iPOD THEREFORE I CAN: ENHANCING THE LEARNING OF CHILDREN WITH INTELLECTUAL DISABILITIES THROUGH EMERGING TECHNOLOGIES

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Abstract

This paper explores the pedagogical and social potential of emerging technologies, in particular the iPod, in facilitating the learning of young Australians with severe intellectual and social disabilities. The study, which was carried out in a segregated educational setting in Victoria, Australia, sought to establish whether the intrinsic portable, multi-media capabilities of the iPod particularly lent themselves to a practical application for students with severe disabilities. It was concluded that such new technology has considerable power and potential as an emerging pedagogy with students with severe intellectual and physical disabilities.

Introduction

At a time when many schools are banning iPods as disruptive to educational processes, Barwon Valley School in Australia is viewing iPods as assisting students with severe intellectual and physical disabilities achieve their individual education and learning goals.

This paper reports on a study that aimed to determine the effect that such technology had in relation to students' control over their own learning. Teachers implemented a program within their classrooms, assessing the usefulness of iPods in achieving Individual Education Program (IEP) goals of various students in the areas of literacy, social development and behaviour modification (through social scripting).

The school recognised the potential of multi-media content flexibility and easy portability of the iPod as an assistive technology device for students with severe disabilities. A program was established to trial the effect that peer valued 'fun technology' has in relation to students control over their own learning and whether that leads to an increase in the effective use of technology.

iPods were placed in classrooms to be used with/by students, under the supervision of teachers, who placed age appropriate content on the devices, using music, photographs, Picture Card Symbols (PCS), videos, spoken word, and social scripts in video, textual and slide show formats. Students were observed and

progress, ability, interest and improved responses documented, as were teacher responses and reflections.

The study sought to establish whether the intrinsic portable, multi-media capabilities of the iPod particularly lent themselves to a practical application for students with severe disabilities. It was concluded that such new technology has considerable power and potential as an emerging pedagogy with students with severe intellectual and physical disabilities.

Aims

This study aimed to explore the pedagogical and social potential of emerging technologies, in particular the iPod, in facilitating the learning of young Australians with severe intellectual disability. The research focused on how the portable, multi-media capabilities of the iPod, which should be regarded as an emerging and adaptive technology can contribute to the educational and social development of the target group of students. We are currently in an era in which many schools regard iPods as disruptive to the process of education, and accordingly, are banning them. Yet at the same time, schools such as Barwon Valley School (a Special Developmental School) in Victoria, Australia, have seen the potential of iPods to enable students with severe intellectual (and in some cases, physical) disabilities, to achieve their individual education, learning and social goals. Very recently, the term *iPodagogy* has been coined in an attempt to capture and integrate the familiar *pedagogy* with the use of the somewhat unfamiliar *iPod*, to create new directions in both learning and teaching (Johnstone, 2006).

The research draws on findings from a recent pilot study, carried out at Barwon Valley School. During 2006, teachers from Barwon Valley School received professional development on how the multi-media potentialities, flexibility and easy portability of the iPods might be used as assistive technology in the education of students with severe intellectual disability. The pilot program aimed to determine the effect that such technology had in relation to students' control over their own learning, and whether this, and the accompanying 'peer approval,' led to an increase in the effective use of the technology. Teachers implemented a program within their classrooms aiming to assess the usefulness of iPods in achieving Individual Education Program (IEP) goals of various students in the areas of literacy, social development and behaviour modification (through social scripting), and introducing culturally diverse musical styles.

Background

Students with disabilities in Victoria usually have an Individual Education Plan (IEP) that is reviewed and redeveloped every six to twelve months. Learning goals across a variety of domains and Key Learning Areas are addressed in these plans, which may include literacy, numeracy, self-help and social skills, for example. Students in Special Developmental Schools, such as Barwon Valley School, usually have an IQ of below 50, and accordingly, learning outcomes sought are usually set at a low level, with small achievements regarded as successes. Teaching a student to wash their hands successfully, or to play safely with other children, might be IEP goals in the social and self-help areas. Learning to read simple words, such as the days of the week, might be a suitable literacy goal for some children, while for other children such a goal might be too ambitious.

