from school, often resulting in cycles of falling behind in their studies. It is possible that students can become preoccupied with trying to keep up with the workload (Kleibenstein & Broome 2000; Mukherjee, Lightfoot et al. 2000; Lightfoot, Mukherjee et al. 2001; Shiu 2001). It has also been reported that many students feel stressed or depressed and find it difficult to attend school after a period of prolonged absence. Feeling unable, or refusing, to attend school following recuperation is a significant concern for students with a chronic health condition (Shiu 2001).

There are no widely available teacher professional development guidelines for teaching in online learning environments. Research suggests that the use of ICT for professional development of teachers is most effective when it is tailored to teachers’ specific needs (OFSTED 2002). Online professional development for teachers is one approach that will be considered. In the United Kingdom online teacher professional development is being trialled (Dfes 2004), but evaluation of this work is yet to be published. The present study is exploring
and identifying necessary skills and investigating ways in which teachers might best be supported in acquiring them.

The project

ICT will be used to establish several different modes of formal and informal electronic contact with a focus on education and preparing absent students to return to mainstream schooling and maintaining connection with the learners’ school community. The project is generating information about necessary infrastructure, appropriate communication strategies, effective teaching approaches, and the key issues for teacher professional development in relation to this type of program. Based on these findings, guidelines will be prepared to enable utilisation of ICT for school engagement in other hospital-based settings and in contexts where students are unable to attend school for other reasons.

A range of possible teaching and learning approaches is being investigated, depending on the school level and needs of the students. These will include:

- the student works from the usual textbooks but is in regular email contact with the teacher in the school and possibly an assigned tutor;
- the student works on special material supplied online or by email by the teacher, who provides feedback and interacts with the student as a member of the class;
- the student works on material supplied by the hospital education team but retains some form of technologically mediated interaction with teachers and peers;
- the student works in a virtual learning environment constructed for hospitalised students and stressing the maintenance of basic skills until such time as the student can rejoin the class.

An innovative aspect of this proposal is the use of a VLE or virtual learning environment as a tool for communication, for managing learning materials, and for collecting data. This model is built on the McDougall and Squires (1997) Perspectives Interactions Paradigm, extended for use in this project to incorporate online learning. The broken arrows between the VLE and buddies, family and teacher researcher show interactions that do not constitute data for this project.

This framework, originally developed for studying ICT use and related teacher professional development for classroom settings, is extended in the present study to apply in online learning contexts. The paradigm identifies five foci related to continuing teacher professional learning: skills with particular applications, integration into existing curricula, IT-related changes in curricula, changes in teacher role, and underpinning theories of education (McDougall & Squires 1997: 120). A distinctive feature of the paradigm is its acknowledgement of the situated nature of learning. The extended framework is being used to identify the needs of the participating teachers, and develop, evaluate and modify authentic school based professional development activities.

Full lines indicate sources of data to be collected in project. Interactions shown by broken lines will not be collected.
Previous studies into re-engagement of adolescents disconnected from learning have shown the importance of empowering the participants in the research; this can be assisted through the language used to describe the groups of participants (Duckworth 2001). Following the example set in Duckworth’s Notschool.net project, student participants in the current project are involved as researchers. There are several different types of participants in the project. A first categorisation is into “researchers” and “non-researchers”. In line with Duckworth’s (2001) suggestions the participating students and their teachers, as well as RCH-EI and Melbourne University staff, are classed as researchers. Peers of the students and online tutors are non-researchers. A fuller explanation is provided in the following table:

Table 1. Project Participants

<table>
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<tr>
<th>Researcher Participants</th>
<th>Non-Researcher Participants</th>
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<tr>
<td><strong>Student researchers</strong> – up to 30 young people associated with the RCH who have been absent from school for a sustained period. Student researchers use laptop computers and a virtual learning environment (VLE) including video conferencing to engage in learning activities in conjunction with their teachers and tutors, and also for social and personal communication with school peers.</td>
<td>Tutors - pre-service teacher education students from the Education Faculty at The University of Melbourne. Tutors provide online subject-specific assistance to senior secondary student researchers in instances where relevant teachers are unable to participate, and support students at all levels through the vacation times when teachers may not be available for the student researchers. Contact between student researchers and tutors is wholly online. It is envisaged that student researchers see tutors as both complementary and alternative to their teachers. Tutors can provide academic assistance, clarifying and correcting work done and, if needed, setting further work. Tutors liaise with the university researchers and with teachers as appropriate, and make regular electronic reports.</td>
</tr>
<tr>
<td><strong>Teacher researchers</strong> - teachers from the schools of the student researchers, who volunteer to be part of the project by using technology to provide communication, learning materials and feedback for the student researchers.</td>
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<tr>
<td><strong>Partner researchers</strong> - staff from the RCH Education Institute.</td>
<td>Buddies - school peers or family members of the student researchers who use the technology for social and personal interaction with them.</td>
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<tr>
<td><strong>University researchers</strong> – 2 Chief Investigators, a Research Assistant, and a PhD candidate.</td>
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Requirements for teacher professional development are being investigated with the students’ teachers, using visits, telephone or electronic communication, and a program of activities appropriate to each teacher’s situation is established. The teacher professional development and student learning activities are monitored by the University researchers through interviews and electronic communication; these are modified as needed so that effective and suitable strategies are developed. Where needed, tutors supplement the work of the teachers, communicating electronically with their students and maintaining records of their work.

