Learning in Motion: Connecting Schools and Knowledge for Aboriginal and Torres Strait Islander Children

Investigating iPads for learning and literacy

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Victoria University acknowledges the Elders and families past and present of the Aboriginal and Torres Strait Islander peoples of Australia. We recognise that the land on which we live, meet and learn is the place of age-old ceremonies of celebration, initiation and renewal and that the living culture of Aboriginal and Torres Strait Islander peoples has a unique role in the history and life of Australia.

Victoria University expresses appreciation to the Elders, families, Koorie Education Support Officers and Aboriginal and Torres Strait Islander communities in each of the three school clusters who participated in this study and to the principals, teachers and students of the schools concerned.

Victoria University acknowledges guidance provided by the Catholic Education Office Victoria, Independent Schools Victoria and the Department of Education and Early Childhood Development Victoria, in establishing and assisting the project throughout 2011-2012.

Victoria University is also most appreciative of the ongoing advice provided by the project’s Critical Friend, community members who advised on the accuracy and meaning of community comments and support provided by project managers and officers regarding organisation of the research.
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Established by the Department of Education and Early Childhood Development Victoria, Catholic Education Commission of Victoria and Independent Schools Victoria and funded by the Closing the Gap program of the Council of Australian Governments, the Technology Enriched Curriculum Program (TECP) seeks to improve literacy outcomes and engagement with schooling for Aboriginal and Torres Strait Islander students.

This research report of TECP details an investigation into the use of Information and Communication Pedagogies with middle years (Years 5-8) Aboriginal and Torres Strait Islander students to improve literacy progress and engagement with schooling. It was located in fifteen non-metropolitan schools in Victoria involving the Government, Catholic and Independent sectors. Approximately 140 students were involved to varying extents throughout the year and were provided with tablet technology purchased from project funds.

The research team from Victoria University Melbourne was aware of two major problems associated with research of this kind. Firstly epistemological and sociological issues of Aboriginal and Torres Strait Islander children attending mainstream schools usually in small numbers and contradictions that can exist between family and school understandings of schooling, knowledge and teaching. Secondly the design and conduct of research methodologies that may not be in accord with Aboriginal and Torres Strait Islander community philosophy and aspiration. In this regard, the research team is most appreciative of the ongoing critical advice from the project’s Critical Friend and provided from an Aboriginal and Torres Strait Islander perspective.

In discussing and theorizing the findings and recommendations of this study, it is hoped that the general insights and practices outlined will inform and guide similar work elsewhere and open up continuing and perhaps new fields of investigation. As is mentioned throughout the report, the philosophical and practical difficulties of researching Aboriginal and Torres Strait Islander education conducted within bureaucratic and ideological institutions need to be recognised and dealt with in appropriate ways. Quality teaching and learning is always complex and challenging taking place as it does within the different cultural, educational and political arenas of diverse socio-economic communities. This study suggests however that the incorporation of new technological devices and pedagogies for Aboriginal and Torres Strait Islander education can enhance practices of schooling and learning.

Terminology

1. The phrase ‘Aboriginal and Torres Strait Islander’ is used throughout this report, whereas the word ‘Indigenous’ may be used in referenced documents or in a global and historic sense when referring to general issues of knowledge and learning. The term ‘Koorie’ is used to identify Aboriginal and Torres Strait Islander peoples of Victoria.

2. The commonly used phrase ‘Information and Communication Technology’ (ICT) is based on the field of Cybernetics involving the study of physical and biological
systems that are changed through feedback mechanisms as the environment changes. Information and communication have specific cybernetic meanings that apply across fields as diverse as engineering, neuroscience and psychology. Within education, the phrase generally refers to computer-based systems that enable students to interact with knowledge for learning purposes.

3. Pedagogy is a broad concept that extends beyond the science of teaching to involve reasoned and moral human interaction that enables new knowledge and learning processes at all ages not necessarily within formal institutions. Information and Communication Pedagogy (ICP) refers to the use of ICT in formal school settings but is extended here to refer to the facilitation of knowledge and learning that is reasoned, moral and new as defined by particular organisations and communities.

4. Mobile learning refers to learning with and through mobile technological devices so that learning situations are not determined by location and can be investigated immediately on-site. The term usually assumes portable and hand-held devices such as mobile phones iPads etc., that allow for learning anywhere, anytime.
1. EXECUTIVE SUMMARY

A selective set of Information and Communication Technology (ICT) equipment and programs was introduced into participating schools to investigate whether Aboriginal and Torres Strait Islander students will be more engaged learners, will demonstrate enhanced literacy outcomes, will utilise ICT technology for personal and community purposes and will strengthen pride in their own cultural identity. The overall project was be managed by a representative working party that was responsible for general oversight, employment of a program co-ordinator, the purchase and distribution of ICT equipment and liaison with the Victoria University research team. The research was complicated given the usually small number of Aboriginal and Torres Strait Islander students in each school, the mix of primary, secondary, government and non-government schools and the sensitivities of working with different local Aboriginal and Torres Strait Islander communities. An Aboriginal and Torres Strait Islander staff member of the School of Education advised the research team as critical friend throughout the project and a cultural awareness seminar was conducted for the team at Worawa Aboriginal College. It was intended that the project assist schools in respecting Aboriginal and Torres Strait Islander culture and knowledge and in the incorporation of Aboriginal and Torres Strait Islander knowledge and culture into the regular curriculum. In researching the program, the Victoria University research team attempted to conduct research methodologies that were respectful and inclusive of cultural understandings and protocols.

The schools participating in the project were arranged in three clusters in country Victoria and are shown in Table 1 below:

<table>
<thead>
<tr>
<th>Cluster 1 Demographic data of participating schools*</th>
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<tr>
<td>School</td>
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<tr>
<td>Healesville HS</td>
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<td>Healesville PS</td>
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<td>St Brigid’s PS</td>
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<td>St Josephs College</td>
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<td>School</td>
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<td>------------------------------</td>
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<tr>
<td>Worawa Aboriginal College</td>
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<tr>
<td>Cluster 2 Ballarat</td>
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<tr>
<td>Ballarat SC</td>
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<tr>
<td>Forest Street PS</td>
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<tr>
<td>St Alipius PS</td>
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<tr>
<td>St Patrick’s College</td>
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<tr>
<td>Cluster 3 Echuca</td>
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<td>Echuca College</td>
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<td>Echuca PS</td>
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<td>Echuca South PS</td>
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<td>Echuca East PS</td>
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Three research questions constituted the basis of the study as follows:

1. What is the relationship between educational and cultural factors that impact on literacy and engagement for Aboriginal and Torres Strait Islander children in regular classrooms?
2. How does the introduction of Information and Communication Technologies into classrooms impact on the literacy and engagement of Aboriginal and Torres Strait Islander children in regular classrooms?
3. How does altering the matrix of educational and cultural factors for Aboriginal and Torres Strait Islander children in regular classrooms impact on new understandings of literacy and engagement by Aboriginal and Torres Strait Islander children, parents and community?

Data collected involved On Demand and NAPLAN test results, student writing work sample, student engagement survey, student attendance records, teacher personal accounts and parent comments.

Issues arising from the study requiring ongoing investigation are listed below:

1. That research projects involving Aboriginal and Torres Strait Islander peoples need to ensure appropriate initial discussion between communities, schools and research teams so that research purpose and methodologies are agreed and that communities are able to participate throughout the duration of the project.

2. That Information and Communication Technologies and Information and Communication Pedagogies in schools need to reflect, support and enhance the cultures and knowledges of Aboriginal and Torres Strait Islander peoples.

3. That electronic tablet devices support literacy progress and engagement with schooling of Aboriginal and Torres Strait Islander children when applications are culturally inclusive and respectful of local community culture and knowledge.

4. That Information and Communication Technologies should be available for school use and out-of-school use so that Aboriginal and Torres Strait Islander families can
participate for educational and cultural purposes including literacy and school engagement.

5. That Information and Communication Technologies and Pedagogies can support the experience and investigation of different cultures from different community perspectives enabling Aboriginal and Torres Strait Islander children and non-Aboriginal and Torres Strait Islander children to more deeply appreciate diverse knowledge, customs and viewpoints.

6. That teachers should be able to access professional learning programs including those that are designed and delivered by Aboriginal and Torres Strait Islander people and that support the education of Aboriginal and Torres Strait Islander children and the innovative use of Information and Communication Technologies and Pedagogies with Aboriginal and Torres Strait Islander children.

7. That mixed methods methodologies are most likely to enable respectful research relationships with Aboriginal and Torres Strait Islander culture, knowledge and learning and recognize the history, language and perspectives of Aboriginal and Torres Strait Islander communities.
2. RECOMMENDATIONS

1. That all schools establish protocols for respectful communication with Aboriginal and Torres Strait Islander parents on all matters regarding the incorporation of Aboriginal and Torres Strait Islander culture and knowledge across the curriculum.

2. That all schools provide continuing access to Information and Communication Technological devices for Aboriginal and Torres Strait Islander students for incorporation across the curriculum, including literacy applications.

3. That all teachers have access to professional learning programs regarding the incorporation of Aboriginal and Torres Strait Islander culture and knowledge across the curriculum and the use of tablet devices for literacy purposes.

4. That all research regarding Indigenous issues should include Indigenous researchers.

5. That funding be sought for longitudinal mixed methods research regarding the incorporation of Aboriginal and Torres Strait Islander culture and knowledge across the curriculum and the use of tablet devices for literacy purposes.

6. That a seminar be held for all stakeholders including local communities, Elders and Koorie Education Support Officers regarding Aboriginal and Torres Strait Islander education to discuss strategies for the incorporation of Information and Communication Technologies and Pedagogies especially in relation to literacy and school engagement.
Researching the education of Aboriginal and Torres Strait Islander children in Australian schools is an exceedingly difficult and uncompromising task. Working respectfully with local Aboriginal and Torres Strait Islander communities must remain top priority with any research project regarding Aboriginal and Torres Strait Islander viewpoints of culture, knowledge, teaching and learning and the purposes of schooling. In many cases, such viewpoints will be congruent with those of the school, but in others, there may be significant differences. All researchers whether Aboriginal and Torres Strait Islander or non-Aboriginal and Torres Strait Islander need to have a respectful understanding of local perspectives, values and community interests and carefully negotiate the direction of research and the appropriate methodologies to pursue. This is particularly complicated when researching within the policies and structures of social institutions such as schools where many procedures have already been set, in some cases to meet the requirements of outside authorities. With the best of intentions however, all researchers need to recognise that historic and contemporary ‘Imperialism frames the Indigenous experience’ (Smith, 1999, p.19) and that research projects must not impose philosophical world views that colonise or counter Indigenous culture and knowledge.