Strategies to assist students to achieve the goals are usually specified in the IEP, with teachers seeking to draw on a diverse range of resources and technologies. Social stories and social scripting are such a technology that works especially well with children with autistic spectrum disorder. Social stories are comprised of scripts that address an area of learning need. They are often developed into 'books' that include photographs of the student in question performing the target behaviours, or may be comprised of simple drawings from computer programs such as Boardmaker that are designed for such a purpose. Social scripts and stories are sometimes (although not always) developed collaboratively with the student. Such social scripts serve to model the desired behaviour, and are read and viewed often. They are, however, usually static. In the case of this research, the social scripts, for example, were filmed, and placed on an iPod for the student to view as desired.

A detailed search of the literature shows that very little work has been done in this area. While there is a burgeoning field of literature on the use of pod and webcasting within tertiary education, and indeed, this has moved down through secondary education into primary schools, there is little written on the use of iPods outside webcasting, and an obvious lacuna exists in research and literature addressing in the use of iPods in special educational settings (for social scripting or, indeed, any other purpose). As far as can be ascertained from a thorough literature search, no researcher or educator appears to have written about any program (within educational settings for students with intellectual disabilities) that is even moderately similar to that described here.

Early references to the *ipodification of education* in the literature (Brabazon, 2006) suggest that the focus on the use of technology in teaching and learning may, in fact, be an outcome of "marketers and public relations consultants employed to

sell its value." This is an interesting perspective from which to consider the usefulness of iPods in education. The initial generations of iPods were designed to provide a convenient, compact and portable way to transport music (although they could be, but seldom were, also used to store the spoken word as well). Initial advertising targeted the youth market, but the first generations of iPods were audio-only devices. It is only in its recent incarnations (beginning with the fifth generation iPod that was released in 2005) that the iPod also had the capacity to be a video device. As the movie potential became a commercially viable proposition educators began to notice the educational potential of the iPod.

The educational uses, however, have been somewhat governed by the easy accessibility of ready-made content such as podcasts. Commonly, with the introduction of new technology, the most obvious capabilities are utilised first, allowing the creative imagination of educators to explore the less than obvious potentialities of the technology. Teachers, many of who may be regarded as "digital immigrants", struggle to provide content and programming for a generation that must be regarded as "digital natives" (Prensky, 2001). Not only do many teachers suffer from failure to see the potential of the technology, but also they fear that creative use of the emerging technology may also create additional workload. As Selwood (2004) contends however, ICT does not, of itself, create additional workload for educators past the short term. As they tackle the easier aspects, their knowledge base increases, and the more difficult, obscure and esoteric potentialities are explored. The creation of original content or programming need not necessarily contribute to unrealistic workloads, particularly when teachers and students work collaboratively to create content.

There has been very little focus on the educational use of iPods other than for podcasting and webcasting, even on the Apple Education website. Recently, however, Apple described a project in the United States in which students with special needs (the types were not specified) who have been integrated into regular schools, were using iPods to read and listen to test materials so that they could complete the same tests as their class mates. While this use of iPods can be seen to have some value, it does not include the students in constructing their learning. Students in the proposed research at Barwon Valley School were directly involved in the development and filming of the content for their iPods.

It must be stressed that the creative use of iPods in regular schools in Australia is not uncommon, although it has not yet been well documented in refereed literature. Rather, the print media are the main available source of information on projects in schools. For example, iIn Geelong, at Bellaire Primary School, students recorded their own news and sports reports, interviewing relatives for oral history projects, and editing and uploading the sound to the Internet (Cooper, September 9, 2006). The Victorian state government is currently sponsoring several school

trials, such as at Rosewall Primary School in Geelong (where the project has been supported by the Barwon Valley School staff), but, once again, these trials are with students in regular schools (Papadakis, September 17, 2006).

What must be stressed is that tools such as iPods are not neutral, objective devices. In this project, they are tools that will be used to transform the lives and learning of students with severe intellectual disabilities. As Callister and Burbules (n.d.) observe: "The use of a tool does more than accomplish some purpose; it creates new purposes, new needs, and new expectations. It allows for new possibilities and new ways of doing things, which in turn suggest new things to be done." This project sought to do just that.

Significance and Innovation

The students who were the target of this research are often not considered capable of being socially useful members of Australian society because they are not seen by the wider community as having the intellectual, social or work related skills to enable them to participate effectively in adult life. The possibilities of what may be learnt using the iPod, especially with the positive outcomes of the pilot study, suggest that it may be possible to change this trend so that these students can have a greater opportunity to more effectively participate in adult life. The development of IEPs that address socially useful life outcomes and specify strategies and technologies that make possible these outcomes is an area that warrants considerable research. The use of iPods in this manner could potentially be developed to teach vocational skills, for example, such as the work jobs of kitchen hands, or the processes of managing the recycling tasks in offices.

