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Digital literacy and digital pedagogies for teaching literacy: Pre-service teachers' experience on teaching rounds.

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Abstract

When pre-service teachers go into primary schools on teaching rounds it is highly likely that they will encounter a different learning environment to the one they met as students. Over the past decade, both teaching and learning have changed radically. As new information and communication technologies (ICT) are developed, their use has been adapted to meet educational needs. Many school students read, write and view in an interactive and complex way with new technologies and social media outside of school hours, such that the way they learn and use literacy is different from the way their teachers learned.

New pre-service student teachers not only have to contend with a technology enhanced classroom, they also encounter university systems in which much of the interaction occurs online. Pre-service teachers need to have, or develop a high level of digital literacy themselves whilst simultaneously learning how to use a range of technologies within digital pedagogies.

The study discussed here is an action research project that was part of a larger joint project, and involved volunteers from a whole cohort of Australian Aboriginal pre-service teachers who were undertaking a targeted Bachelor of Education course for Aboriginal students. This course was designed to include supports such as extra home tutorial assistance, negotiation of assignment due dates and a lighter load in the first two years. The students all lived in regional or remote rural locations and studied in block mode which included intensive face to face classes on campus and online components when they had returned home. They also had two teaching practice rounds in which they were required to

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utilise technology for teaching and to develop digital pedagogies. Focus groups, research articles and interviews with volunteer third and fourth year pre-service teachers and their lecturer were used to investigate what was learned in relation to the development of their own digital literacy and digital pedagogies for teaching literacy.

Background

There is an increasing volume of research and theoretical literature on digital communication, 'new' digital literacies and the use of digital technology as teaching and learning tools in classrooms. The literature that was used to inform the current study came from several areas: digital literacy, digital pedagogies, the ICT skills of Indigenous tertiary students, and using digital pedagogies to teach literacy.

The foci of the literature on digital literacy seem to fall into two broad categories, developing critical and discerning abilities in the students and providing up-skilling for the teachers. Most of the current generation of students have grown up with digital technologies, and it has been claimed that not only are current students techno-savvy but also that they think and process information differently from their predecessors (Prensky, 2001. p1). The use of Prensky's term 'digital natives' as applied to all of the current generation of students has been questioned as it 'obscures inequalities in access to technology' (Hague & Williamson, 2010, online at hhtp://cmslive.curriculum.edu.au/leader/default.asp). The latter authors also note, for example, that the types of technology and media that are said to generate informal learning are 'products of the commercial landscape, usually designed for purposes other than education' and that students may not be learning anything that is transferable to their education. They also note that students may not be able to discern the commercial side or impact of that on them. A

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number of studies stated that teachers need to teach students how to use digital media alongside of teaching them critical skills (Hague & Williamson, 2010; Luckin, Clark, Graber, Logan, Mee & Oliver, 2009; MCEETYA, 2010).

When developing students' skills with digital technologies for education purposes, it is also necessary to consider how the technology has changed what is now regarded as Literacy. Literacy itself now entails a wider range of interconnecting elements including decoding and writing text in multimodal forms and scripts, visual interpretation, site navigation, media manipulation, and comprehension. This includes comprehension of the words and how the media may impact or alter the meaning of the words (Asselin & Moayeri, 2011; Poore, 2011). In a recent text based on classroom research Walsh (2011, p12) indicated that multimodal literacy 'may [also] include listening, talking, enacting and investigating as well as writing, designing and producing such texts'

As the notion of what constitutes literacy changes, approaches to teaching literacy in schools also changes (Carroll, 2011). These changes are more than teachers adopting new tools to teach literacy in the same way as before. As an awareness of the way in which literacy has changed, fundamental changes in literacy pedagogy are being developed. In the current study the pre-service teachers researched their practice in teaching literacy in elementary/primary classrooms through the medium of ICTs. The lecturer investigated the best ways he could support the students' development of digital literacies and the development of their own digital pedagogies to teach literacy.

What is digital literacy?

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The Australian MCEECDYA report (2010) into ICT in Education in the middle school years identified three strands of digital proficiency: working with information, creating and sharing information and using ICT responsibly. They further identified six processes involved in digital literacy. These are: accessing, managing and evaluating information, creating new understandings, communicating with others, and using ICT appropriately. It was reported that of students assessed on these categories, only 57% of Year 6 students met their expectations (p6).