Indigenous philosophy is generally described as involving the interrelatedness of all aspects of the universe, cycles of experience, ‘seeing’ the perceptions of nature, intimate connection with and belonging to the land, family and community stories and oral traditions, careful listening and patience and the knowing of relationships between events. Traditions of living are passed on from generation to generation by Elders. They are clearly distinct in the main from those of non-Indigenous society and regular schooling that rely on linear cause and effect, detailed analysis of specific and isolated issues to relieve doubt and a distinct separation of the physical and metaphysical. For these reasons, the process of colonization including the forcible removal from land placed considerable pressure on tribal knowledge, language and customs and remains a major cultural disjunction for Indigenous peoples today whether living in urban, regional or remote communities. The dominant society will always dominate making it extremely frustrating and often impossible for marginalized groups to participate fully in social life while at the same time remaining true to community beliefs and practices. For these reasons, a democratic and equitable society must establish ways of recognizing and respecting Indigenous history, language and customs in all appropriate social institutions and procedures to provide cultural identification and sustainability.

In considering the above principles, the work of two Aboriginal and Torres Strait Islander Australian scholars has been drawn upon in constructing a framework for the research. Firstly, Martin Nakata has developed the concept of the ‘cultural interface’ where he describes this ‘contested space between two knowledge systems’ (Nakata, 2007, p. 9) as being not clearly Aboriginal and Torres Strait Islander or non-Aboriginal and Torres Strait Islander. This could be described as a ‘liminal’ consciousness as understandings become more variable and are challenged and questioned by changing circumstances. Nakata suggests that the Aboriginal and Torres Strait Islander epistemological constructs of knowledge are embedded in land and place for many Aboriginal and Torres Strait Islander people, as well as
Holistic approaches to learning that are infused with culture, language and community intersect closely with the pragmatic philosophy of John Dewey (1963). Here, learning arises from the continuing experience of living and thinking carefully about the effects of experience. That is, knowledge emerges from the resolution of disrupted habits and customs by the adjustment or alteration of belief, or the stabilisation and formation of conventions in response to the resolution of doubt. When humans are confronted with new situations that challenge current understanding and practice they reflexively call upon their knowledge, culture and history with their experience in relation to particular influences for constructing new ways of interacting with their changing environment. Knowing, being and language constitute a foremost strategy in this process for understanding the problems being faced, possible options to enact and communicating with others for support and advice. In general terms, pragmatic philosophy is the basis of integrated knowledge and inquiry learning around which many schools organize their curriculum and teaching. Paulo Freire (1972) saw learning in a similar light, situated in community interest and being approached from a cultural standpoint. His literacy work in Brazil and elsewhere centred on ‘culture circle’ discussion amongst people who had come together to solve problems important to the community and who undertook a process of discussion, action, communication, writing and reflection to produce a way of improving life conditions for the people.

The social inquiry and cultural basis of knowledge as understood by Dewey and Freire provide a secure and recognized backdrop for Indigenous knowledge and learning in formal schooling. Freire’s notion of literacy for example is embedded within his central concept of ‘conscientisation’ or the development of community and personal critical consciousness to critique and change society. He placed importance on dialogue between participants, with the essence of dialogue being the word. Each word contains the two dimensions of action and reflection, or of usage and meaning and to deny either destroys the praxis that exists between them. Freire (1972, p. 29) argued that teachers and students need to have a relationship of ‘authentic dialogue’ and that

If learning to read and write is to constitute an act of knowing, the learners must assume from the beginning the role of creative subjects. It is not a matter of memorising and repeating given syllables, words and phrases, but rather of reflecting critically on the process of reading and writing itself and on the profound significance of language.

There are strong connections between the key points noted above and the current strategy for the education of Koorie students in Victoria. Organised as a partnership between the Department of Education and Early Childhood Development Victoria (DEECD) and the
Victorian Aboriginal Education Association Incorporated (VAEAI), the strategy known as *Wannik: Learning Together – Journey to Our Future* (Victoria, 2008) highlighted the need for a ‘comprehensive and holistic approach’ (p. 14) and a ‘culturally inclusive curriculum’ (p.15) within current curriculum guidelines for all schools. Significantly, *Wannik* also commented that ‘Victoria is well behind other states in recognizing the cultural identity of our Koorie population within a curriculum framework,’ that ‘Engagement between school staff, parents and community is poor and under-valued’ (p.12) and that substantial improvement was also required in ‘participation, attendance, literacy, numeracy, retention and completion’ (p. 8). As a broad strategy, *Wannik* did not provide detail of how such culturally inclusive and improved learning outcomes were to be achieved, but did provide a number of systemic reform proposals. What seemed clear however was the imperative that if the formal learning of Aboriginal and Torres Strait Islander children is to improve, then the curriculum of all schools needs to be more culturally inclusive, that all schools need to be respectful of the knowledge and social background of local communities and that there needs to be a closer relationship between all schools and local communities.

Introducing an expanding range of Information and Communication Technologies (ICT) into schools over the past thirty years has not fundamentally changed how schools operate, how the curriculum is arranged, or the relationships between teachers and students. In accord with Dewey and Frere, the latest ICT applications should be used to promote an integrated and inquiry approach to knowledge and learning and indeed, to create a new suite of Information and Communication Pedagogies (ICP) for this intent. In particular, innovative ICPs should be used across the curriculum to strengthen culturally inclusive learning environments at all levels that open up current fields of study to fresh investigations and understandings by students and which move beyond constraints and barriers to learning into new vistas and imaginings. Such aspiration should be available for Aboriginal and Torres Strait Islander children as well. In terms of supporting children from diverse backgrounds, ICPs should enhance connections with family backgrounds, community cultures and aspiration for success within the regular curriculum, as well as provide encouragement and opportunity for every child to explore knowledge in creative and expressive ways. Difficulties will arise for all children when they are working within the complicated cultural interface of Nakata, drawing on their own cultural histories in relation to the ideas and customs of others, a situation that hopefully can be interpreted and reconstructed by prudent ICP. Literacy and numeracy are important examples of the cultural interface where school structures and practices of knowledge and learning need to recognize and not deny the place of culture and community in learning. Social media enables language, story, communication and expression to be integrated by children and may explain why ICTs that incorporate these features are used quite extensively. Under these circumstances, the voice of child and community can be respected, unadulterated by outside authority and regulation.

Taking these factors of respect for culture and community into account within the confines of regular schooling demonstrates that research projects involving Indigenous peoples must be sensitive to ontological and epistemological concerns. All research projects need to act in the interests of Indigenous peoples first rather than impose predetermined world views and theoretical frameworks of knowledge embedded in research design. This is exceedingly difficult to do for non-Indigenous researchers especially when the time available and other project features make careful and respectful discussion and immersion in local culture and aspiration constrained. At Worawa Aboriginal College (2012) in Victoria, an integrated education model has been developed that attempts to enable such respect and immersion to occur within state curriculum guidelines. In this model, the ‘Worawa Way’ involves the four
principles of relationship (ways of being), responsibility (ways of knowing), respect (ways of valuing) and rigour (ways of doing) so that a holistic and culturally inclusive education for students can be pursued. These principles can serve as a research framework as well, holding Indigenous knowledge, learning and community in esteem and as the mutual search for meaning continues. This research project has attempted to adhere to a philosophy of democratic process and knowledge creation that is in accord with Indigenous ways of being, knowing, valuing and doing to the best of our understanding and capabilities.
The future of digital technologies in Indigenous education is upon us. However, it is important to remember that Indigenous perspectives on Indigenous education in the twenty-first century are under-theorised in Australia. We have little knowledge of what parents of Indigenous children think about digital education, or what needs and aspirations an ICT education can meet in the twenty-first century. We have limited knowledge of how to integrate technology into non-English speaking Aboriginal communities (Rigney, 2011, p. 40).

This literature review provides a brief outline of Aboriginal and Torres Strait Islander education in Australia, with particular emphasis on learning and curriculum forms. It has been organised around a series of six themes although these of necessity intersect and have common ground. Following some contextual remarks, the themes are discussed in the order of Aboriginal and Torres Strait Islander research, ways of knowing, information and communication technologies and pedagogies, approaches to curriculum design, literacy and learning outcomes and academically robust curriculum. A summary discussion of the review is then provided. The review consists of pointers to major topics, themes and reports rather than an extensive discussion of each.

Context

Australia does not have a commendable record regarding Aboriginal and Torres Strait Islander education at all levels. The situation itself is complex involving as it does different views regarding power, race, knowledge and learning. Aboriginal and Torres Strait Islander students are also dispersed across urban, regional and remote communities, with the majority attending neighbourhood schools in the towns and cities of eastern Australia where they are generally a small minority of the individual school population. It is difficult to generalise across Aboriginal and Torres Strait Islander communities that have different languages, geo-histories and aspirations. However a report from the Ministerial Council on Education, Early Childhood Development and Youth Affairs, now renamed as Standing Council on School Education and Early Childhood (SCSEEC, 2010-2014) provided six general guidelines for Aboriginal and Torres Strait Islander education involving readiness for school; engagement and connections; attendance; literacy and numeracy; leadership, quality teaching and workforce development and pathways to real post-school options. Such detail needs to be seen within the general Australian commitment to improved educational options as noted by the Melbourne Declaration (MCEETYA, 2008) through building on the knowledge of Aboriginal and Torres Strait Islander students and working in partnership with local communities. Internationally, the specific recommendations of United Nations Declaration of the Rights of Indigenous Peoples (UN, 2007) as a global consensus that took twenty years to assemble need to be considered, especially Article 14 which asserts:
1. Indigenous peoples have the right to establish and control their educational systems and institutions providing education in their own languages, in a manner appropriate to their cultural methods of teaching and learning.

