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Title: Equation: digital resources + interactive whiteboards + collaborative tools = *transformative pedagogy* for the classroom*

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Abstract

This paper contributes to new understanding of teaching and learning by examining teacher engagement with innovative information and communication technologies. When teachers construct learning by searching for quality digital content through education portals like the *Teaching and Learning exchange*, and expose it on an interactive whiteboard supported by collaborative tools, it has the potential to engage and motivate the 'digital natives'. Explicit examples of these technologies from the Centre for Learning Innovation's work in NSW Department of Education and Training schools and TAFE colleges will be discussed.

Introduction

Constructing learning to engage the 'digital natives' requires teachers to know what is significant in the lives of young people [1]. The choices a teacher makes in terms of *what digital content*, exposed through *what medium*, using *what device* is paramount if learning that has embedded information and communication technologies (ICT) is to be

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[1] The terms 'digital natives' and 'digital immigrants' were first coined by Marc Prensky (2001). Our students today are 'native speakers' of the digital languages of technology in all its forms, the latter 'immigrants' are the older generation, new to technology.

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engaging and motivating (Sawyer, 2006; Hayes, 2005). This idea is not necessarily new, however it is possible that the components of a *fresh technology equation* may transform teaching and learning in classrooms in schools and TAFE colleges inhabited by today's 'NetGen' [2].

That equation is:

digital resources + interactive whiteboards + collaborative tools =
transformative pedagogy for the classroom [3].

From equation to practice

Consider two very different scenarios:

1. Danielle, is a teacher in a government primary school in NSW. She uses TaLe to search for "Virtually Archibald" [4]. Her Year 5 class is studying the concept of artistic portraiture using authentic examples that are displayed on the interactive whiteboard at the front of the classroom. She models the difference between portraiture and photographs, the students discuss the remaining images. Each student works at a computer, Danielle is able to monitor each students understanding of the concept through an online forum tool in the learning management system she has used to design the unit of work. When reviewing students' responses to the forum conversation, the meta-language they are using to describe portraits is at a very high level. Every child has responded to the forum conversation including those children who don't usually contribute in face-to-face discussion.

2. Jenny teaches in a small rural government primary school in drought-affected NSW. She has recently attended a professional learning workshop at her school

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[2] Refered to as *NetGen* in Sachs, J (2006) *Technology as tool or tyrant*. Keynote address presented to Global Summit in Sydney held in October. This term is another way of describing technology savvy students.

[3] *Tranformative pedagogy* is based on the notion of *constructionism* (Sawyer*),* it uses the potential of this idea as applied technology.

[4] Teaching and Learning exchange or TaLe www.tale.edu.au is an education portal; it is managed by the Centre for Learning Innovation (CLI) in NSWDET. TaLe uses a metadata profile that links 15,000 digital resources for learning to syllabuses and courses in schools and TAFE. To date it has had over 6 million hits. "Virtually Archibald" is a resource produced by CLI that can be accessed on TaLe, it is underpinned by the *NSW model of Quality Teaching*. Evaluation of this resource found it 'very valuable for mainstream and distance education students' (University of Sydney, 2004).

to find out about TaLe. Using this education portal, she has discovered The Le@rning Federation (TLF) [5] digital resources and objects for counting and number work which she uses to stimulate learning for students in her IO class [6]. One child, nearly 11 years old is practicing counting to 10. She finds a pencil difficult to hold; instead, she touches the interactive whiteboard at the front of the classroom to move the ladybirds when the answer is correct. When all the ladybirds are counted, they dance on the screen and she dances on her mat.

Digital resources

Discovering quality digital resources through education portal technology like TaLe enables "teachers to quickly access multiple streams of information, to set up frequent and quick interactions with content which can then be integrated into learning for students" (Van Eck 2006:18). The evaluation framework that provides evidence for how teachers use TaLe employs teacher log data, feedback tools and qualitative studies of frequent users. One study found that teachers value the sifted nature of a 'boutique' portal whose main role is to provide quality assured authoritative digital content (Access Testing, 2005).

Recent international research on the quality of digital content accessed by teachers suggests that over time we will better understand how teachers' use it in their practice. What we do know, is that when teachers see the immediate usefulness of content on targeted portals, it is very powerful in persuading them to embed digital resources into learning (Haughey, 2005). Furthermore, a BECTA review on barriers to technology uptake concludes that teachers use and exploration of digital resources was contingent on "ease of access, accuracy and perceived relevance to syllabus content" (2004:10).

Freebody, in his evaluation of TLF online curriculum content, draws our attention to teachers and students in Australian classrooms who have already used the learning objects regarding them "in generally positive ways and that there are distinctive benefits in their use, they also have reliable effect on aspects of mathematics learning at Years 5 and 7" (2006:20). We would agree that more systematic programs of research are

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[5] The Learning Federation (TLF) is an $80 million Commonwealth project to produce digital objects and assets in 7 learning areas for students in K-10 years; to date 4,000 resources have been developed.
[6] Students who are classified 'IO' have intellectual disabilities in the moderate to severe range.

needed from a theoretical basis capable of exploring new disciplinary and interdisciplinary knowledge for futures-oriented learning and teaching.

There is a plethora of other resource content described as digital game-based learning. An emerging research field relates the hypothesis that video games are good for learning when supported by features of empathy, preparation for action, distributed intelligence, team work, situated meaning and open-endedness (Gee, 2006)[7]. Many commercial games built on learning principles underpinned by research in the learning sciences hold out the possibility for moving beyond entertainment into effective resources for deep learning. Game based taxonomies for example in the latest *SIMS 2* align with learning categories in the social sciences, personal development, health and physical education and medical science [8].The potential of games resources and finding out how and why they are effective in learning is not well understood. There is a need to know not so much about what the game is, but what games embody, and what learners are doing as they play a game (Van Eck, 2006).