Students may use ICTs competently for social networking but need teacher guidance for learning based digital literacies (Luckin et al, 2009). It was also noted that students are not expert at evaluating the relevance of material found online, its accuracy or the authority of the person who uploaded it.

What is digital pedagogy?

Digital pedagogy includes several axiomatic changes to traditional pedagogy and has more in common with a constructivist approach, in which students construct their own knowledge in a social context. However, digital pedagogy goes beyond that to include teaching about and for digital technology for learning. Central to digital pedagogy is the co-construction of knowledge. A digital pedagogy includes planning for learning which is less content than problem-solving based. It can present knowledge as problematic rather than as fixed. As such it promotes higher order thinking skills and students move from remembering content to gaining a deep understanding of concepts (Kent & Holdway, 2009). It develops critical analysis, metacognition and reflection, often through creation, editing and publishing online (Luckin et al, 2009). Further, digital pedagogies can include Web 2.0 technology for social networking, with

the use of blogs, wikis, i-phones and i-pads for learning. In this way digital pedagogies help to promote connectedness to the wider world. (Kent & Holdway, 2009).

In order to embrace digital pedagogies teachers may find they are no longer the experts and that they need to change from being users of technology, such as when they find and print off activities for students, or information for themselves to use in teaching, to becoming co-creators (Poore, 2011).

As not all students have navigation skills or use the whole range of ICT competently (MCEEDYA, 2010), teachers need to demonstrate how to identify, select, analyse and use ICT information such that students develop critical digital literacy (Asselin & Moayeri, 2011). Teachers also need to accept that there will be fundamental changes to activities, rather than using old activities on new media.

Using digital pedagogies to teach literacy

Some recent studies have investigated current classroom practices around digital pedagogies for literacy. For example Oakley (2008) investigated using a language experience approach with digital storytelling using power point with voice recordings and Ciampa (2012) studied the use of electronic storybooks to increase reading motivation. Both found the methods successful in motivating students and teaching an aspect of literacy. A series of linked studies were undertaken to investigate a professional development model of up-skilling classroom teachers in pedagogical practices with ICT to teach literacy. An initial survey demonstrated that many primary students were not choosing to read print based texts for leisure outside of the classroom. In the study across nine schools only 10% of Year 5-6 boys (but 44% of girls)

indicated they enjoyed reading for leisure. However, 96% of boys indicated their preferred leisure activity was playing computer games (Walsh, 2011, p6).

Walsh (2011, p7) indicates that as literacy purposes and uses outside of school have changed, that pedagogy for teaching literacy needs to change to capitalise on the skills students are developing in other contexts. She states: 'Teachers need to be able to develop pedagogy that embeds digital communication technologies and texts to meet curriculum outcomes and assessment requirements, while at the same time maintaining students' engagement with print-based technologies, particularly literature'. Walsh further indicates that teachers need to be aware of the increased number of processes involved in making meaning and producing digital texts and that the way digital texts are accessed are also different. Instead of a linear, sequential process, as in reading or writing a traditional paper based text, digital texts encourage a browsing, selecting and sampling strategies incorporating images, sound and interactive elements (p11).

As yet there is scant published research into the development of pre-service teachers' digital pedagogies to teach literacy so the current study is timely.

How is the digital literacy of Australian Aboriginal pre-service teachers developed?

A scan of the literature indicated that there is very little research into the use of ICT in higher education to support the learning of Indigenous students. There are several reports into the education of Indigenous tertiary students (DEST, 2005; Gunstone, 2008; Harrison, 2007; MCEEDYA, 2009) they have not however focussed on digital literacy. There are however a number of studies which investigated the development of ICTs in tertiary populations which