2. Indigenous individuals, particularly children, have the right to all levels and forms of education of the State without discrimination.

3. States shall, in conjunction with indigenous peoples, take effective measures, in order for indigenous individuals, particularly children, including those living outside their communities, to have access, when possible, to an education in their own culture and provided in their own language.

Given the connections for all Australians between formal education and access to higher education, vocational education and training, economic security and standing in the community, these trends from pre-school onwards contribute markedly to personal, social and economic disadvantage. They are however well known and the inability of Australian society to make progress on their improvement gives cause for grave concern. The significance of educational reform for Aboriginal and Torres Strait Islander peoples cannot be overestimated. The view of Rigney at the head of this chapter clearly refers to technology for specific educational and learning purposes as distinct from daily use and it does indicate that considerable theorizing of application is required. In this regard, Radoll (2012) proposes that ‘there is a commonality between Aboriginal pedagogy and ICTs, which teachers can explore in the classroom’ (p.122) and goes on to argue that teachers can use ICT to ‘ensure that Aboriginal and Torres Strait Islander students move towards a student-centric, teacher guided learning environment in which the student takes primary responsibility for their own learning and educational outcomes’ (p. 123).

**Aboriginal and Torres Strait Islander Research**

A number of problems exist in relation to the conduct of research into Aboriginal and Torres Strait Islander education in Australia. Aboriginal and Torres Strait Islander communities who aspire to have their children succeed in mainstream curriculum with mainstream outcomes are confronted by epistemological and ontological difficulties that the regular curriculum has either ignored, or has not been able to resolve. Aboriginal and Torres Strait Islander communities who aspire to a more culturally-inclusive understanding of knowledge and history if necessary integrated with mainstream outcomes will also have considerable difficulty in finding school locations where this occurs. Academic research that arises from a dominant culture will tend to overlook contextual features of culture and socio-political circumstance and will not only provide an inadequate and distorted account, but will be seen by Aboriginal and Torres Strait Islander peoples as another form of oppression.

As a Quandamooka woman from Queensland, Karen Martin (2003, p. 204) claims ‘my genealogy, my ancestry and my position as a researcher and author. The purpose is to locate myself firstly as an Aboriginal person and then as a researcher.’ She suggests that a ‘Quandamooka ontology’ informs Indigenist research through the relations of ‘Ways of Knowing, Ways of Being and Ways of Doing’ (p. 208). From a non-Indigenist perspective, such ontology is often disregarded as unnecessary, with research being seen as disconnected from the background of researchers. That is, how research is conducted and how knowledge is understood is quite separate from researcher world views such as community, feminist, social class, or race. Martin highlights an essential problem for Indigenous researchers undertaking projects in non-Indigenous social and political environments, but similar issues
also apply for non-Indigenous researchers who adhere to articulated world views of their own to inform the generation and interpretation of knowledge.

In a major study, Mellor and Corrigan (2004) have argued that Aboriginal and Torres Strait Islander research ‘is not explaining the rich and complex factors that are contributing to Aboriginal and Torres Strait Islander students’ poorer educational outcomes.’ They suggest a number of limitations of the research including projects that are isolated from the broader educational discourses, a lack of connection with other disciplines such as sociology, research findings that are equivocal, incomplete or unclear and testing without context. Mellor and Corrigan point out that good studies use a mix of qualitative and quantitative methodologies to get a more detailed picture of complex situations and that a lack of this type of research should be remedied.

A recent development in Australia has been Hooley’s (2007, 2009) proposal for the adoption of narrative inquiry as a democratic means of qualitative Aboriginal and Torres Strait Islander research. According to Clandinin and Connelly (2000), ‘Arguments for the development and use of narrative inquiry come out of a view of human experience in which humans, individually and socially, lead storied lives.’ If this is so, then the school curriculum needs to ensure that narrative forms of knowing are included for all children along with those approaches that are more empirically oriented. Based on the writing of Clandinin and Connelly (2000), Hooley has developed a systematic four-dimensional approach towards narrative curriculum. As Rigney (2006, p. 42) points out, we hope that narrative can support the project of Indigenist research ‘to chart our own political and social agendas for liberation from the colonial domination of research and society.’ The methodology involves students in cycles of looking backwards and looking forwards, looking inwards and looking outwards, thinking about the ideas we have at present and how we might go about changing current circumstances to take our understanding forward.

A key aspect of Aboriginal and Torres Strait Islander research is that of oral history. Accepting the oral traditions of Aboriginal and Torres Strait Islander peoples may be difficult for some researchers and therefore the inclusion of voice and story in research projects may often be overlooked. Attwood (2005) and Clendinnen (2006) have both discussed oral history in terms of its interpretation and incorporation into research. These questions of knowledge demonstrate the problems that afflict testing regimes within schools and the inaccuracy of results if they are not taken into account. The question of whether Aboriginal and Torres Strait Islander peoples in colonial societies wish to live within two worlds and resist cultural assimilation, or find strategies whereby communities remain time-honoured and customary, is a problem for formal education that runs throughout this report.

In some respects it is understandable that there are major deficiencies regarding Aboriginal and Torres Strait Islander research, given that the question of research itself is a highly contested area. Qualitative research is still not recognised as a legitimate form of research in some quarters and within qualitative research different methodologies are still being developed (Denzin & Lincoln, 2004). Conversely, in the continuing debate regarding the No Child Left Behind legislation in the United states, Cummins (2007) has strongly argued that ‘The research reviewed in the National Reading Panel (NRP) report provides no empirical support for the imposition of scripted reading curricula on schools serving low-income students. The research studies cited by the NRP as supporting systematic and explicit phonics instruction show no consistency in the way that construct is operationalised. Thus the construct is devoid of theoretical coherence and empirical substance.’ As this shows,
academic research regarding human knowledge is fraught with disputation and competition between two epistemological and value positions. In particular, literacy and numeracy find themselves caught within a vigorous political and educational debate about schooling that Dewey (1963) characterized as ‘traditional and progressive.’

**Aboriginal and Torres Strait Islander Ways of Knowing**

Aboriginal and Torres Strait Islander knowledge that is shared and community-based rather than individual and competitive poses a number of intricate issues for non-Aboriginal and Torres Strait Islander law, science and educational practices. This is sometimes seen as a problem to be solved, rather than possibility for democratic engagement. According to the Native American Battiste (2008, pp.89-90), ‘To effect reform, educators need to make a conscious decision to nurture Indigenous Knowledge, its dignity, identity and integrity by making a direct change in school philosophy, policy, pedagogy and practice.’ Indigenous communities around the world have regularly reported a small set of principles by which they see learning and knowledge occurring. Confirmed by Australian studies (Hughes, 2000; Hughes & More, 2004), these include learning from the land, proceeding from community interest, the respectful participation of Elders, holistic connections between knowledge, forms of observation and practical inquiry, longer time spans and the place of culture involving language, ceremony and communication.

In discussing his work on the connections between digital applications and Aboriginal knowledge, Christie (2005) makes a number of significant ontological and epistemological comments. He is interested in how digital environments such as the database can assist ‘collective memory-making which is fundamental to renewing traditional knowledge in each new generation’ (p. 62) and how digital systems can support this process:

> When Aboriginal elders are inducting their young people into their ancient knowledge traditions, they are not so much interested in teaching them the content of their knowledge, but the shared background which make truth claims and performances possible and assessable, the practices of intuition which derive axioms from theorems, the modes of performance through which truth claims and performances can be made and the complex ethical and aesthetic work which is done in validating and privileging some particular performances rather than others (p. 66).

The fact that the regular curriculum in Australia and elsewhere has found it incredibly difficult to incorporate and work with these principles indicates either a lack of ontological and epistemological sophistication, or the continuing influence of prejudice and bias regarding diversity. What is striking however when reading the literature is the close correspondence between ways of knowing and the approaches of integrated inquiry learning outlined by the pragmatic philosophers such as Dewey (1963, 1997). Australian education has struggled to implement a truly integrated and inquiry curriculum and still maintains a system that is heavily characterised by behaviourism. This may be due to the strong cultural yet essentially unexamined and uncritiqued framework that has grown up around a particular subject, as with school mathematics, or the power relations that are maintained by privileged forms of knowledge through strict regimes of assessment. These features of culture and power that determine curriculum design and pedagogical practice make it extremely difficult for Aboriginal and Torres Strait Islander considerations to be heard, let alone impact substantially on daily classroom life.
Approaches to Curriculum Design

Partington (2002) has outlined a number of models that have characterised Aboriginal and Torres Strait Islander education in Australia. He has termed these models of separate schooling, deficit/assimilation, culture, empowerment, two-way schooling and partnership. Bilingual and multiliteracy approaches will also be discussed below. Partington suggests that the move to cultural models for the provision of education represented a landmark in Aboriginal and Torres Strait Islander education. It has also been noted that little evidence exists to suggest that modest curriculum revisions alone will provide for the inclusion of ‘non-dominant knowledge’ (Ladwig & Amosa, 2004). While these models did not ensure empowerment of Aboriginal and Torres Strait Islander people, they did at least acknowledge the validity of the culture of the people. There will always be a tension between the requirements of the European state as translated by principals and teachers and the cultural aspiration of local communities. The role of the individual teacher and teaching teams is central and extremely complicated here, as they attempt to find ways of making progress with European knowledge such as literacy and numeracy, while at the same time recognising the cultural imperatives and framework within which they work.

Hooley (2002) in following the work of Harris (1990) on two-way learning has incorporated Dewey’s notion of inquiry into a systematic approach towards two-way inquiry learning. The appropriateness of two-way learning has been contested in Australia, particularly in regards to whether the dominant society and culture will always prevail or indeed assimilate the non-dominant culture and society. In rejecting the notion of ‘hybridity,’ Hooley has attempted to cover this criticism through the notion of systematic inquiry. He has provided a list of seven dimensions that characterise this approach as being continuity of experience, a recognition that learning occurs in different ways and involves long-term reflection on experience, an integrated practice and theory, integrated and constructed knowledge, childrens’ knowledge as being valid and a holistic view of life itself. These dimensions should enable peoples from across cultural settings to come together to discuss and reach consensus on issues of mutual concern and to consider ways of moving forward together. Two-way inquiry learning is not intended to remain at the level of understanding only, but to develop new ways of resolving practical problems and thereby to enact new forms of understanding. This raises the possibility of new narratives being constructed as noted above in relation to narrative as research methodology.