The VLE used in this project can record and store messages sent and received by all users who are part of the project. It enables both synchronous and asynchronous communication and provides a significant amount of qualitative data; details of interactions among the
participants provide the more substantial, richer data for analysis. In particular information is provided on:

- interactions between student researchers and teacher researchers or tutors. Data collected on these interactions include the number, initiator, length, date and time (to look at frequency and synchronicity), and content;

- requests from teachers for technical or other types of support from the hospital, and the timing and nature of responses;

- communications between teachers and hospital or university researchers.

University and partner researchers maintain reflective research diaries, recording conversations, and comments on actions and activities. Teacher researchers maintain diaries to record the normal types of information recorded by teachers about their students. Tutor diaries are mainly logs of communication between tutors and students.

Prior to commencement of the online component of the project, each participating student researcher is interviewed about perceptions of the effect hospitalisation has had on his or her schooling, confidence in technical proficiency, and attitudes to learning. Teacher researchers are interviewed about their technical proficiency, teaching style preferences, and perceived needs for professional development about online teaching and learning. Individual face-to-face interviews are used to collect data on issues such as which aspects of the project worked well and otherwise for both students and teachers.

Up to 10 student researchers and their teachers are being selected for more longitudinal case studies. The case study subjects will include high and low users of the VLE, and students who complete convalescence and return to their schools; as far as possible the case studies will be representative of the age, gender and ethnic backgrounds of the student researcher cohort. The effect on the online teaching offered by teachers as students go through cycles of treatment and recuperation will be examined.

Students who have contact with the RCH-EI come from all parts of Victoria and Tasmania, southern NSW and eastern South Australia, with smaller numbers coming from the other states as well. Time and cost prohibit ongoing visits between the RCH Education Institute and the students’ teachers. As a student researcher’s work progresses, one of the University researchers will travel to the school, and if appropriate the home, of the student researcher, to collect data through “face to face” interviews with the student and his or her teacher(s). Issues raised and the strategies arrived at in each student researcher’s case will be recorded and will provide data for development of guidelines for exemplary practice.

**Educating teachers within the project**

A conceptual model of communication in the research project is shown in Figure 2. Not all data that is recorded automatically on the RCH-EI server will be used by the research team. In particular, student communications with either their family or peers will be excluded. It should be noted that all the electronic communication aspects of *Back on Track* and other RCH-EI projects are moderated by education advisors in accordance with RCH
protocols. However as noted previously, in this research project it has been decided not to include any of the email, chat or video-conferencing data generated when students communicate with either their parents or school friends (buddies).

From a teacher education perspective, even this simplified model requires substantial amounts of initial and on-going professional development. On-going professional development for RCH-EI advisors and coordinators is part of their normal work practice and will not be discussed in any detail here. Reasonable levels of ICT competence and confidence are necessary before teachers are employed in these roles. In addition the RCH-EI has developed processes for ensuring all staff are involved in on-going refinement of their ICT knowledge and skills that relate to the hardware and software the use as part of their work. This is most noticeable when a new member of staff arrives or when some aspect of the ICT being used is upgraded or changed.

In Figure 2 the term “Teacher” refers to the classroom teacher or teachers who teach the student. In general, students at primary levels have one teacher they communicate with while secondary students have several. Consequently there are two quite different continuing professional development (CPD) issues. Because students can come from anywhere within a radius of approximately 400 kilometres from Melbourne, RCH-EI staff often have to travel long distances to make contact with schools, teachers and families. The communications model used for this project requires little more than Internet access, and this has reduced the need for advisors and technicians to make multiple visits to schools and student’s homes to install and maintain equipment.