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have some relevance. One of the key early studies that investigated changes to learning, described interactive multimedia as being able to provide a 'situated learning model', in which students are able to learn 'within the context of real world applications', which makes learning authentic, allows for modeling, scaffolding, collaborative knowledge construction, and promotes learner reflection (Herrington & Oliver, 1997, p 127). Recent research has indicated that ICT learning is socially constructed, is active and engaging and incorporates diverse knowledge systems (McLouglin & Lee, 2010). The researchers note that there are challenges for staff to provide 'personalised learning experiences using suitable learning technologies that cultivate independent learning skills, while also scaffolding learner reflection and the development of generic competencies' (McLouglin & Lee, 2010, p 38). Several other studies investigated technology and higher education, such as a study of undergraduates use and ownership of emerging technologies (Oliver & Goerke, 2007); a networked learning community approach (Watson & Prestige, 2003); multimedia, science and distance education (Bowyer, 2003); developing a smart community in higher education (Baskin, Barker & Woods, 2003); and research undertaken at a number of Australian Universities into the use of ICTs learning technology (Moyle & Owen, 2009) but they did not identify the impact for equity groups.

There were a few studies that investigated ICT use with Indigenous tertiary students, however they were mostly seeking to identify barriers to learning via ICT. For example one such study investigated equity and the use of ICT in higher education (Barraket & Scott, 2001). That study found that women, older students, those from low socio-economic groups and Indigenous and rural or isolated students studying in block mode were disadvantaged. The study found that poor levels of information literacy and the resultant lack of confidence led to lack of access to

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the technology and to technology supports. They further noted that it was students with the greatest need that had the least access. (Barraket & Scott, 2001, pp 3, 8). A later study (Gibb, 2006) had similar outcomes noting that rural students studying in block mode were doubly disadvantaged. The students in the current study fit a number of the factors identified as they are mostly female, mature aged and Indigenous, from rural or isolated communities and studying in block mode. Whilst it might be argued that singling out Aboriginal students in this study could have a negative impact, the disadvantage suffered by Indigenous Australians across a several sectors including Health, Housing and Education is well recognised and successive governments have tried to redress that disadvantage. This study documents part of the learning journey of such students to come to some understanding of their learning needs in order to better provide support.

A commissioned study identified three types of barriers to e-learning which contributed towards a 'digital divide' in the Vocational Education and Training (VET) sector. These were (a) Connectivity, that is the infrastructure and access to the internet; (b) Capability, described as the internet skills and confidence and valuing the internet; and (c) Content that was relevant and useful (Australian Institute for Social Research, SA, 2006, p 3).

Part of providing relevant content relates to the language used. As language and culture are intrinsically intertwined and each person is a product of his/her own culture, any text produced will be biased towards that culture in terms of language usage and meanings, visual images, and cultural knowledge. As such, unfamiliar cultures will be excluded to greater or lesser extents depending on the proximity of one culture to that which produced the text. Therefore, when a website is developed it will also reflect the mainstream culture of those who created it and will inadvertently be less accessible, or exclude those from other cultures and those

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who are less familiar with the dominant culture. In creating websites suitable for Indigenous learners McLoughlin and Oliver (2000, p 58) argued for 'cultural localisation, which means incorporating the local values, styles of learning and cognitive preferences of the target population'. They indicated that web designers would have to look beyond surface level design considerations in order to achieve a design that was culturally inclusive. The design guidelines that they developed are located within social constructivist theory in which learning is viewed as being socially constructed ideally through active participation and real life tasks. The guidelines include: learning tasks that support different learning styles, providing scaffolds, flexibility and choice of tasks, the opportunity for students to collaborate with peers and for them to be able to add cultural content to the site, and learning activities that 'provide bridges to the student's culture and community' (p69). However, an investigation of distance education and equity for Aboriginal students (Gibb 2006, p 21) found that there were differences between the 'preferred Indigenous learning practices and current online distance educational processes' and that students were thus 'doubly isolated', demonstrating that online course writers have been slow to adapt and incorporate the findings of earlier studies.

Further, when the students have to learn by distance or through block mode internet connectivity and speed issues have an impact on learning. Added to these challenges for university provision and student access and equity, ensuring inclusivity and catering for the learning needs of different cultural groups can be difficult. For example, research has indicated that Indigenous students like to make deep connections and that relationships between students and between students and teachers are most important in supporting their learning (Gibb, 2006). Other research outcomes that relate to the current project include designing pedagogy to

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encourage independent learning and problem solving, building a community of e-learners and developing the technical vocabulary and textual practices around electronic media (Doherty, 2002, p58).

The current research will increase our understanding of factors influencing the success of Indigenous pre-service students with ICT learning, and the development of their digital pedagogies for teaching literacy.