As a first step to cultural inclusiveness, schools need to develop structures that enable Aboriginal and Torres Strait Islander families, children and Elders to participate as respected equals in the learning process. Wherever we live, there will be Aboriginal and Torres Strait Islander co-ops, health centres, education houses and local identities through which contact can be made. To see formal education as a community partnership involving all stakeholders is surely not a radical idea. In Sweden for instance and as described by Brophy (2001), a system of study circles has existed for over one hundred years. This is seen as a form of liberal education and a means of strengthening democracy for the entire country. Swedish study circles have over two million participants each year and arrange about 200 000 cultural events annually. They follow the same tradition of the folk high school established in 1868, where programs are decided by the people according to current interests and needs.
Aboriginal and Torres Strait Islander peoples in Australia are also familiar with this type of organisation. In attempting to make progress on reconciliation matters, a number of learning circles were established to bring Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander peoples together for cross-cultural understanding. Key features again included a sharing of experience and explanation through story telling and the identification of common themes arising. Depending on the circumstances, a learning circle exists inside other structures. For schools, there are constraints of time and regulation including the need for formal assessment. The purpose of the learning circle is however to go beyond such barriers and to work with other structures that are enduring, democratic and respectful. The learning circle provides a structure to enhance human agency, not to restrict it.

**Literacy and Learning Outcomes**

As the discussion thus far has indicated, research and assessment, learning generally and literacy and numeracy learning in particular are complicated and contested areas around the world. There may well be cultural incongruence between formal education programs and the history, practices and understandings of communities. Testing programs for example have long been criticised for concentrating on what can be ‘measured’ empirically at a particular time instead of the emerging knowledge, insights and apprehensions of the child over time. In diverse communities, what is considered ‘common’ and therefore available for measurement is changing and often disputed. It was only in the 1950s that the place of science in the curriculum as compared with the humanities was still being decided. More recently, the role of new technologies across the curriculum has needed to be considered. A significant report however conducted for the NSW Minister for Education canvassed a wide range of issues regarding Aboriginal and Torres Strait Islander education and identified the following strategies as having potential to improve the learning of Aboriginal and Torres Strait Islander students (NSW, 2004, p. 76):

- talking and listening activities, especially in kindergarten to build on home language
- literacy and numeracy workshops for parents supported by local Aboriginal Education Consultative Groups
- professional development for teachers regarding Aboriginal English, language development and Aboriginal learning
- strategies that enable Aboriginal students to hear, understand and engage in classrooms and to be able to code switch between Aboriginal English (AE, home language) and Standard Australian English (SAE, school language)
- specific support for literacy and numeracy in both AE and SAE
- culturally inclusive texts
- mainstream programs that incorporate the needs of Aboriginal students
- academic research and mentors regarding quality teaching.

To act on all of these recommendations at once is a difficult task for schools and to be successful will require whole school approaches over time. As the NSW report suggests, the Scaffolding Literacy program offers promise in accelerating literacy skills. It appears to be especially appropriate for those who have failed to make appropriate literacy gains and who may be falling behind classmates (Creswell, Underwood & Withers, 2002). Teachers involved with the program comment that major features include age-appropriate texts, professional development and the applicability of the program across stages and key learning areas of the curriculum.
Any discussion of literacy in Australia must note the most recent report (DEST, 2005) that has been both strongly supported and criticised. Release of this report continued the national debate regarding whether literacy is best taught through an emphasis on phonics and phonemics, or through an emphasis on experience including whole language. This debate has been vigorous around the world for many years and has included the contentious No Child Left Behind Legislation (NCLB, 2002) of the United States. The debate concerns whether or not humans learn language through direct instruction of letter-sound correlations as their first encounter with literacy, or whether such coding is incorporated into the child’s general experience when needed. Whole language advocates support the latter approach and argue that culture, context and experience are necessary for comprehension, as distinct from a knowledge of other components of language such as grammar, syntax and spelling. This debate is highly significant for Aboriginal and Torres Strait Islander children if one method or the other of teaching reading and literacy is imposed by the dominant society, without a balanced view of all the factors at play being adopted.

In an extensive report regarding the literacy and numeracy learning of Aboriginal and Torres Strait Islander children in the early years, Hughes (ACER, 2003, p. iv) raises the question of the development of assessment tools that do not disadvantage Aboriginal and Torres Strait Islander children. He describes a test item that asks the child to explain the logo on a carton of milk and comments: ‘Who has the cultural advantage here - the student whose father has a strong interest in basketball, season tickets to the game and drinks fresh milk from the cool room at the supermarket – or the student who lives in a small community in the country, follows the local football team and who drinks generic long-life milk bought in a box?’ This is only one cultural problem of literacy and numeracy testing that in the mainstream curriculum draws almost exclusively on dominant life practices rather than a diversity of geographies and experience.

Although concerned with the early years, this report raises many issues that can be related to Aboriginal and Torres Strait Islander education generally. Factors that the report found as being statistically associated with achievement included the role of the school, differences between metropolitan, regional and remote locations, language background including the speaking of standard Australian English at home, school attendance and student attentiveness. A list of learning contexts was also included such as cultural diversity and inclusivity, the provision of literacy and numeracy programs and school-community partnerships. Some of the key factors that were seen to be important in enabling student success were the style of leadership, attendance and engagement of students, good teaching and an Aboriginal and Torres Strait Islander presence in the school. An important finding of the study was that the pre-school years provide the foundation for future learning and student skills at the start of school shape their subsequent learning in powerful ways.

A federal discussion paper (MCEETYA, 2001, p. 34) also noted that literacy skills in Standard Australian English are central to success in formal education for all ages and subjects. The report emphasised again that Aboriginal and Torres Strait Islander students are often confronted with literacy and numeracy activities that assume culturally-embedded understandings and that assessment regimes that follow a similar pattern can produce less than adequate or accurate results. Particular mention was made of mathematical concepts such as space, time, number and measurement that may be considered in a more abstract and cultural manner in schools and topics like chance and data and algebra may alienate Aboriginal and Torres Strait Islander students for similar reasons. The report indicated that
many educators may also have low expectations of Aboriginal and Torres Strait Islander learning and that this can become a self-fulfilling prophesy. This problem can arise specifically if Aboriginal and Torres Strait Islander children do not read, write or use mathematics for personal enjoyment, but see these activities as compulsory and imposed by the school.

Amongst other issues, the concept of bilingual education for Aboriginal and Torres Strait Islander children in the Northern Territory was reviewed by Collins (1999) and strongly supported. Since that time, the policy has undergone major changes with the current government committed to strengthening the practice across schools as it exists. Bilingual education is sometimes confused with two-way learning which is a broader concept than involving language alone. It is significant that the Collins review preferred the term two-way learning in relation to language because it brought together and respected both formal and vernacular speech and communication. It was also stated that a ‘one size fits all’ approach to two way learning is inappropriate with different communities needing more flexible approaches. The review found that improved speaking and literacy development was a key concern for Aboriginal and Torres Strait Islander parents, students and community members. There was also comment from older Aboriginal and Torres Strait Islander people that the literacy level of the current generation was less than their parents.

Rose and others at the Koori Centre, University of Sydney have worked on a long-term action research program with school and university programs across Australia and internationally. Strategies have been developed for teaching reading and writing at all educational levels, particularly with Aboriginal and Torres Strait Islander learners (Rose et al, 2004). At the Koori Centre these strategies are known as scaffolding academic literacy and are currently being implemented by staff in the Diploma and Tertiary Preparation courses. Scaffolding is a technique used in teaching generally and with literacy in particular whereby key ideas and information are made available to learners as a framework within which they build and experiment with new ideas and concepts.

Questions of multiliteracy (Yelland, 2006) including orality (Ong, 2012) and the place of information and communication technologies must also be considered in regards to literacy for Aboriginal and Torres Strait Islander children. These issues show that notions of culture and literacy are changing in the broader community and that this will impact on Aboriginal and Torres Strait Islander practices as well. The use of computer-based technologies in relation to music improvisation, composition and performance, graphics and design, Internet searches, text messaging, video and digital film creation and application all demonstrate that Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander culture is dynamic and that static representations are not necessarily accurate or appropriate. These developments have important ramifications for notions of teaching, learning, curriculum and assessment.

Information and Communication Pedagogies

Information and Communication Pedagogies (ICP) are an emerging branch of educational practice and theory, the role of which is promote the adoption of technological innovations in schools and other learning organizations, in order to prepare new generations for the digital society. CIP attempt to explore, understand, describe and explain the complex relationships between futuristic policy aspirations, evolving architectures of learning and teaching, and discordant models of evaluation and assessment of student performance and learning.
outcomes. This section will reflect on key Australian policy directions related to new technologies and Indigenous learning, Indigenous access to technologies, and will examine the culture-pedagogy-technology nexus in the context of Indigenous culture in Australia and beyond through a number of research studies involving Indigenous participants.

*Future-proofing Australia in the global digital age – Implications for Indigenous students and their schools*

Unprecedented technological progress resulted in rapid changes to our daily lives. Through digital technologies, most social practices have been reconceptualised, demanding significant adjustments in ways of thinking acting and learning. In order to keep up with these revolutionary developments within the context of global economies, schools have been receiving steady injections of technological infrastructure to ensure that the future workforce of Australia is ready for the global challenge. Unfortunately, due to lack of strategic thinking around the deployment of ICT infrastructure, including the preparation of teachers and provision of technological support, the investments created little return in the form of student outcomes (Dakich, 2008).

The recent Gonsky report revealed that the performance of Australian students continues to fall behind other OECD countries when it comes to literacy and numeracy skills. Additionally summaries of OECD reports (ACER, 2012) indicated that Indigenous test results of reading, mathematical and scientific literacy had not improved in between 2000 and 2009. In particular, test results of Indigenous students were overrepresented at the lower literacy bands and underrepresented at higher literacy bands. In order to stop these unfavorable trends, Prime Minister Gillard announced a national overhaul of school funding, costing the states and territories 6.5 billion, to help raise the performance of Australian students in literacy, numeracy and science to the top five countries by 2025 (Gillard, 2012). The Gillard Government also committed additional funding loading, beyond the Gonsky recommendations for every Indigenous student across the country. In its decision-making the Government was responding to the National Congress of First Peoples Education Advisory Group. The Advisory Group recommended a change to the funding scheme, and emphasized that “closing the educational divide requires a focus on Aboriginal and Torres Strait Islander students, as well as a system, which is inclusive of ongoing professional support and development for their educators, and quality support for parents/carers and community, throughout this process (National Congress of Australia’s First People’s, 2012, p.3).