Pedagogical approaches to teaching students with severe intellectual disabilities commonly use simple technologies, but seldom those at the cutting edge such as iPods. Because such devices exist in a commercial and retail world, and are adapted to a use that was probably never envisaged by the designers or manufacturer, the notion that these can be adapted for use in educational settings places them into the adaptive or emerging technology category. Accordingly, this research project advances the knowledge base of how emerging technologies such as iPod may be used in novel and innovative ways in education, especially for students with severe intellectual disabilities.

As far as the researchers can discover, no comparable research appears to have been carried out, although in some contexts previously mentioned, iPods *have* been used with students with intellectual disability. However, these students appear to have been high functioning, and the content of the iPods has had a somewhat utilitarian and non-constructivist focus. Similarly, projects do exist where students are using similar content on iPods, but the target groups is not

students with intellectual disabilities, and these projects have been informed by the project at Barwon Valley School. Indeed, the project is so innovative that Apple flew an educational representative from Sydney to Geelong to observe the project, which they agreed, was unique in their understanding (Milne, 2006).

Methodological Perspective

This research, in the main, took a qualitative approach, although some simple quantitative measures were adopted in the evaluation of whether student IEP goals have been met. Qualitative methodology was selected because of its potential to construct and evaluate multiple constructions of social reality, including as perceived by young people with disabilities, while focusing on interactive processes and events (such as the way students use their iPods and the content they select). As such, qualitative research acknowledges that personal values, such as those of the researchers, the teachers and the students, are present and made explicit (Neuman, 2003, p. 17), thus ensuring a degree of transparency.

Epistemologically, this research finds its conceptual framework within constructivism. According to constructivists, meaning is not discovered, but rather is constructed: 'meanings are constructed by human beings as they engage with the world they are interpreting' (Crotty, 1998, p. 43). Similarly, a constructivist pedagogy allows learners the opportunity to "manage their own learning through metacognitive, self reflective and collaborative processes" (Osborn & Theodore, 2005). While such learner control is not expected of students with severe intellectual disability, our research suggests that in simple ways, the students' learning is constructivist. Students contributed to their own iPod content, as well as being able to make a choice, using the menu of the iPod, as to what curriculum content would be addressed, and how. Furthermore, the processes followed by the teachers at the school, in learning to work with their students in the iPod milieu, also take a constructivist approach.

This research was constructed and interpreted from a socially critical perspective. Simply put, the aim of critical research is to change the world (Neuman, 2003). The transformation of social relations, in this case between a group so easily disempowered and the rest of the world (through teachers, educational demands, social expectations and the like) is no small order. Yet if these young Australians are to be part of the future of this country, there has to be an acceptable starting point for social change. While it may not be a realistic expectation that this group of students can change the world for themselves, it is hoped that through their agency in the process of developing and using content for the iPod, small changes may occur that act as catalysts in the change process. The intention of the project was to expose the received belief that people with severe intellectual disabilities

have no power to change their lives and their 'reality', and to provide these students with some of the tools and expertise to assist their part in the transformation of their 'reality'. Participation, where possible, in the decision making processes relating to the use of their iPods, assists these students in taking control of their lives and transforming their 'reality'.

Action research (Kemmis & McTaggart, 1981; O'Hanlon, 2003) formed the methodological basis for this project. Teachers participating in this project followed three cycles of planning, acting, observing and reflecting. Professional development activities provided additional skills and confidence in the process to ensure that the cycles ran smoothly. After each cycle, the team met to evaluate the processes that were put in place, consider further developments, organise further professional development and, if need be, technical support, and plan for the next cycle of the research.

Methods

Each student in the project, and each participating teacher, had access to fifth generation iPods, that were capable of storing movie and PowerPoint files. The iPods were placed in classrooms to be used with and by students, under the supervision of teachers, who placed age appropriate content on the devices, using music, photographs, PCS (Picture Card Symbols), videos, spoken word and social scripts in video, textual and slide show formats.

