Australian Experiences with Education and Technology

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Abstract

The impact of technological advances over the last twenty years, including our use of Google, not only impinges on our teaching and learning abilities, but also on our individual lives. Have these technological advances been a panacea for our educational systems? The focus for this paper will be on some Australian research with references to four Australian State examples to provide evidence of the successes or difficulties imposed on schools, parents and communities as technology continues to be introduced into the educational systems. The discussion begins with a Western Australian overview and evaluation of twenty years of the use of technology in Australian schools. The paper continues with an analysis of the variations in results for a selected group of Tasmanian participants in an online course when compared to another group of Tasmanian participants in the same face-to-face campus study, the impact of which will impinge on the further use of technology to provide University education. The collaboration of a New South Wales based city Council and the State's Education Department in an educational research study, involving the use of IPads, highlights the need for communities to also engage with technological advances into our society. Finally, the research from Queensland which describes the possible deployment of a wider range of technologies such as blogs, vlogs and podcasts, provides suggestions and methods to invigorate and change specific English curriculum from "shaping" it, by prescribing what it will contain and how it will be assessed, to giving it a more "design" focus where the students will compose their own courses and assessment activities.

Keywords: Technology, Online -Study, IPads, Innovation

Introduction

This paper has the focus of highlighting some interesting research, conducted in four States of Australia, and about the interaction of education with various aspects of the technological advances which have overtaken our lives over the last twenty years. Have these technologies been the panacea we imagined them to be for stimulating our education systems or have they taken on roles of their own and in practice been counter- productive in education or within society itself? The four experiences will begin with a theoretical overview of the introduction of digital devices in Western Australia, and then a comparison between a Tasmanian on-campus study and an online study. Following this will be research on the use of iPads by Primary School children in New South Wales and the use of digital technologies to change the design of English courses in Queensland.

One researcher, (Newhouse 2013), investigated what had happened with computer technology in Western Australia1980 -2012. The Australian government policy of a 1 to 1 computer per student in secondary schools by 2012 became a tipping point for reflection about technology (Greaves and Hayes, 2008). This also became an opportunity to consider what had been learnt about computer access in schools. The conclusion was that the process had been more about implementing the computers into schools and how this would change teaching and learning, than actually about the role of the technology. The arrival of word processors and a computer literacy rational in the 1980s was aided by the increasing affordability of computers. However, this did not translate into better teaching and learning practices in the1990s. The ability to make the computer portable was the first positive sign that computers could take a central role in teaching and learning. The belief then became that the computer would "teach", even act as a "tutorial" device (Cox, 2012). Now that computers are smaller, cheaper and more powerful and have coupled with the technology of the mobile phone, it has also been an aim to have every teacher and student with access to both devices since 2012. The advantage of this mobile learning is that it can occur at any time of the day and in any place (Kearne et al.2012).This portability could be the centre of the rationale for future computer use. A further consideration is that the technology could be developed to address the many problems in education, but will the costs of any new technologies be justified by increased learning outcomes or better use of teacher and student time?

Research at the Launceston campus of the University of Tasmania (Pullen 2014), outlines the increasing use of communication and technology communication, in particular online learning management systems (LMS) to provide the teaching and delivery of course materials and to provide assessment. Distance education is one initiative used by universities to deliver courses to students with more diverse learning needs, including those who are unable to attend University, because of work, family, costs or physical distance. Since 2012, following the Australian Bradley Review Reforms (2008), the Universities can enrol as many students as they wish depending upon their eligibility and the University's ability to teach them. Consequently, the University of Tasmania is able to use the technology Desire2 Learn (D2L) for face-to-face, online or a mixture of both study modes for delivery methods. Previous research had discovered that whilst undergraduates were "digital natives", their use of available technologies was not as consistent as expected and not all these technologies were being used to their full potential (Kennedy, Churchward, Gray & Krause, 2008).There appears to be a great divide in the access to online courses and its related technology and equally the students' abilities to access and use the available technological functions and capabilities. Despite the views that online learning initiates

many changes in the design of the programs, it is actually the students who will decide *if* and *how* they will use the technologies.

The researcher, (Pullen, 2014), also reported on the Pew Research findings which indicate that learning from online courses is considered to be lower when compared with the on-campus courses (Parker, Lenhart & Moore, 2011). Technology does offer learning without consideration of time or place and fits perfectly with educational institutions encouraging students to place themselves at the centre of the learning process. To meet industry and personal changes then, the higher education sector must realign with academic teaching practices and student approaches to learning, (Biggs 2003, Ramsden 2003). To discover whether there are differences in final results between on-campus and on–line students, the Pullen study (2014) sought to identify the differences in educational attainment between pre-service teachers, studying compulsory undergraduate courses either fully online or on-campus.