The above commitments of the Australian Government mirror the aspirations articulated in the Melbourne Declaration of National Goals (MCEETYA, 2008). The goals aim for excellence across all school sectors and highlight the need for working with Indigenous communities on all aspects of schooling by promoting high expectations for the learning outcomes of Indigenous students, and building on local cultural knowledge and experiences. The Australian Curriculum (ACARA, 2010), attempted to operationalize these goals by incorporating Aboriginal and Torres Strait Islander histories and cultures within the English, Mathematics, History and Science curriculum areas as a cross-curriculum priority. The aim of this curriculum innovation was to help teachers avoid tokenistic and simplistic representations of Indigenous cultures, and assist them with the development of culturally relevant learning experiences that build on partnerships with local Indigenous communities and promote rich cultural interfaces and intercultural understanding between Indigenous and non-Indigenous Australians.
The Federal Closing the Gap initiative (Altman, 2009), a long-term commitment of the Australian Government to work towards a better future for Indigenous and Torres Strait Islander Communities, called on State and Territory Governments to commit to developing local and regional strategies in order to improve educational outcomes for Indigenous student and school communities by:

- improving enrolment rates;
- improving attendance;
- improving student engagement;
- improving literacy and numeracy attainment;
- developing an Indigenous education workforce;
- up-skilling the teaching workforce to better support Indigenous students;
- improving parental and community engagement;
- improving ‘wrap around’ support, including through extended service school models;
- improving retention rates;
- improving transitions from school to further education and training; and
- creating high expectations for Indigenous young people (p. 25).

Surprisingly, improving access to new technologies or raising the bar when it comes to digital literacy amongst Indigenous students was not explicitly articulated in this strategy. However, since its publication, the Australian Government Initiated and funded a number of projects including the TECP project evaluated in this report, aiming to close the gap between Indigenous and non-Indigenous educational outcomes and open up sustainable pathways towards employment and community development for all Australians.

These efforts were fortified by the $540 million investment following the National Partnership Agreement on Literacy and Numeracy that was allocated to improve literacy and numeracy performance of students from over 1000 schools across the country, as well as the Digital Education Revolution (DER). The goal of DER was to scaffold effective integration of new technologies to Australian Schools, with a special focus on providing every secondary school student in years 9-12, with a laptop/notebook computer through the National Secondary Schools Computer Fund (www.coag.gov.au/schools_and_education). Part of this initiative was to provide 33,500 Indigenous students in years 9-12 across states and territories with personal access to a portable computer, hoping to improve student engagement and retention in upper secondary education.

Currently, there is a lack of conclusive research evidence that could support a sound analysis on why so little progress had been made towards this goal, despite major national initiatives and investments, the were directed towards raising learning outcomes and improving the pathways for the participation of Indigenous youth in the Australian Workforce. Studies from around the world, involving Aboriginal and Torres Strait Islander students and other First Nation communities (Reedy, 2011; Hartnell-Young and Vetere, 2008; Pirbhai-Illich, Turner and Austin, 2009; Smith and Magee, 2005; Chikonzo, 2006; Mignone and Henley, 2009; Litchfield, Dyson, Lawrence, and Zmijewska, 2007; Oakley, Pegrum, Faulkner and Striepe, 2012), highlighted a number of issues that hinder the success of top-down interventions by governments. These issues include access and connectivity, examining digital technologies through cultural contexts and cultural interfaces, and looking at the barriers of their integration within traditional western learning paradigms and pedagogies.
Digital access, inclusion and participation

Much has been written on the problematic of digital divide in the last decade (Norries, 2003; Warschauer, 2004), and how it affects the socio-economic health of modern societies. Mainly through trial and error, it has become evident that the key steps towards a digitally inclusive society are providing convenient and sustained access to ICT infrastructure as well as opportunities for participation in the digital society. Assessing the challenges of social participation, this review looks beyond the context of education, and examines arguments offered by a recent study (Perlgut, 2011), in which the author warns of a “...looming ‘digital participation gap’ in Australia” (p.1), likely to affect the most vulnerable communities of the society in the midst of the rollout of the National Broadband Network (NBN). He highlights the critical importance of access to the Internet, hardware and software, relevant content and services as well as to opportunities for the development of digital literacy skills as key prerequisites for participation in a networked society. Perlgut also identifies the gap in digital ownership, as symbol of a growing problem and the next big social justice issue. According to him, owning digital artifacts takes on symbolic meaning and represents social participation and belonging to the broader society. It is important to mention that this theme emerging from the literature review is underpinned by the findings of this study and translates into one of the recommendations of this report.

Similarly to Smith and Magee (2005) Perlgut’s study argues for understanding the importance of connectedness and the need to risk-proof Indigenous communities from being excluded from enjoying the benefits of the National Broadband Network. With the deployment of NBN in full swing, it is expected that about 80% of all Australian premises will be connected by 2025. Perlgut argues that:

> we must commit to 100% inclusiveness, because if we aim anywhere lower we are running the risk of creating a second class of citizens, and whole communities that have the potential to become divorced from social, civic and economic engagement with the rest of Australia (as well as the rest of the world) (p.4).

Digital technologies, context and culture

Another broad concept that emerges from a number of studies is the extent to which digital artifacts are determined by the culture in which they were created and how they are reconstructed and assigned new values through social practices. Technology driven approaches to educational innovation often consider digital technologies as culturally neutral artifacts, while critical perspectives highlight possible hidden agendas of market driven segments of the society (Ferneding, 2003; Drenoyanni, 2006), and view technologies a new platform of cultural imperialism (Dyson, 2004). In her analysis, Dyson raises pertinent questions such as:

> How are Indigenous peoples to deal with these technologies? Will they be able to access the many advantages while retaining their own cultures intact? Importantly, do they view them as a medium of colonization, antithetical to their traditional values and worldview? (p.58)
Dyson’s analysis concurs with Pelrgut’s (2011) remarks that limited access, lack of computer ownership and poor levels of digital literacy are key to low adoption rates of digital technologies in Indigenous Australians. She also emphasizes the importance of cultural appropriateness in the use of technologies and the need to reflect indigenous knowledge and contexts and support individual and community aspirations.

Similarly to authors representing a variety of Indigenous perspectives from countries around the world (Chikonzo, 2006; Mignone et al., 2009), Dyson highlights the role of in maintaining cultural continuity and cultural preservation, including the revival of Indigenous languages. She suggests that rather than maintaining cultural marginalization, “against the exclusion of the print elites, ICTs offer the prospect of genuine, unmediated, unedited Indigenous Australian voice to be heard across Australia and across the world.” (p.69). Brugier and Greathouse-Amador (2012) further argue that digital technologies and new learning environments based on culturally sensitive experiential learning provide opportunities for cultural transactions and the development of intercultural understandings, a generic capability recently introduced into the National Curriculum.

In recent years, the widespread introduction of smart phones, tablet devices and Web2 technologies brought these ideas alive. Instead of pushing mono-cultural information, these digital tools allow for the creation and communication of user-generated content regardless of language, culture and worldview, thus opening up new opportunities for harnessing their power for pedagogic transformation and improving the outcomes of diverse groups of learners.

Making the most of mobile learning

Mobile learning has become increasingly popular amongst young people where it often is a technology of choice (Hartnell-Young et al., 2008). They allow students to learn anywhere anytime and according to these authors, mobile technologies are used in conjunction with new styles of communication, new literacies (Lankshear and Knobel, 2006) and personalized curriculum. Mobile learning has the capacity to incorporate old and new literacies and provide a more student-centered approach to learning. Through Internet connectivity (Smith et al., 2005) and rich multimedia experiences mobile technologies transform conventional literacies and expand traditional repertoires of communication by adding moving images and audioscapes to words, creating multiliterate (New London Group, 1996), multimodal channels of communication and collaboration. Because of the above characteristics, it is hypothesized that mobile technologies are conducive to facilitating student engagement and improving literacy outcomes for Indigenous students. Two recent studies conducted with Indigenous Australians (Hartnell-Young et al., 2008 and Oakley et al., 2012) that explored pedagogical approaches of using mobile technologies for improving literacy outcomes for Indigenous students will be looked at in the next section.

Hartnell-Young and Vetere (2008) have conducted a small-scale study in the Northern Territory by providing four male secondary school students with mobile phones with a camera and an online Life blog software that automatically stored text images and video. The students were asked to record their everyday life and provided minimal guidance. Apart from the Life blog data the researchers visited each student in their schools and recorded their conversations. The authors found that the opportunities for engaging with new forms of literacies facilitated various forms of storytelling and that these digital creations representing segments of students’ families and community experiences contributed to personalizing the
curriculum in a meaningful way. More importantly, in their article Hartnell-Young and Vetere argued that the study had significant implications for existing assessment practices by demonstrating the need for broadening assessment to include learner–generated material. The study also reported a positive effect of mobile learning on students’ self-confidence.

A larger sample of both Indigenous and non-Indigenous students was involved in Oakley et al.’s (2012) study, where a two-phase project involving a broad survey of ten independent schools in Western Australia was followed by six in-depth case studies of schools in the second phase of the project. The researchers explored pedagogical applications of mobile technologies for teaching literacy. The devices of choice were iPods and iPod Touches that were provided to students with the aim to transform the teaching and learning of English and improve learning outcomes through literacy as a ‘general capability’ as described by the New Australian Curriculum across other learning areas. The study concluded with significant implications for current interpretations of literacy, suggesting the likelihood of “further redefinition of what literacy actually is and what is it for” (p.67). The researchers highlighted the need for providing teachers with ongoing professional development as well as professional networking opportunities. They have identified the need for further research examining the impact of mobile technologies on students’ learning of traditional texts as well as multimodal digital texts.