Method

This paper focuses on one aspect of research undertaken as part of the larger study. The larger study investigated the variables of e-technologies, access and equity for University participation of mature aged, English as an additional language speakers and Indigenous students, many of whom live in rural or remote locations.

A participatory action research model was chosen for this section of the research in which third and fourth year Australian Aboriginal pre-service teachers in a course exclusively for Indigenous students, researched their own practices. During the semester in which the action research was conducted, the students were studying a subject on 'Research and ICT'. In that subject they learnt about and were required to undertake some action research by setting a question, such as '*How can I use ICT to teach writing in Year 3?'*, and then investigating it. They did this by preparing lessons that incorporated some form of technology and teaching those lessons while on two separate teaching rounds, one in a rural school and one in an urban school. They were able to reflect on the first practice and then adapt it for the second practice. The pre-service students were encouraged to post online reflections and join in discussions about how to

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use the new technology when teaching. Students kept a reflective journal to map the progress of their own learning. The aim was to develop strategies to build student skills and teaching capacity with ICTs and develop a supportive learning community. Students also evaluated their own teaching and its effectiveness in terms of student learning and finally, wrote a research article which linked their practice to the theory. Volunteers were called for to take part in the research study, (n=19: 11 were third years and 8 were fourth years) so that the researchers could undertake focus groups and have access to the article they wrote as their final assessment piece. While some of the students investigated using ICTs to teach subjects other than literacy, only those who investigated teaching literacy are the focus of this paper. Literacy was chosen as a focus for the paper, as the students had recently received instruction in literacy pedagogy and a number of the volunteers had written their articles on using digital technology to teach literacy.

At the same time as the pre-service students were investigating their practices, the lecturer conducted his own action research. He did so by designing and teaching the subject and reflecting on how to further develop the group's ICT skills for teaching along with theoretical understandings and research skills. In this paper the lecturer's reflections provide elaboration and triangulation of the student data.

This study is also informed by some of the findings from Phase 1 of the project in which the Indigenous tertiary students' use and familiarity with digital technology was examined. The students filled out a 'tick the box' survey and joined follow up focus groups in order to gauge which technologies they used at home and at University, the frequency of use and which they felt competent in using. An audit of the courses they had undertaken in their studies was done in order to ascertain how much was technology based and which technologies and technological

skills were needed, and how much information they had gained so far about teaching literacy. This background information was necessary to interpret the analysis in terms of increases in knowledge. For example, the audit indicated that all of the pre-service students in the current study had passed two University 'Language and Literacy' subjects and so had knowledge of curriculum, genre theory, research and practice related to teaching and learning literacy, but this did not include any theory related to digital pedagogies for teaching literacy. The fourth year students had passed one further Language and Literacy subject on teaching English as a second or other language, and some pre-service students had been able to use an Interactive Whiteboard on a previous teaching round.

The survey and follow up focus group interviews conducted in Phase 1 of the larger study revealed that all of the pre-service teachers used computers for word-processing, emailing, social networking and the blended component of the course. At the beginning of the research, none had smart phones, blackberries, nor i-pads, although two had i-pods for listening to music. None had used wikis, were not very familiar with Web 2.0 technology and none considered themselves highly competent technology users.

Analysis and findings

In an analysis of the current data, the research articles of the volunteer pre-service teachers were examined for themes related to their own learning about using ICTs, their understanding of digital pedagogies, student learning via ICTs, strategies for teaching literacy and the linking of their experiences to research and theory. The unit outline and other subject materials were examined and considered along with the reflections of the lecturer to determine how the digital literacy and digital pedagogies of the pre-service teachers were developed. In the

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following analysis and discussion, examples from individuals are used to highlight overall findings and show differences amongst students.