Students who participated in the project had suitable materials developed to meet their IEP goals, and these were placed on an iPod. Where possible and appropriate, the students were collaborators in the development of content, but this varied according to degree of disability. Students were free to use the iPods at suitable times in the classroom timetable, as extrinsic reward, during lunchtimes (where care of the iPod is not an issue), and at home. The students were observed using the iPods, and progress, ability, interest and improved responses documented, as were teacher responses and reflections. Student outcomes on IEP goals were regularly monitored, and iPod content revised or developed accordingly.

A sample of 10 students was selected from the junior, middle and transition years at Barwon Valley School. Because of the small number of students who were suitable as participants, the sample was not selected randomly, but rather on the basis of a variety of eligibility criteria. This meant that the research represents a case study, and so it is not possible to make broad generalisations from the project. It is possible, however, to gain an understanding of relevant parameters for implementing a much broader research project in the long term. Students who were selected to participate in the research were required to have

- adequate fine motor skills to operate an iPod
- relevant IEP goals that could be operationalised using the iPod
- a classroom teacher who was willing/adaptable
- motivation to be part of the project
- a predictable pattern of behaviours that meant the equipment would be unlikely to be damaged
- parents who functioned at an adequately high level to give informed consent for inclusion in the research.

As part of the IEP process, students were pre-tested on their skills, and they were also post-tested at the end of the research period. The students were also observed and their use of the technology and their learning outcomes monitored throughout the research process.

Results and Discussion

Not surprisingly, the students wholeheartedly embraced the prospect of working with an iPod, and in fact, the behaviour of a number of students improved when they understood that this might influence whether they were chosen to be part of the program. One student, who was well known for his challenging behaviour, was rewarded for time on task with the opportunity to use an iPod in the playground at lunchtime. The chance to be seen as 'cool', wearing the iPod on an armband, and 'grooving' round the playground was enough incentive for this student to overcome his longstanding difficult behaviour.

It was intended that the use of an iPod as an educational strategy would be made specific in the Individual Education Plans, but in reality, this only occurred in 60% of cases and, as such, will be closely addressed in future projects arising from this one. What became clear is that teachers needed additional support in the process of integrating emerging technologies clearly into their educational programming. Most teachers who currently work in the special education system in Australia are not digital natives. While this is changing as younger teachers move into the system, for many of the teachers emerging technologies were not addressed in their teacher training, and often do not play a part in their personal lives. Yet this is an area currently being emphasised by the Victorian Department of Education and Early Childhood Development, in their move towards the expansion of e-learning across all Victorian schools, and it will be necessary for these teachers to become comfortable and proficient in the use of such technologies in the classroom.

Overall, while a larger number of students participated in the program, ten were targeted for close observation. Each of these students had an IQ that had been

measured as less than 50. In addition, the majority of the participating students were also located on the autistic spectrum, usually with poor communication skills and no functional reading skills. Curriculum areas targeted varied for each student, but specifically included: Leisure, Health and Physical Education; Reading; ICT; and Mathematics. Material that was placed on the iPods included: photos for personal self-esteem and social cognition; movies featuring the student as social scripts to demonstrate and reinforce appropriate behaviours; the use of pictorial symbols for coin recognition, days of the week, and daily activities (such as timetabling); and pictorial symbols, photos and videos to improve cognitive skills, such as classifying and categorising.

One boy, for example, had been struggling to learn the recommended and hygienic procedures for washing his hands. Teachers had struggled with this social skill with the student for several years. In this project, the student was photographed performing the process. This footage was then used with voice over describing the process, and pictorial symbols were also placed under the photographic stills. The photos were also placed in a book that the student could access as he listened to and viewed the footage on the iPod. The photos were also placed above the washbasin as a visual cue. With the use of the iPod as a teaching device, and the student depicted in his own social story, it was not long before he was washing his hands successfully. Moreover, he was clearly extremely pleased with the result himself, when it was captured on film. Additionally, although he was considered to be a non-reader, he was filmed scrolling through the menu on his iPod and selecting his favourite programs.

Generally, available data from this project was uneven in quality, due to the need for greater training of teachers in the use of the IEP process in relation to iPods (as discussed above). As 40% of IEPs did not include the iPod specifically as an educational strategy, 40% of the final IEP reports did not specify the educational outcome, and so it was difficult to ascertain the success of the program for these students, although anecdotal evidence and testing did suggest progress. For the other 60% of the group however, all educational goals addressed by iPod use were successfully met. This is a remarkable success rate for this population of students who traditionally make very slow progress in their learning.