Studies involving Indigenous participants in countries such as Canada, the US, Mexico and Zimbabwe (Smith et al.,2005; Chikonzo, 2006; Mignone et al., 2009; Pirbhai-Illich et al., 2009) also highlight the need for rethinking literacy and the assessment of literacy skills in culturally diverse classrooms. According to Pirbhai-Illich et al. (2009) prepared worksheets, grammatically correct sentences are much easier to assess and align with curriculum documents than student-generated content and report cards filled at the end of terms do not provide an accurate representation of deep knowledge and critical literacies learnt through pedagogical approaches using digital devices. This often results in teachers reverting to less challenging approaches to teaching and learning and assessment.

The above argument demonstrates the complex context of technology integration that goes beyond providing access to technological infrastructure and calls for a pedagogical cultural repositioning that takes into account the nature of knowledge the contexts in which the production of knowledge takes place, as well as how it is enacted in praxis through the prism of values and beliefs. Studies demonstrate that pedagogical approaches and assessment methods are by and large incongruent with the cultural context in which they are employed and are unsuitable for measuring new forms of knowledge that emerge from learning experiences with and through digital technologies. Research also suggests that ignoring teacher professional development needs breaks the link between policy and practice and prevents successful translation of government investments to improving learning literacy levels and broader learning outcomes.

If we are to provide equitable access to education for Indigenous Australian learners, as Reedy (2011) recommends, we need to extend research into four major areas. This entails research into mobile technologies to facilitate teaching and learning, research into models of flexible delivery for indigenous students to foster retention and pathways, research into the interfaces of formal and informal learning, and finally, research into alternative assessment forms of student learning to measure learning experiences and outcomes that are life-changing, and create an interface between social capital and increased socio-economic well-being (Reedy, 2011) for young Indigenous Australians.
Academically Robust Curriculum

There is constant debate in Australia and overseas regarding the nature, purpose and structure of curriculum. This is not unusual as society and the economy changes and the expectations of schooling change. Retention rates to Year 12 for example are subject to policy review and update as more students regardless of socio-economic background are expected to complete secondary schooling and to move to either higher education or vocational education. Accordingly, there is deliberation as to whether or not the curriculum should consist of the academic disciplines, a selection of contemporary knowledge, or focus on student interest. There is a divide between abstract and applied knowledge, with primary schools focusing on broad language development through integrated and applied activities and secondary schools tending to separate knowledge into discrete academic blocks. Currently there is discussion regarding the appropriateness of a national curriculum for all schools in Australia and how the question of diversity can be best handled.

In considering how to arrange the work of schools within this context, the effective schools movement outlined a series of principles (for an Australian perspective see McGaw et al, 1992). These included strong administrative leadership, high expectations of student achievement, frequent evaluation of learning, an emphasis on basic skills, a safe and orderly climate and a well trained teaching force with clear goals and outcomes. This approach has sometimes been criticised on the grounds that it is essentially an industrial model of organisations imposed on schools. That is, schools are not factories or assembly lines where a strong manager sets down the goals of the company which employees then set out to meet. The effective schools movement discusses a broad range of issues within the principles outlined above including curriculum, the role of staff, students and parents, school ethos and vision, the capacity of schools to change and improve and the location of schools within the community and systems. These items can be taken separately, or be seen within the complexity of school life, each connected to the other.

Associated with the idea of schooling effectiveness, is the self-managing school concept (Caldwell & Spinks, 1988; Caldwell, 1994, 2006). Here the school is somewhat extricated from systemic requirements and adopts the principles of strong leadership, clear goals, well trained teachers and the like. This approach was adopted in varying ways by Victorian governments from the mid-1980s onwards and is still influential today although to a limited extent. Some commentators have argued that the transition has not gone far enough and the self-management that occurs within a framework of government regulation and devolved responsibility, should proceed to self-governing where all schools operate as independent entities. A criticism of this view is that it detracts from public concepts of education for all and is based on notions of privatisation involving student fees and fund raising by school communities. The self-managing school model has also never been able to adequately demonstrate that its organisational structure results in improved student learning outcomes. Connections may be drawn with the Year 12 exam results for private schools and their independent forms of operation as advocated by effective schooling. This is a complicated relationship however involving social capital, cultural reproduction and connections with privileged knowledge, a relationship that is subject to ongoing community and professional debate and research (Teese & Polesel, 2003)
An interesting trend in Australia has been to isolate the notion of teacher quality from the broader approach of schooling effectiveness. In some respects this is a simplistic argument building on the hard-to-dispute contention that good teachers are significant for improved student outcomes. The extent of the impact of quality teaching is difficult to define especially in regards to other factors such as the socio-economic background of students and the intermixing human, cultural and economic capitals of the school. This leads to a debate that is referred to as ‘within school differences,’ or ‘between school differences.’ Can the teacher overcome all the other factors that exist in a school and which are brought to the classroom by students and achieve high quality learning outcomes by excellent teaching alone? The current framework for curriculum in Victoria (VELS, 2005; AusVELS, 2012) has drawn upon these ideas identifying essential learning in three strands: processes of physical, personal and social development; a selection from traditional disciplinary knowledge and a number of interdisciplinary domains such as communication and technology. The VELS framework is difficult to describe in theoretical terms as it is a mixture of activities that do not necessarily fit neatly together. As a framework, it remains the responsibility of schools to decide how they will arrange the strands, domains and dimensions provided and to this time, many schools are in transition. The rhetoric however continues to be firmly but uneasily based in quality teaching and therefore schooling effectiveness. It is still too early to ascertain whether any new schooling structures have emerged in public schools to support the new curriculum and whether such structures and processes have impacted on learning outcomes.

Apart from teacher quality, another specific aspect of schooling that is commented on frequently is that of educational leadership. Fullan’s work is important here and his efforts at clarifying leadership characteristics and school reform initiatives over many years and in different countries have been prominent (Fullan, 2003, 2004, 2005). He has a democratic and collegial approach to the leadership question while not denying that particular people with particular roles are important. Within Australia, Sarra is a former school principal and Aboriginal and Torres Strait Islander educator who has placed emphasis on strong leadership at the school level achieving outstanding results on attendance and other indicators. He comments that ‘School is a place where you get power, where you learn how to play and win the game of life. We want to change the tide of low expectation among Aboriginal and Torres Strait Islander students and teach these students to have high expectations. All educators should have high expectations of students whether they’re Aboriginal and Torres Strait Islander students or not’ (Sara, 2007). He advises that teachers of Aboriginal and Torres Strait Islander children should not worry too much about their lack of knowledge regarding Aboriginal and Torres Strait Islander issues, but rather ensure a belief that educational outcomes can be achieved, have an open mind in working with the community and be bold in setting out to achieve the results you want. These remarks begin to unpack the idea of leadership and how it works for Aboriginal and Torres Strait Islander schools. The role of the principal is crucial not only in articulating a vision and program for the school and community, but in working with teachers who may be inexperienced and require considerable guidance in bringing expectations into effect.

In discussing education in more remote Aboriginal and Torres Strait Islander locations, Pearson (2004) notes the market framework of supply and demand: ‘The supply-side concerns the provision of good teaching. It is not just a quantity issue about how much teaching is available, but perhaps more importantly, the quality of that teaching. The demand-side concerns the desire for learning amongst the community, parents and students.’ This is an important insight of two-way education where responsibility for outcomes falls on the organic relationship between school and community. He goes on to note that high quality
educational leadership is also required and must be able to flourish, rather than be mired in the bureaucratic jungle of forms and other requirements. Pearson argues that education should be ‘exciting and culturally engaging to encourage parental and community interest,’ a theme that is very strong in the literature involving all children and families. This again provides a clear guide for educational leadership, showing that the good leader is not aloof from or above particular situations, but has a deep understanding of problems arising from practical experience and works diligently with colleagues in planning realistic strategies about how to proceed. Pearson’s work at the Cape York Aboriginal Australian Academy (2013) has the stated aim of closing the achievement gap between Aboriginal and non-Aboriginal students and to support the ‘bicultural’ identity of Cape York children. The Academy has attracted attention particularly for literacy and its teaching emphasis on ‘direct instruction’ (DI). This approach draws upon the early work of Siegfried Engelmann (Barbash, 2012) and the systematic instruction by the teacher within narrow, predetermined content, ability groupings and the frequent assessment of students. In addition to direct instruction, the Academy has introduced extra curricula clubs alongside Aboriginal culture and language activities. A recent review of the Academy by McCollow (2012, p.107) notes a comment from Professor Allan Luke that, despite ‘some serious reservations about DI, it would be unhelpful for the debate to develop in a way in which the choice is between polarized ‘pro-DI’ and ‘anti-DI’ positions.’ Rather, there may be ways for direct instruction to connect with other broader and deeper pedagogical and curriculum experiences.

Is it possible to detail and generalise these notions of quality teaching, expectations and leadership as they might apply to Aboriginal and Torres Strait Islander education? The answer is yes, but we must be very careful in so doing. Like all schools, there is probably no blueprint on such matters that can be automatically implemented, but principles that need to frame consideration of the specific issues and dilemmas that exist. Quality teaching that is required to achieve high expectations of learning involves taking the key ideas that are thought to be important and connecting them with the culture and interest of the child. Attempting to impose the major features of privileged knowledge whether it be atom from chemistry, equation from mathematics, energy from physics, or time and sequence from history will generally confuse rather than enlighten. Working with only pencil, paper and written text will probably alienate rather than engage the young mind. Disconnecting ideas from the world of experience will make it difficult for intellectual leaps to occur. Setting the bar too high and ensuring failure to clear, will not of itself enable barriers to be overcome. Educational leadership takes place within such a matrix of competing factors with new relationships between them being formed and reformed in diverse classrooms every day. What seems clear is that for all children, schools should embody a democratic and culturally-inclusive life of respect and challenge, where practices are informed by internal reflection and by the external understandings of others. For children and learning, quality teaching, expectation and leadership are built and not enforced.