Analysis revealed that around half of the students not only developed digital pedagogies for teaching literacy, they were able to link their experiences to the theory. As might be expected those who indicated a reasonable initial level of ICT skills were more confident in using ICT in the classroom. Overall, however, one half (mostly fourth year students), tended to tackle more complex use of ICTs or use them for broader purposes in their classrooms and to engage at a deeper level with the theory. The other half (mostly third years) tended at least initially, to couple the ICTs with traditional strategies, using the interactive whiteboard (IWB) as a regular whiteboard. Third year Lilly, for example, was in a Kindergarten class, and she used the book *'The Very Hungry Caterpillar'* by Eric Carle to teach vocabulary and sentence writing. She read the story, asked the students questions and wrote their answers on the IWB. Other learning activities such as matching words and pictures were similar to what could be done on a regular whiteboard. In her reflections her comments were mostly at the level of a new user coming to terms with the various functions of the technology. She did discuss how she could hide and reveal content and make things bigger or smaller. She did not, however, discuss how using technology changed her pedagogy, how that related to student learning, nor did she discuss the theoretical background.

Another third year, Kate was working with Stage 1 children on narrative writing. The children used digital cameras to create picture stories and then wrote narratives from that. She said *'I discovered the enthusiasm of the students as many of them had not had the opportunity to use digital cameras before.'* She noted that *'Some children took random photos, but they still*

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managed to write narratives, incorporating correct grammar learnt from a previous lesson, thus making the activity of using a digital camera successful.' She only used one form of technology with the class and her assessment of the success of the lesson was basic. She did not consider how she might further develop her own pedagogical practice so that the children understood that taking sequential pictures would help them structure a successful narrative, nor how she could use the ordering of the pictures to teach grammatical items such as past tense or 'before and after' in a meaningful context. Both of these students felt that the lessons were a success in terms of student learning and in terms of using ICTs to teach literacy. However, there was no deep reflection on their own practice nor an indication of how they might develop or improve.

By comparison fourth year Carol, taught Exposition writing to Stage 2 Year 4 children, 76% of whom were from other language or dialect backgrounds. In her interactive whiteboard lesson she used you-tube video and joint construction of an expository text on the topic '*Why we should keep our waterways clean'*. Students then drafted their own exposition. They were put into groups to use their notes and photos from the related excursion to produce power-point presentations. In a reflection on her teaching Carol noted that even the better students struggled in writing the exposition genre and concluded that she had not provided sufficient scaffolding to ensure success. The inclusion of the power point presentation added to the complexity of what the students were expected to do. She stated '*this proved to be a difficult task for the children who had limited ICT skills, and some children ran out of time.'* She realised that even though they were working in groups, without teaching the skills in technology use, the task was over complicated for them. Whilst this lesson was less successful, Carol was able to analyse why and how it might be improved in the future.

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Another fourth year, Kylie demonstrated a complex use of digtial technologies. She used the IWB to view photographs taken by the K-2 children with digital cameras and recounts in the form of Powerpoint programs, animated nursery rhymes and digital storybooks. She indicated that this was to '*build their field of knowledge and to scaffold their learning'* whilst she constructed recounts prior to the class jointly contructing a recount. Her discussion demonstrated a thorough understanding of genre theory, scaffolding learning and how and why using digital technologies could be used to develop digital pedagogies for teaching literacy. She did find that in the first school, when children were required to work alone to write a recount only a few could do it competently. She also noted that more scaffolding was needed and put this into practice in the second school for a better outcome.

Other difficulties experienced by students include a statement by Laurie that many teachers would relate to. She said '*It took almost half the lesson for the students to log on to the computers'*. A few pre-service teachers discussed the problems they had trying to use the technology to teach. For example: *'The experience with the use of ICT at this school was daunting (for me). The children were ranging in ages from 5-6 years of age and they clearly had more knowledge on the IWB than I did. A few situations arose where I was perplexed and three children immediately ran to my aid.'*

Fourth year, Shirley commented on the benefits of using ICT for literacy including being able to produce, adapt and change resources, the variation in formats and the range of information and programs available.

Overall, the majority of the pre-service teachers indicated growing familiarity and confidence in using ICTs in teaching and most did link their practice to the theories they had

learnt about at University and through their readings. The theories most frequently cited were 'Constructivism' and Vygotsky's notion of scaffolding learning by working with students in their 'zone of proximal development'. Many commented on the ability of ICTs to engage students and how that then encouraged learning to take place. Those Pre-service teachers explained their understandings of how digital pedagogy could engage students and the make them active participants in learning. Shirley noted that it was possible to build rapport by engaging the whole class . She stated*:*

I made a conscious decision to make each lesson as interactive and engaging as possible so that each student could be involved. Part of the rapport was built by ensuring the inclusion of all students throughout each lesson.