While many of the technical problems that existed in the pilot studies have been overcome with the introduction of a new web-based communications model, there remain many problems related to the levels of knowledge and experience that teachers have about using ICT for teaching and learning. There is evidence that many teachers do not use ICT as an integral component of their everyday classroom practice. Several attempts have been made to conceptualise the connections and interaction between the subject knowledge of teachers, the approach to teaching they apply in the classroom, and the use of ICT. A model based on Schulman’s (1987) pedagogical content knowledge of teachers is presented in Figure 3. This conceptual configuration of technological pedagogical content knowledge (TPCK) from Mishra & Koehler (2006) is being used within the research project.

**Figure 3:** Technological pedagogical content knowledge (Mishra & Koehler, 2006).

Two aspects of the Mishra & Koehler (2006) model are of specific interest to researchers in the current project. Each of the factors content, pedagogy, technology, and their intersections, will be investigated in relation to the participating teachers. Teachers will be asked about their...
experiences, both previous and current, with teaching and learning with the assistance of ICT in general, and with online teaching in particular. Because teachers are very busy professionals, an enormous burden can be imposed when they are asked to find time to become proficient with new software in order to communicate with a single student who no longer attends normal classes. Students will also be asked about their experiences and perceptions of online communication, especially for learning.

The areas of intersection or overlap in Figure 3 are also of interest in this project. Teacher learning associated with some of these intersections is critical to both the education of the students and to the project. The intersection of pedagogy and content is the traditional convergence of content to be taught and pedagogical strategies for teaching it. This is the area that Schulman (1987) focused on. With the introduction of ICT into education teachers now have to consider the consequences to their teaching strategies, technological pedagogical knowledge. Another research project being undertaken by some of the authors is video-recording teachers in lessons where they do not use any form of ICT and also in lessons that have a high use of ICT, to explore the differences and commonalities in pedagogical strategies used in technology rich and poor environments.

The technological content knowledge intersection focuses on whether having and using ICT in the classroom has any effect on the content being taught. One example of such a change to both content and pedagogy appears to be occurring in school science where computer-based simulations are replacing the traditional hands-on science experiment (Ng and Gunstone, 2002). Recent research by Hennessy et al. (2007) into the use of ICT in secondary school science suggests there is less use of concrete experimentation and more use of simulations and similar software for virtual experiments. They differentiate between empirical experiments with physical objects and thought experiments through ICT, noting that technologies can be used as tools to support the processes of both empirical and thought experiments since scientific reasoning is the common underlying goal (Hennessy et al. 2007: 149).

The final area of intersection brings together all of the previous intersections, and asks teachers and researchers to consider the effects on teaching, learning and subject content in classroom environments that make use of the affordances of ICT.

This research is addressing some issues associated with teacher professional development for online teaching and learning. The study will develop guidelines for teacher professional development in contemporary online technologies and present these in a form that can be disseminated throughout school systems and to teacher education institutions. It is likely that at least some of the findings of the study will have application to other non-attending (e.g. marginalised, rural or remote) student groups.

**Ethical issues**

A range of ethical issues are raised by this study. The VLE software is used to encourage and store both learning-related and social communication. It is easy to make the case for learning-related communications constituting relevant data for the project. This is not so for communications between student researchers and their peers (buddies). Participants are asked to consent to communications between student researchers and university, hospital, and teacher researchers and tutors being available as project data. The participants’ consent form states explicitly that while communications between student researchers and buddies are logged by the software, message content will not be analysed or used as data. Because all student researchers are in the project as the consequence of a major illness or related condition, the option of withdrawing from the project either temporarily or permanently is continually available to all participants.
A necessary condition for participating as a hospital or teacher researcher or tutor is provision of consent for interactions and communications with each other and with student researchers to be recorded in digital or written format and used as project data. Student researchers are asked to consent to being audio-recorded during interviews.

Conclusion

Many Australian students are absent from school for long periods due to illness or accident, as is the case for those associated with the RCH in this project. The project’s guidelines will be published in website and booklet form suitable for use at RCH and in other hospital settings. The teacher professional development guidelines will be presented in a form suitable for dissemination throughout school systems and to teacher education institutions.

Inevitably it took some time to discuss these ethical issues and to obtain ethical approval for data collection for the project, from the University, the hospital, the Department of Education and, where appropriate, individual schools. At the time of writing data collection is underway, but it is still too early to document useful analyses; presentation at the conference will include some preliminary findings from the project.

In 2008 there are still relatively few teachers who have been trained in the intricacies and nuances of online teaching and learning. In this paper we have reported on instances where the online learning is in addition to all other teaching duties and commitments, and is for a single student who has a serious illness. We know that there are tens of thousands of these students in countries that have the necessary infrastructure and resources to provide support, and we encourage student welfare groups, educational systems, and especially schools and teachers that have a student with a chronic health condition to investigate ways of keeping these students involved in education.

References


Author et al. (2005)