The Sydney Region and the New South Wales Curriculum Learning and Innovation Centre formed a partnership to scope an evaluation of the use of iPads in the classroom. This was done to provide information to schools to allow informed purchasing decisions and to identify critical ramifications of tablet technologies on teaching and learning and appropriate opportunities for professional learning for teachers

In Queensland the Australian curriculum's emphasis on the use of technology is filtering through educational programs. Some teachers are wary of this deployment, many being 'digital immigrants' (new to technology) and not 'digital natives" (conversant with technology) as are our students. The author Jetnikoff (2009) suggests that by embracing new media forms such as podasts, blogs, vodcasts and responses, there will be a whole new world of possibilities for literary and creative texts which will have new audiences and publication spaces. The author also argues that teachers can overcome their technophobia and technology resistance in classrooms, opening up potential for "authentic audiences' through their students' publications online and possibilities for composition and responses. In her paper Jetnikoff explores digital storytelling using other digital multimodal texts such as blogs and wikis in the resources for English teaching.

Methods

Newhouse (2013) did not include practical experiences but instead offered some philosophical ideas to guide teacher and students and their experiences with technology. He argued that all technology use should be based on an "understanding of the nature of learning" (Newhouse 2013). He used a two vines metaphor from Pines and West (1986) "with the upward spontaneous growth of knowledge frameworks originating from the learner, entangling with the downward imposition of formal knowledge" from the technological device. Therefore computers can be visualised as providing support for the learner deciphering that entangling stage, noted as the "zone of proximal learning" thus computers should be viewed in terms of the overarching support they can provide. As each new technology emerges, teachers and researchers should investigate them in the classroom.

For this concept of computer support, Newhouse developed a model which starts with the learning environment and extends through the teacher with beliefs, attitudes and perceptions and continues to a response and a level of facilitation and then back via a loop to impact on the environment. The students should contribute as do external factors encouraging and discouraging the use of computer support. Then the balance of all these forces determines the response of the teacher which leads to the amount of use and the meaningfulness of that computer involvement.

Pullen (2014) from the Launceston campus of the University of Tasmania focused his research on the two important aspects of his investigation into on-line and on-campus learning.

RQ1 *Does it matter to student academic achievement (final module grade/award) if attendance is online or on –campus (face-to-face) and*

RQ2 *What are the differences in instruction satisfaction and learning in online and on-campus mediums*?

There were several components of this study with the participants being all the students in their third year of study in a teacher preparation course at the University of Tasmania 2013- (203 in total) The University of Tasmania used the commercial platform *Desire2Learn.*The module occurred in the first term with 39 hours of study. In the total group 86% were female and 14% were males. Those who studied the module online constituted 63% of the total students in the course with 83% being female and 17% male. The age range online was 18-57 with the average age being 29 while the age range on campus was 18-48, the average being 23.Students studied fully online or on-campus.

The compulsory module was about health and well-being of school–aged children and their families. The delivery included a one hour recorded lecture and a two- hour tutorial per week. The researcher had a background in Health Sciences and he was the principal teacher. The content and assessment practices were well developed and the researcher tutored 7out of 8 tutorial groups- 4 online groups and 3 on- campus groups. Reading lists were provided before tutorials and feedback given weekly upon completion of tutorial activities (Charts, Web-Quests, Posters, Lesson Plans and Conversations). A sense of community was fostered and two major assignments were marked by the researcher for consistency and comprehension.

In the Sydney experience (Goodwin 2012), tablet technologies or mobile touch screen technologies were recognised for providing a new generation of technological and educational tools for instant access to a wealth of online resources and the opportunities for creative use. They could enable learning everywhere and the classroom would no longer be the centre and the teacher would no longer be at the centre of all learning, 'as the web democratises the availability of information' (Snyder, 2008).Teachers do have an abundance of learning materials for use on iPads, but limited research has been done on the use of touch screen devices and their support for the learning process. This evaluation seeks to provide evidence-based information about the practical and technical implications of deploying mobile devices and their impact on teaching and learning.