Summary Discussion

It is suggested that the data covered by this review while significant are often broad and require ongoing research and elaboration. Similar issues are seen internationally as in Australia. From the above discussion however it is possible to distil a number of specific items that impact strongly on Aboriginal and Torres Strait Islander education and curriculum. These have been grouped under six themes and commented on as follows:
Models of curriculum

Central to the establishment of successful schools and educational programs for Aboriginal and Torres Strait Islander peoples is the recognition and respect accorded Elders, Traditional Owners and families of local communities. Because of this, it is inappropriate to attempt to design a national or state-based model of curriculum that is applied to all locations in the same way. It is the responsibility of central authorities to provide adequate levels of funding and guidance, assistance and support materials that all communities require to meet the learning needs of children. Developing a model of curriculum for a particular community is a difficult process that must give due attention to government and other regulation, draw upon a complete understanding of knowledge and learning and enable appropriate processes of assessment and evaluation. Elements of curriculum that need to be considered for Aboriginal and Torres Strait Islander communities involve cultural inclusivity, Aboriginal and Torres Strait Islander ways of knowing, cognitive and active engagement with knowledge production, community participation and two-way connections with the regular curriculum. To shift the paradigm of under-achievement for Aboriginal and Torres Strait Islander children in mainstream schools particularly in the literacy and numeracy areas requires attention to be given not only to the educational framework, but to the actual day-by-day, or hour-by-hour techniques that teachers apply.

Having an understanding of Aboriginal and Torres Strait Islander epistemologies and pedagogies however can challenge all communities, especially when learning outcomes must embrace both Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander formalisms such as literacy and numeracy. While teachers and parents have high expectations that their children can achieve at the highest levels, programs need to be constructed that enable this to happen. A cultural framework within which teaching and learning occurs is necessary and it is the role of the teacher to ensure that connections are made between the understandings that all children bring to school and the outcomes that the community desires. In essence, these connections involve ideas that are abstracted from experience and ideas that are grounded in experience and involve investigation of the links that bring practice, reflection, and theorising together. An excellent example of this approach is called ethnomathematics (Ascher, 1991), almost unknown in Australian schooling, where serious attempts are made at working with the cultural understandings of mathematics that exist in multicultural and Aboriginal and Torres Strait Islander communities and the formal knowledge and concepts of regular schools. Working with the codes that characterise formal language, mathematics, science and other areas of school knowledge is an experiential process that is time consuming and complicated and which brings together the expectations, interests, history and language of local communities. These are the features that build a high quality curriculum with high quality teaching rather than having it imposed from external sources.

Leadership

Experienced leadership is required in all schools to establish a culturally inclusive high quality curriculum with high quality teaching. Leadership exists at all levels including principals, teachers and community. Principals occupy a central position in that they are experienced personnel who are appointed to ensure that the learning needs of children are met
and that all aspects of the school run smoothly. Being a principal is exceedingly demanding under any circumstances, but even more so when Aboriginal and Torres Strait Islander requirements are present. Hopefully, there is community participation in the selection process and that strong and collegial links are maintained between the principal and community. A good principal does not emphasise a pyramidal or top-down structure but encourages all staff to play important roles in the life of the school regardless of experience. New teachers bring energy and enthusiasm to schools and in dealing with problems and often have a ‘why not?’ approach.

Schools need to be organised in such a way that democratic teams or learning circles deal with all the main issues particularly those of curriculum, assessment and evaluation. In smaller schools whether at the primary or secondary levels, it should be possible to involve all of the community in considering school programs on a regular basis. Principals who have a non-Aboriginal and Torres Strait Islander background need to be very sensitive to culture and local issues and ensure that the entire school is infused with the recognition and respect of the community. Depending on the state jurisdiction, it is advisable that Aboriginal and Torres Strait Islander representatives are members of school decision-making bodies and if possible, be in the majority. The principal has a vital role in the appointment of staff and should provide leadership in the balance between Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander members. This is not always an easy task, given the lack of qualified Aboriginal and Torres Strait Islander teachers around Australia.

Communities of practice

Two concepts that can inform the actual setting up of the above conditions involve democratic schooling (Pearl & Knight, 1999) and communities of practice (Wenger, 1998). Pearl and Knight contend that democratic education requires that knowledge should be universally available, that students are involved in the posing and solving of social and personal problems, that students participate in all decisions that affect their lives, that clearly specified rights should be universally available and that all should be encouraged to succeed in society’s legal endeavours. These are high expectations indeed of schooling and of the curriculum, but expectations that are appropriate for all children, both Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander. Clearly, strong and perceptive leadership will be required to achieve them. Wenger has similar aspirations for his concept of communities of practice. Based in the literature of organisational change, Wenger raises questions regarding situated learning and knowledge management. He suggests an alignment between participants and tasks so that progress can be made on innovative solutions to difficult problems. Obviously, the community of practice enables all those concerned to work together and to be respected for the contributions they make. A consideration of these two features of organisations, that is democratic process and community of practice, locates Aboriginal and Torres Strait Islander education in the respected literature and strengthens the notion of two-way approaches as a planning framework.

Community support

Realistic mechanisms of support are necessary if the above steps are to be put in place for Aboriginal and Torres Strait Islander education. The role of government and bureaucratic authorities has already been mentioned. Appropriate support is however required on-the-ground, on a daily basis if any progress is to be made and sustained. As mentioned above, within Victoria the state-wide Aboriginal and Torres Strait Islander organisation VAEAI
supports the operation of a number of Local Aboriginal Education Consultative Groups throughout the state. VAEAI works closely with government for policy development and implementation, has a number of officers and enables funded projects to occur. Similarly, other organisations such as Dare to Lead (2012) and What Works (2012) also provide support for schools and local communities. The above discussion that raises issues regarding the improvement of learning outcomes such as literacy and numeracy, democratic schooling and the establishment of more formal communities of practice, imply that the organisation currently available needs to be strengthened. A positive means of so doing is the study circle proposal (Brophy, 2001; Hagan, 2005).

Given the proviso of appropriate funding, culturally-inclusive teaching, community respect and the like, the establishment of a series of community study circles or learning circles in Victoria associated with the work of VAEAI and LAECGs could provide a more systematic way of raising, considering and supporting the complex array of issues discussed in this review. A small group of experienced educators (similar to Koorie Education Support Officers in Victoria) could be appointed to work alongside state organisations and to initiate an ongoing series of study/learning circles to reinforce the role of local communities in their relationship with schools, principals and teachers, to support the leadership role of principals, teachers and community members, to develop deeper understanding of issues such as cognitive engagement mentioned above and to ensure participation in curriculum design, implementation and evaluation. Study or learning circles would consist of Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander persons associated with a particular school, would promote dialogue and consensus rather than formal debate and would focus on emerging understanding as distinct from strategic positioning. Such an arrangement could be formalised in terms of locating this support group (or perhaps Aboriginal and Torres Strait Islander Education Study Circle Network) at a university and linking or co-ordinating its work with other such organisations Australia-wide. This approach is non-bureaucratic, practice-based and rather than overlay a new structure, is intended to enhance Aboriginal and Torres Strait Islander community structures that already exist.

**Teacher education**

The issues raised in this summary are not complete without a consideration of initial teacher education programs and of professional learning programs for teachers and community alike. There has been discussion throughout Australia over recent years regarding the place of compulsory Aboriginal and Torres Strait Islander studies in pre-service teacher education courses. Very few such compulsory studies exist at present and usually involve single semester units rather than a sequence of units. Difficulties included in this debate range across finding space within already crowded programs, the problem of students paying HECS for any additional units and the support for more integrated rather than separate approaches to knowledge and teaching that many programs embody. There are also issues regarding the lack of experience felt by many staff and the possibility they feel of acting inappropriately and making mistakes in their teaching. The Victorian Institute of Teaching (VIT, 2007) which registers teachers in Victoria, has recently endorsed a new set of course approval guidelines for teacher education programs which encourages rather than makes compulsory, all teacher graduates to be capable of meeting the educational community goals of Aboriginal and Torres Strait Islander peoples. VIT has also recently decided that the renewal of registration every five years must include 100 hours of recognised professional development which opens up the question of Aboriginal and Torres Strait Islander programs being a necessary pre-requisite. The issue of compulsory studies for all teachers both for initial and
renewal of registration and the provision of funded programs for community members needs to be worked through carefully with Aboriginal and Torres Strait Islander communities, government authorities, university teacher education programs and teacher organisations.

Reconciliation

Finally, a note regarding the underpinning issue of the above discussion. The availability of democratic, high quality, culturally-inclusive education and curriculum for all children is necessary for reconciliation between the Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander peoples of Australia. The features of education and curriculum raised here have not been generally achieved thus far in Australia, indicating that the problems involved are substantial and systemic and require sophisticated rather than simplistic practical solutions. The review has provided some background information regarding initiatives and programs that have been tried and has raised some tentative suggestions in the summary regarding possible and realistic pathways to progress. No other social question is more urgent for Australia to confront if it is to be considered a civil society amongst the nations of the world.
Case 1: Worawa Aboriginal College

Situated to the east of Melbourne on the former Coranderrk Aboriginal Station and near the township of Healesville in the tranquil Yarra Valley, Worawa Aboriginal College continues to honour the ideals of its founder, Aboriginal visionary Hyllus Maris. Speaking at the opening of the college in 1983, Hyllus said: ‘...in this, the first Aboriginal school in Victoria, the educational curriculum has been specially designed to suit Aboriginal students to bring them to their full potential...Aboriginal culture will be imparted not only as a school subject in each class’s timetable but as an integral part of every day life at the school’

Worawa Aboriginal College is a boarding school for Aboriginal young women in the middle years of schooling who come from Aboriginal communities in urban, regional and remote locations across Australia. Worawa provides a holistic education through an integrated education, culture and wellbeing approach. Governed by Aboriginal people, the Worawa Model of learning is grounded in Aboriginal values and ways of knowing, doing and being. The academic program is based on AusVELS that incorporates the new Australian Curriculum while retaining Victorian principles and approaches. The curriculum is delivered through a series of Learning Centres involving Aboriginal Culture, Health and Sport, Creative Arts, Languages, Mathematics and Science Environment, the education program includes personalised learning plans, partnerships with other schools and organisations, vocational education experience, sport and physical fitness and health and well being arrangements. The beautiful rolling hills and country setting of the college includes the world-renowned Healesville Sanctuary and provides wonderful opportunities for students to interact with and contemplate their relationship with the natural environment.