Some pre-service teachers noted that there was a shift in power from teacher to more a more collaborative approach in which the teacher was more of a facilitator. They stated that digital pedagogy is constructivist in that knowledge is co-constructed. One pre-service teacher indicated that the perception that merely using technology fostered learning was incorrect. However, another pre-service teacher noted that using technology '*could be empowering for students with low literacy skills'.*

One pre-service teacher discussed the theory of multiple intelligences and how '*use of digital technologies favoured and improved visual literacy which can lead to visual intelligence'.* A number of others discussed the possibility of the improvement of visual literacy (the ability to understand and interpret the meaning of information contained in images). Other statements about using digital technologies for teaching included that it could enhance social interaction, that it enabled the opportunity to provide motivation and learning that is relevant and relates to

the real world. Further, that it fostered cooperative group work, accommodation of different learning styles- in particular visual and kinaesthetic, open ended questioning, hands on activities and that it developed language proficiency.

Overall the Indigenous pre-service teachers experienced a rapid learning curve in which their own digital literacy was developing and at the same time they were developing digital pedagogies for teaching literacy. Keeping reflective journals and posting to the online discussion blog gave them the opportunity to think deeply about their teaching, record those thoughts, try different teaching strategies and then reflect again. They used the reflections to interpret the applicability of the theory they had learned about in class and readings to write a research article. Those articles revealed their understandings of using digital pedagogies to teach literacy. It was clear from the articles that there was still a range of understanding of using digital technologies to teach literacy. As might be expected, the fourth years, in general, were better prepared and had greater theoretical understandings even when their own level of digital literacy was initially low.

As for the lecturer, he identified a range of issues that impacted on pre-service teachers' success in using digital technologies in their placement. The pre-service teachers did not have access to interactive whiteboards and limited access to some software and resources such as digital cameras whilst on campus. He felt that it was therefore important that a comprehensive range of opportunities for hands-on learning was available to pre-service teachers while in their placement schools. The pre-service teachers were placed in different primary schools. Problems arose when the number of pre-service teachers on practicum in one of the schools exceeded the digital technology resources available and some of the supervising teachers did not have the

necessary expertise in using digital technologies to support the professional learning of pre-service teachers.

The lecturer also commented that the professional development of academic staff at his university was pivotal to effective pre-service learning. The lecturer commented that, as a result of the study, he would change his pedagogy in the future. He said ... *I want to try to incorporate more workshop time for students, and access to the technologies while they come here on their block periods, and also for us as academics to get up-skilled in using the technology.*

To encourage student interactions between face-to-face blocks, the lecturer indicated that he planned assessment tasks for the 'ICT and Research in Education' subject that provided both a scaffold for progressive learning and skills acquisition, and opportunities for students to *respond and support each other*. Students were encouraged to join in an online discussion blog to share their work as it progressed. In practice however this proved difficult for some students who were less confident about the quality of their work than others. The lecturer attributed the reticence to share written work to the dynamics of the differently staged year groups. He explained that while some 3rd years had more confidence in the personal use of technologies, they had had fewer opportunities for applying that knowledge in classroom placements and in particular they had less experience with interactive whiteboards. The 3rd year students were also at a different level than the 4th years in terms of experience with academic writing. The lecturer believed that the dynamics of combining the year groups was not productive in terms of culturally appropriate delivery:

In terms of quality teaching ... that was very problematic, and I think it caused them some frictions within the class. When you're dealing with Indigenous students ... they don't want to be

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shown up as incompetent in front of their peers ... and if the 4th years have had the opportunity, obviously they're going to be better equipped.

While the online discussion was not as successful as the lecturer had hoped, peer discussions in class were more successful. In Phase 1 of the study the lecturer commented that Indigenous students seemed to prefer oral presentations to written assignments and this was borne out in the Phase 2 data. In using technology to foster communities of practice within the student cohort, the importance of *seeing each other* was emphasised by the lecturer. At the close of Phase 2, the lecturer was actively exploring opportunities for pre-service teachers to interact 'face-to-face' via videoconferencing and technology such as Skype between block residentials, and while they were on practical placements in order to provide them with effective support:

we're trying to use Skype, and trying to set up a three way conversation with the lecturer to other students ... we're going to just talk it rather than actually write it ... I think oral communication is something that our students feel more comfortable with, so we've got to set up sort of a comfortable yarning type approach, which I think is more culturally sensitive to the students that we're dealing with, and again we need to have that facility.