To address this the Sydney Region conducted an iPad trial in 3 Primary Schools in the Sydney area. The trial included approximately 18 weeks' time in the selected schools. There were 3 schools, 5 teachers, over 90 students and 75 iPads used in this multi-setting case study. Multiple data sources were used to provide descriptive information re the technical and logistical us of iPads. A comprehensive data set provided- lesson observations, teacher-student online surveys, principal-parent semi-structured interviews, digital work samples, teacher and student blogs and an 'app matrix'.

Jetnikov (2009) provided no practical experiments, but was conscious of the fact that the students' use of social media in their home lives and with their friendship group should be utilized. Teachers should be using this student engagement to develop critical skills "to sift through the plethora of virtual worlds" (p. 56). Text only presentations (Power Point) are now outmoded and we now must emphasise the use of online technologies for teaching and learning. Students are becoming more socially semiotic (visual), so there are opportunities for creating and

composing more visual content in digital stories. Students are also using technology on the home front and this "domestication' should be embraced as it is most useful for English teachers who need to work in contexts which are relevant to the ways our student interact with the texts. It is obvious that technology is changing quickly and that this can be alienating to teachers, but they can be assisted through understanding about these new technologies which students are bringing into the classroom. Two theories dominate the perspectives around using technology and literacy. The discussion focuses on Technological Determinism versus Social Determinism. The former argues that technology can be held responsible for social changes whereas the latter states that users do have power and control over computers. In other words 'people, not technology (are) portrayed as responsible for the phenomenon of digital democracy' (Snyder, 2008, p. 162)

Findings

Newhouse (2013) realised that obstacles and barriers will moderate the amount of computer support which is largely dependent on the type of teacher response, including such aspects as toleration or investigation. One advantage has been that the former storage devices needed to be held in hardware or software, but now the strategy is to access data or software through networked servers, eradicating the need to move to computer laboratories, but instead to have flexible access, in the school or any workplace.

In the online versus on-campus study (Pullen, 2014), electronic portfolios from the participants of the course were assessed and the technology they used. The lecturers utilized Analytics' tools to gauge student use of the lectures, readings, tutorials and peer feedback. An eVALUate survey was an additional component which needed completion and the use of Social Media such as YouTube, Wikipedia and other sites were queried. There were no significant difference in the final achievement scores for the on-line students when all the Modules were collated, but there was a significant lower achievement effect shown on the final Health Module result for the online group and this was related to the lack of tutorial involvement on-line and the lack of a second reading of all the notes in the course. There were some complaints about the work load and the fact that board posts were not assessed. The Mean scores - attendance above 80% - were significantly different when compared to attendance below 80%; (M=4.20 versus M=2.60).The type of learning mode affected student's use of additional technologies when studying.

This research highlighted the need for university lecturers to engage with more of the social media technologies to deliver learning. Attendance at tutorials needs to be emphasised, as must real time VOIP with lecturers and peers communicating more with each other by Skype and text chats. The students' use of technology and the educational parameters of these will guide university teaching and learning in the future.

The Sydney trial with iPads (Goodwin, 2012) found two broad areas of teaching and learning implications, including parent concerns about technical and logistical considerations. This type of teaching placed additional demands on teachers' planning and preparation time. Significant time was taken in evaluating the educational apps and evaluating relevance to the NSW curriculum. Time taken to install apps (applications) on individual student services was also a problem. This technological method was used in a myriad of ways across the Key Learning Areas, but teachers tended to map the iPad use to existing curricula and preferred the content –creation 'productivity' apps. The content-creative apps produced higher order thinking and collaboration amongst students, while the games-based apps were suitable for rote

memorisation – spelling and tables. One professional piece of work by a Grade 3 student used the iPad and voice recorder, camera and screen recorder to create a body of work.

Both teachers and students believed that iPads enhanced teaching and learning. The trial was successful because teachers embedded activities in authentic and rich learning experiences and they explored more innovative pedagogy. It was found that iPads enhanced engagement and motivation, improved collaboration and personalised learning. Teachers could differentiate activities according to students' needs and preferences. Predictive text supported spelling as normally iPads are designed for single –consumer use and not for group or paired activities. Technical problems encountered included the availability of internet connectivity, proxy servers, restricted internet use and export of student work.

Schools must make careful decisions about sharing and deploying iPads across classrooms and support models must be considered prior to their implementation. Schools must budget for the additional costs –infrastructure and teacher professional learning and administrators need to also consider the storage and sharing of student content. Teachers need an 'app' selection rubric with explicit criteria to judge the effectiveness of individual apps. Explicit training is also needed for teachers for evaluating apps and copyright regulations. Online app databases are also needed showing information and relevance of apps for learning. Drill –and - practice games should be used sparingly and only to aid students' memorisation as open ended apps encourage higher order thinking. A wider variety of apps should also be considered –not just iTunes. Parents need evidence –based information about the safety and impact of learning with apps.