Directions for the Future

Much has been learnt from this pilot project, and the special setting in which this pilot project took place is continuing to work with students with iPods in that setting. In the future, the school is looking to integrate the program with their use of electronic whiteboards across the school. They have decided however, that at

this stage, they do not wish to have the project further researched within the school.

At the same time, there is clear need to expand the project further, and embrace students with intellectual disabilities who have been included in regular neighbourhood schools, as well as those children who have been placed in the segregated system. In 2008, two primary schools in the same region as the special setting have agreed to be part of an expanded program, and students with intellectual disability have been selected from across all grades to participate in the project. One of the schools has a full complement of electronic whiteboards, and it is anticipated that this technology will be integrated with the use of the iPods across the school. This school hopes to expand the iPod program in 2009 so that all children at the school have access. The second school is less well equipped with emerging technology, but is also highly enthusiastic. This school has a large number of students on the autism spectrum and is eager to see how the iPods might be used with these students.

Learning from the experience in the segregated setting, teachers in the new program will complete a pre-research needs analysis to determine their readiness for the program. Based on the outcome of this needs analysis, professional development will be provided to support the teachers in developing IEP goals for students in relation to target areas. The teachers will be guided through three action research cycles, during which time they will receive technical and pedagogical support to develop appropriate content for their students' iPods.

Conclusions

The success of this pilot project suggests that through the implementation and development of new social and academic skills, participating students (and consequently, their families) will have greater potential to live healthy, fulfilling and productive lives. This project has also resulted in new knowledge relating to the way emergent technology (such as iPods) can be used to enhance educational objectives across the school system, and for all students, but particularly for those with intellectual disability. At a time when the Australian government is seeking ways to enhance educational quality nationally, innovative and unique uses of readily available technology can contribute much to the national agenda.

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References

Apple Education. (2006). iPod helps special-needs students make the grade. *Apple Education*. Retrieved October 12, 2006, from http://www.apple.com/education/profiles/louisamuscatine

Brabazon, T. (2006). *Socrates with earphones: The ipodification of education.* Centre for Critical and Cultural Studies, The University of Queensland. Retrieved June 20, 2006, from http://www.cccs.uq.edu.au/index.html?page=42950&ntemplate=365.

Callister, T., & Burbules, N. (n.d.). *Be careful what you ask for: Paradoxes about the 'digital divide'.* Retrieved June 7, 2006, from http://faculty.ed.uiuc.edu?burbules/papers/aesa3.ntml.

Cooper, M. (2006, September 9). Not all music to their ears. *Geelong Advertiser*.

Crotty, M. (1998). *The foundations of social research. Meaning and perspective in the research process.* Sydney: Allen and Unwin.

Johnstone, R. (2006). *The learning and teaching potential of a hand-held technology within a Scottish educational framework. "iPodagogy".* Edinburgh: The City of Edinburgh Council, Children and Families Department eTeam, and Gracemount High School.

Kelly, B., Phipps, L., & Swift, E. (2004) Developing a holistic approach for e-learning accessibility. *Canadian Journal of Learning and Technology*, *30*(3). Retrieved October 13, 2006, from http://www.cjit.ca/content/vol30.3/kelly.html.

Kemmis, S., & McTaggart, R. (Eds.). (1981). *The action research reader*. Geelong: Deakin University Press.

Milne, J. (2006). Personal communication.

Moore, G. (1998). *Crossing the chasm. Marketing and selling technology products to mainstream customers.* New York: Capstone.

Neuman, W. (2003). *Social research methods. Qualitative and quantitative approaches*. Boston: Allyn and Bacon.

O'Hanlon, C. (2003). *Educational inclusion as action research: An interpretive discourse.* Maidenhead: Open University Press.

Osborn, M., & Theodore, C. (2005). Constructivist online pedagogy: The trials and tribulations of novices. *Proceedings of 2005 Forum of the Australasian Association for Institutional Research.*

Papadakis, M. (2006, September 17). Bans lifted on teach tool. iPod gains school cred. *Sunday Herald Sun*.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, *9*(1).

Selwood, I. (2004). Can ICT play a role in reducing workloads, or does it actually add to the burden? *UK BECTA*. Retrieved September 26, 2006, from http://partners.becta.org.uk/index.php?section=rh&catcode=_re_rc_rc_co4_04&rid=11104