Strong partnerships between the university and placement schools was also discussed by the lecturer as crucial to building communities of practice where the pre-service teachers could acquire professional teaching standards. As mentioned, disparities between resources and supervising teacher expertise in partner schools had a direct impact on pre-service teachers learning in digital pedagogies. The lecturer mentioned that while his university had strong partnerships with schools in the metropolitan area, they had not had such success in pre-service teachers' home communities, which were often great distances from the university. Again this

was a matter of time and funding to *work more with supervising teachers to support and access professional teaching standards in a practicum setting*.

Conclusion

This paper sought to explore the development of Australian Aboriginal Pre-service teachers' digital literacy and understanding of digital pedagogies for teaching literacy. As such it reports on data collected from an action research project that was part of a larger project investigating flexible delivery for equity groups at two Australian universities (Armitage, Campbell & Welsby 2011). The Indigenous pre-service teachers in this study did not rate themselves as proficient with digital technology at the commencement of the project. Similarly, many of the students in their classes on practicums rounds were unfamiliar or lacked competence in ICT use. This complicated matters for the pre-service teachers as they often had a wide range of digital literacy and familiarity with new technologies in their classes.

They also had the difficulties of being rural students studying by block mode identified in earlier research (Barraket & Scott, 2001, Gibb, 2006). In particular the problems of connectedness and capability identified in a study of Indigenous VET students (Kilpatrick & Bound, 2003) came into play. Towards the end of Phase 2 however, the lecturer found ways to improve the capability factor by switching from a written to oral and visual mode of online interaction. In doing this he encouraged building a community of e-learners that could share and problem solve together, elements deemed important by Doherty (2002). Finding culturally appropriate models of online interaction was also highlighted in research by Oliver and Goerke (2007) and whilst this study was undertaken with Australian Aboriginal pre-service teachers the finding may apply to students, from other cultural groups, who are still developing ICT skills.

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The action research model has provided all parties the opportunity to reflect individually and discuss experiences and findings together. It has also been a useful way to discover the level of understanding and concept development in relation to developing pre-service teachers' digital literacy and concomitantly developing digital pedagogies to teach literacy. Whilst at the end of the study some pre-service students had developed greater competence than others in applying and demonstrating their understanding of digital pedagogies for teaching literacy, all had experienced it over two practice rounds and found the experience worthwhile.

The key findings were that both the lecturing staff and the pre-service teachers need more practical workshops with hands on experience with new technologies such as interactive whiteboards. Even so, pre-service teachers can develop digital pedagogies to teach literacy by combining theories about teaching literacy with the theory and practice of using new technologies in their practicum teaching. However, strong relationships need to be fostered between universities and schools so that both work together so that learning about digital pedagogies can be developed in a practical application. While those findings could relate to many mature aged students undertaking teacher education, Indigenous learners studying in block mode face added difficulties. Those difficulties can be addressed in part by using visual and oral connections online rather than only the written form so that a culturally appropriate way to develop a community of e-learners occurs. More research with a broader population of Pre-service teachers would provide further understandings about the development of digital literacies to use digital pedagogies.

References

Asselin, M. & Moayeri, M. (2011). The participatory classroom: Web 2.0 in the classroom. Literacy *Learning in the Middle Years, 19,* (2), i-vii.

Australian Institute for Social Research, SA, (2006). *The Digital Divide: Barriers to e-learning. Final Report.* Adelaide, SA: University of Adelaide.

Barraket, J. & Scott, G. (2001). Virtual Equality? Equity and the use of information technology in higher education. *Australian Academic and Research Libraries Journal*, 32, (2),

Baskin, C., Barker, M. & Woods, P. (2003). Towards a smart community: Rethinking the strategic use of ICTs in teaching and learning. *Australasian Journal of Educational Technology, 19, (*2), 192-210.

Bowyer, P. (2003). Multimedia based enhancement of the science of oenology in the distance education learning environment. *Australian Journal of Educational Technology*, *19,* (3), 323-338.