It appears that further trials need to be undertaken with even younger students and those in secondary schools. There is an underlying message for developers to introduce apps that are vastly different to the design of "skill and drill" which dominates much of the educational market. Touch devices provide unique opportunities to develop students' abstract concepts with dynamic representations and opportunities for embodied learning and interactive elements. Much remains with the applications' developers to match teacher-student and teacher-parent needs and to align with teaching and learning potential in the future.

Queensland's English Curriculum (Jetnikoff, 2009) could adopt the use of *design* and not *shape* curriculum and facilitate the students' selection of a range of tools and technologies, facilitating autonomous and purposeful use of technology to produce audio stories and podcasts with recorded interviews. There could be the creation of multimodal digital images with still images and narration and mini movies which uses both sides of the brain, cognitive and aesthetic. Time could be given to the crafting and sharing of digital stories, such as autobiographies. Students could be trained in the use of an online "cookbook' (manual) for narrative structure and technical guidance. Semiotic or visual decoding interprets images or symbols and will need to be more a part of student experiences.

Digital stories can be responses to literature rather than written versions and narratives can use images and soundtracks (cf Photo Story 3).You Tube has exemplary performances available about digital opportunities and Poetry writing can transform many students by using Slam Poetry which contains many of the rhythmical qualities of rap (cf Poetry Slams). Blogs can now include not only words, but pictures also and Vlogs which incorporate video and are a form of web broadcasts. Podcasts incorporate many types of media on the web. It appears that the traditional way of teaching English can be transformed with many combinations of the new media forms to create exciting and varied experiences for the students of the 21st century.

Conclusion

The research regarding provision of ubiquitous computing access and the use of portable digital devices over the last 20 years has been successful and gives credence to the widespread implementation of this scheme. Whether these devices are most useful for the empowering of our students using the constructivist (student created) method and a portable device is a question still to be addressed. Perhaps we should ask about how the vision for planning and the uses of the technology for learning are decided? The benefits of the many decades of spending on digital technology will be only be realized with a collective will to evolve the pedagogical understanding amongst all the educators and communities involved.

Over the last ten years Australia has had a realistic aim, encouraging students to have a portable technological device and this is particularly so in secondary schools where Newhouse has indicated much student satisfaction and he comments on the positive impact on learning, higher order thinking, collaboration , active learning , productivity, problem solving and authentic assessment. There has also been a wider range of activities, investigating the world, knowledge building and student independence and collaboration, all associated with a process – orientation, not a content one.

By contrast the effect on teachers has been more negative. The teachers' operational skills have been diminished, more likely because they feel inadequate and deskilled in computer-supported environments. However, teachers must realise that TPACK (Technological, Pedagogical and Content Knowledge) (Mishra & Koehler, 2006) must be addressed. The pedagogical strategies appropriate to transfer the curriculum content now includes the capability to plan and implement the computer support. It is a case of a constructivist-type (student created)) belief versus an instructivist-type (teacher created) belief. Many teachers still need to be given targeted curriculum and technical and professional support. Other barriers to computer use and support include schools where there are no computer policies, isolated teachers and short teaching time. The appointment of Curriculum Directors can alleviate these problems with teacher support and integrated computer support to assist learning.

Tablet technologies or mobile touch screen technologies are providing a new generation of technological and educational tools for instant access to a wealth of online resources and the opportunities for creative use. They enable learning everywhere and the classroom is no longer the centre and the teacher is no longer at the centre of all learning, 'as the web democratises the availability of information' (Snyder, 2008).Teachers do have an abundance of learning materials for use on iPads, but limited research has been done on the use of touch screen devices and their support for the learning process.

This research into a small, but varied set of Australian experiences with education and technology highlights one most important aspect that the power still belongs to the student. Technology provides the support, but it will be the student who decides on its contribution to the educational tasks and outcomes. Newhouse (2013) in Western Australia contended that too much attention had been given to all the technology as it became available, rather than the student use of it and Pullen (2014) in Tasmania discovered that online students must commit to access all the online services provided to gain a more comparative result with on-campus students. Goodwin (2012) in New South Wales highlighted the additional safety and storage facilities needed for younger students to fully utilise the use of iPads whilst the innovative Queensland curriculum changes from Jetnikoff (2009) placed the student in control of the whole learning process.

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