Interactive whiteboards

If subject matter is engaging, teachers can use motivating hardware to tap into 'the exceptional visual literacy skills of digital natives'. CLI projects in a number of contexts focus on interactive whiteboards, where teachers are using digital content and the pace of the learning is fast. Students believe these teachers are making a real attempt to 'connect to their world'[9]. Pedagogical approaches using interactive whiteboards vary: reinforcing didactic models of teaching, to highly student-centered environments where the tool assists joint–construction of learning, and facilitates small group interaction, as well as inter-classroom or across-campus and distance learning.

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[7] We posit that it is possible to import some of the elements of games which engage students into the classroom, especially the idea of 'no fear of failure, empathy and repetition'.

[8] "Investigating Pompeii and Herculaneum", another CLI resource, has integrated a games approach with its use of vecta maps, views and video footage of ancient sites.

[9] CLI is conducting: research with UTS on the evaluation of pedagogy using interactive whiteboards; participating in national project with the ANSN and TLF using interactive whiteboards; facilitating an online professional learning community on interactive whiteboards and gathering data on their use from a survey tool on TaLe.

In NSWDET schools female primary school teachers, who have been teaching for longer than 12 years are taking the lead in using this technology[10]. These teachers see the interactive whiteboard, as not only changing practice but appear to use it as a transitional tool that takes them from passive technology participant to engaged constructor of their own experience (Hedburg, 2006; Glover, 2005; Smith, 2005; Higgins, 2003).

Higgins (2005) in an evaluation report of research in British schools reveals that interactive whiteboards do have a significant impact on students' enjoyment and engagement in lessons. While the impact of interactive whiteboards on student learning is harder to identify, there appears to be a type of 'halo' effect inferred from increased attention and motivation. It could be argued that because digital content exposed on this hardware is current, it is perhaps more relevant and meaningful to students than a static resource like a textbook, "the textbook has about five more years to run", or, according to Dale Spender "it is already dead"[11].

Collaborative tools

Interactive whiteboards sit 'mouse in hand' with collaborative tools like learning management systems (LMS) and some of the mobile technologies. Designs for learning like LMS, and other the mobile technologies like PDAs, are not necessarily new collaborative tools but are rapidly being enhanced by developers to embed technology to effect student learning anywhere and at anytime[12].

In a LMS trial conducted in a number of metropolitan schools, teachers believed the 'forum and chat tools' in the application were highly effective in supporting students with different learning abilities[13]. When students worked on computers in a structured learning sequence the teacher was able to carefully monitor their understanding of learning concepts and 'keep a close eye on each student's progress and be able to help them before they fall behind'.

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[10] From survey data of 90 teachers on TaLe interactive whiteboard PLC (Nov, 2006). 80% of teachers believe this tool allows 12 of the 18 elements of the *NSW model of Quality Teaching* to be embedded into learning.

[11] Williams, L. (5/4/2006) *No more pencils, no more books* Sydney Morning Herald, p24.

[12] Examples of LMS are Moodle, LAMS, WEB ICT and Blackboard.

[13] A micro trial of LAMS was carried out in several NSWDET schools by CLI from April–June 2005.

Other examples of enhanced learning are referred to findings of the NSW Board of Vocational Education and Training (BVET) study[14] that used digital content expended through collaborative tools like mobile phones, and other handheld devices. The project comprised a number of pilot studies carried out in TAFE colleges, where one group of students used collaborative tools to create oral texts. Students were clear that such devices enabled them to find and use their voice, in that they 'could readily dial in, up and download information to websites, and use SMS and email to communicate with their teacher' [15].

Transformative pedagogy for the classroom

From research, pilot studies and observations of teachers' classroom practice using parts of the equation, we see the potential for learning transformation using this pedagogical approach. Transformative pedagogy is one that more closely parallels the lives of 'digital natives' outside the classroom.

Frameworks for effective pedagogy sit underneath the fresh equation. These might be composed of authentic elements from *quality teaching*, *productive pedagogy*, *personalised* or *connected learning*. Research into practice with teachers and students where digital resources, interactive whiteboards and collaborative components of the equation all align, is yet to be undertaken.

Conclusion

Moreover, we must reinforce the notion that teachers are integral to all parts of our education algorithm. Evidence shows that teachers are using education portals like TaLe, as their 'one-stop-shop' for digital resources, professional learning and information. Interactive whiteboards are ubiquitous in NSW schools, and they are proving engaging for teacher and student learning. Teachers in different sites are taking their first steps into authoring sequences of learning in LMS environments.

However let's not pretend there aren't challenges ahead, and we must caution not overestimate these technologies, their affordances and capabilities. But for those

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[14] Mitchell, J (2005) *Creating Personalised Learning*. John Mitchell & Associates: Interim Report. Other CLI work includes the Development of an e-learning Knowledge Sharing Model.
[15] Web 2.0 tools provide all types of new collaborative possibilities.

teachers who are beginning to feel just a little uncomfortable with their role as 'digital immigrants', the *migration* is gathering momentum, especially in classrooms like those of Danielle and Jenny.

ENDNOTE

1. A version of this paper has been published in Education Quarterly, Winter 2006, p 36-7 and may be cited here. An expanded article is planned for publication in 2007.
2. Sue Beveridge is the Assistant Director at the Centre for Learning Innovation and has responsibility for TaLe, Jane Hunter is Senior Project Officer on the TaLe team. This paper acknowledges the work of the TaLe team who relentlessly ensure that TaLe is current, operable and informative. The team is managed by Tim Hand supported by Janet Burstall, Kevin O'Gorman, Ian McKee, Maree Banfield and Sarah Chalmers. Wow – what a team!

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