Armitage, L., Campbell, S. & Welsby, L. (2011). The Kindling of a Flame: ICT -enabled learning and widening participation at the University of Western Sydney. Penrith: UWS.

Ciampa, K. (2012). Electronic storybooks: A constructivist approach to reading motivation in primary grade students. *Journal of Literacy and Technology*

13, (1). Online at http://www.literacyandtechnology.org/cfp.htm. Accessed on 223/07/12

Carroll, J. (2011). From encyclopaedias to search engines: Technological change and its impact on literacy learning. *Literacy Learning in the Middle Years, 19,* (2), 27-32.

DEST, (2005). *National Report to Parliament on Indigenous Education and Training*. Canberra: AGPS

Doherty, C. (2002). Extending horizons: Critical technological literacy for urban Aboriginal students. *Journal of Adolescent and Adult Literacy*. 46, 1, 50-58.

Gibb, H. (2006). Distance education and the issue of equity online: Exploring the perspectives of rural Aboriginal students. *Australian Journal of Indigenous Education, 35*, 21-29.

Gunstone, A. (2008). Australian University Approaches to Indigenous Policy. Australian Journal of Indigenous Education, 37, 103-108.

Hague, C. & Williamson, B. (2010). Digital participation, digital literacy and schools, *Curriculum Leadership 8*, (10) Accessed 25/7/11 at hhtp://cmslive.curriculum.edu.au/leader/default.asp

Harrison, N. (2007). Where do we look now? The future of research in Indigenous Australian education. *The Australian Journal of Indigenous Education, 36,* 1-5

Herrington, J. & Oliver, R. (1997). Multimedia, magic and the way students respond to a situated learning environment. *Australasian Journal of Educational Technology, 13,* 2, 127-143.

Kent, P. & Holdway, M. (2009).Interactive whiteboards, productive pedagogies and literacy teaching in a primary context. *Literacy learning: the Middle Years, 17*, (1).

Kilpatrick, S., & Bound, H. (2003). *Learning online: Benefits and barriers in regional Australia* Vol 1. Adelaide, SA: NCVER

Luckin, R., Clark, W., Graber, R., Logan, K., Mee, A. & Oliver, M. (2009). Do Web 2.0 tools really open the door to learning: Perceptions, practices and profiles of 11-16 year old students. *Learning, Media and Technology*, *34* (2), 87-104.

Marsh, J. (2011). Young children's literacy practices in a virtual world: Establishing an online interaction order. *Reading Research Quarterly, 46*, (2), 101-108.

McLouglin, C. & Lee, M. (2010). Personalised and self regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australian Journal of Educational Technology*, *26*, (1), 28-43.

McLoughlin, C., & Oliver, R. (2000). Designing learning environments for cultural inclusivity: A case study of Indigenous online learning at tertiary level. *Australian Journal of Educational Technology*, 16,1,58-72

MCEECDYA, (2009*). Indigenous Education Action Plan Draft 2010-2014 –for public comment*, Canberra: Author.

MCEEDYA, (2010). *National Assessment Program: ICT Literacy years 6-10*. Canberra: Author.

Moyle, K., & Owen, S. (2009). *Listening to students' and educators' voices*: *Research Findings.* Canberra: DEEWR

Oakley, G. (2008). E-LEA: Multimodal writing. *Practically Primary*, *13*, (1), 23-4.

Oliver, R. & Goerke, V. (2007). Australian undergraduates' use and ownership of emerging technologies: Implications and opportunities for creating engaging learning experiences

for the Net Generation. *Australasian Journal of Educational Technology*, *23,* 2, 171-186.

Poore, M. digital literacy: Human flourishing and collective intelligence in a knowledge society. *Literacy Learning: The Middle Years, 19,* (2), 20-26.

Prensky, M (2001). Digital natives, digital immigrants, *On the Horizon*, *9,* (5).

Wallace, R. (2008). *Engaging remote and very remote Indigenous students with education using information and communication technologies (ICTs): Final Report***.** Darwin, NT: Charles Darwin University.

Walsh, M. (2011). *Multimodal literacy: Researching classroom practice*. Newtown, NSW: PETA.

Watson, G. & Preston, S. (2003). A networked learning community approach to sustain teacher ICT professional development. *Australian Journal of Educational Technology*, 19, 2, 227-240.