The College offers a themed approach with a realistic pathways to continued education or the world of work. Environmental management through a state of the art horticulture centre provides the opportunity for students to develop knowledge and skills in Indigenous plant use and extends to special projects such as maintaining a Koala feed plantation for the Healesville Sanctuary. A strong relationship with the nearby world-renowned Healesville Sanctuary enables students to gain work experience in wild life care and management and interpretation. A feature of life at Worawa that brings together Aboriginal and non-Aboriginal learning is the exquisite art work created by students. Reflecting stories of community, family and land, the designs of wonderfully expressive paintings are now incorporated into fabric patterns and are displayed alongside original costume jewellery. The College has a very modern creative arts centre for the visual and performing arts as well as its own art gallery which holds exhibitions that are open to the public. The gallery displays high quality student art as well as art from the students’ home communities and demonstrates the holistic and creative nature of learning for all to see. Through partnerships with the Wilin Centre for Indigenous Art and Culture at the Victorian College for the Arts, Ilbijerri Indigenous Theatre and Malthouse Theatre and partner schools, Worawa is expanding the reach of its arts program to encompass the Performing Arts. Aboriginal languages are seen as a focal point and the College will introduce skills development in media through family oral history collection.
5. METHODOLOGY: SEARCHING FOR COMPREHENSIVE MEANING

In constructing the research design for this project, the following principles inter alia of ethical conduct when Indigenous issues are involved were considered of central importance:

• Indigenous people have the right to full participation appropriate to their skills and experiences in research projects and processes. Research on Indigenous issues should incorporate Indigenous perspectives. This is often most effectively achieved by facilitating direct involvement in the research from the start of a project (AIATSIS, 2012).
• Researchers need to put forward a proposal in which each of the following phases of the research process, where relevant, is ethically defensible on the grounds of each of the values of these guidelines: conceptualisation, development and approval, data collection and management, analysis, report writing, dissemination. Consultation and other strategies that facilitate Aboriginal participation are critical in all phases of this research process (NHMRC, 2012).
• It is required that all research involving or impacting on humans is performed in an ethical manner. Such conduct is guided by the following Principles of Human Research Ethics: 1. Research merit and integrity: research must be worthwhile, and have value to the community. 2. Respect for human beings: individuals should be treated as autonomous agents and that persons with diminished autonomy are entitled to protection. 3. Beneficence: the obligation to maximise possible benefits and minimise possible harms. 4. Justice: addressing the resolution of the question of who ought to receive the benefits of research and bear its burdens (Victoria University, 2012).

Ethical Protocol. While the names of participating schools are noted in this report, the research is not comparative in any way. Given that most schools have small numbers of Aboriginal and Torres Strait Islander students, ethical protocols of confidentiality and privacy require that students cannot be identified. Data and comment contained in the report therefore must not be used to compare participating schools or students for any purpose.

A broadly ethnographic research approach was adopted involving descriptions of the social and educational situations that are encountered and the relational factors that influence teaching, learning and engagement. In terms of data collection, a mixed methods approach to the research is preferred because:

• It combines an integrated philosophical process regarding knowledge production with qualitative and quantitative approaches to more comprehensively analyse and understand a social and educational situation.
• It encourages the respectful incorporation of Aboriginal and Torres Strait Islander community knowledges and understandings in a variety of ways so that the overall integrity of the research is strengthened.
The particular approach to mixed methods methodology being followed gives equal weighting to all data, will collect different data concurrently and will result in explicit theorising of explanation for discussion. The data collected will be discussed, analysed and interpreted holistically for ongoing discussion to gain a more thorough understanding of the learning outcomes of the student sample. Composition of the quantitative and qualitative components will be further discussed in the measures sub-section.

Aboriginal and Torres Strait Islander students from Years 5 to 10 were recruited for the study. Teachers working with the participating students were invited and recruited to be a part of the larger Technology Enriched Curriculum Program. Three clusters of schools were purposively selected and included 15 schools from the Echuca, Ballarat, and Healesville areas. Table 2 presents a summary of participants recruited for each school:

Table 2. Overview of schools, teachers and student numbers

<table>
<thead>
<tr>
<th>School</th>
<th>Cluster</th>
<th>Sector</th>
<th>Number of Teachers in TECP</th>
<th>Number of students eligible for TECP</th>
<th>Number of students w/ consent for TECP</th>
<th>Number of students participating in TECP</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>-</td>
<td>Government</td>
<td>3</td>
<td>12</td>
<td>7</td>
<td>2</td>
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<td>10</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>School 3</td>
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<td>1</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>School 4</td>
<td>-</td>
<td>Catholic</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>School 5</td>
<td>-</td>
<td>Independent</td>
<td>7</td>
<td>59</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
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<td>-</td>
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<td>6</td>
</tr>
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<td>School 7</td>
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<td>Government</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>School 8</td>
<td>-</td>
<td>Government</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
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<td>-</td>
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<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
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<td>-</td>
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<td>15</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
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<td>24</td>
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</tr>
<tr>
<td>School 12</td>
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<td>Catholic</td>
<td>5</td>
<td>12</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>School 13</td>
<td>-</td>
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<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>School 14</td>
<td>-</td>
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</tr>
<tr>
<td>School 15</td>
<td>-</td>
<td>Government</td>
<td>2</td>
<td>11</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>40</td>
<td>184</td>
<td>127</td>
<td>139</td>
</tr>
</tbody>
</table>

The particular approach to mixed methods methodology being followed gives equal weighting to all data, will collect different data concurrently and will result in explicit theorising of explanation for discussion. The data collected will be discussed, analysed and interpreted holistically for ongoing discussion to gain a more thorough understanding of the learning outcomes of the student sample. Composition of the quantitative and qualitative components will be further discussed in the measures sub-section.

The data collected included student test results, student work samples, student attendance records, responses from student engagement questionnaire, teacher personal accounts and reports from parent and caregiver forums. Analysis of data from each of the three groups of schools (Ballarat, Echuca, Healesville) will be compiled into a descriptive case study of each group to indicate themes and issues. Specific measures used to generate data involved:
1. ON Demand and NAPLAN test results (Both measures formally administered by the schools). Both data sets will be de-identified and made available for analysis by schools:

i) On Demand Testing is provided by Victorian Curriculum and Assessment Authority and is an online resource for schools and teachers to use when, where and how they choose. Tests are designed to link to curriculum and Victorian Essential Learning Standards (VELS) standards. Both general ability tests and topic-specific assessments are provided. It is a measure that can be administered to a single student and/or a whole class. Both general skills tests and dimension specific tests are available. Many questions in the tests are multiple choice. Students may also be required to enter short answers on the keyboard, use the mouse to ‘drag and drop’ answers, use an on-screen calculator or answer by locating ‘hot spot’ on screen that corresponds to the answer. The tests are automatically marked by computer providing immediate class and student reports. Within the current research, year level appropriate adaptive reading tests were selected. Adaptive tests deliver sets of questions to students that vary according to student ability. Depending on the responses given in the previous questions, the system automatically presents easier or more difficult questions to each student. These computer-based tests can determine a student’s performance level quickly and accurately. The tests used in the current project included the six English reading tests for the Year levels of 3 to 8.

ii) NAPLAN tests are administered by Victorian Curriculum and Assessment Authority and assess student knowledge in numeracy, reading, writing, spelling, punctuation and grammar. The results of the tests provide information for students, parents, caregivers, teachers and principals about student achievement which can be used to inform teaching and learning programs. NAPLAN tests provide point-in-time information regarding student progress across Australia in literacy and numeracy and are intended to complement teacher judgement and the wide range of formal and informal testing programs that are already used in schools.

2. Student school engagement survey (See Appendix A).

i) The “thinking about school survey”, developed by the Victorian Centre for Adolescent Health (2006) will be completed by participating students (see attached). At this point in time, the measure has been used in a variety of school settings but no specific psychometric information is available. It is the opinion of the investigators that the items included in the measure are well matched to the research. The version of the measure used in the current research was titled “Student Engagement Survey” and includes 27 items that consider student self perceptions of their educational goals, peer interactions, teacher interactions, and school connectedness. Students respond on a 4 point Likert type scale that uses the anchors When you answer the following questions, YES! means you definitely agree with the statement, yes means you agree a bit, no means you disagree a bit and NO! means you definitely disagree. Respondents are asked to circle one choice for each item. All items were scored from 4 (YES) to 1 (NO) except for item 8 which was reversed scored. Respondents could receive a score from within the
range of 27 to 108. Internal consistency or the current version and administration of the survey was $r = .89$ for a sample of 67 full completions of the measure.


Formal writing task (See Appendix B) with a focus on major characteristics of literacy including Audience, Text structure, Ideas, Persuasive devices, Vocabulary, Cohesion, Paragraphing, Sentence structure, Punctuation, and Spelling.

4. Student attendance data. Attendance records for the 2011 School year, Semester 1 and Term 3 from the 2012 school year. Attendance data is presented as the number of days missed in any of the given periods.

5. Student work samples analysis.
Work Sample A (See Appendix C)

i) Each school will provide access to a teacher evaluation of a student work sample that focuses on knowledge and skill attributes they consider demonstrates higher levels of academic achievement by that student. Participant teachers were asked to select and consider a work sample for a student involved in TECP. A work sample should be chosen that clearly demonstrates the capabilities and knowledge incorporated by the student. It does not have to be produced from working with the iPad and can be selected from any learning area such as an English essay, art work, science project, music or dance performance. Teachers were invited to respond via email to the questions below with a paragraph of comment each:
   a. Can you describe the piece of work?
   b. What do you find interesting about this piece of work?
   c. Why do you think this piece of work demonstrates capabilities and knowledge for the student?
   d. Are other students in the class demonstrating similar capabilities and knowledge?
   e. How has your awareness of student capability in relation to this piece of work informed your teaching practices with him/her?
   f. Are there any ways that knowing about such capabilities has contributed to your overall teaching approach?

Work Sample B (See Appendix D)

ii) Each school will provide access to a teacher evaluation of a work sample generated as an outcome of students’ involvement in the TECP program. It is intended that participant teachers will be asked to select a work sample produced from use of the iPads that clearly demonstrates the capabilities and knowledge incorporated by a student. While produced from using iPad applications, the work sample can be selected from any learning area such as digital story telling, music or dance performance, an English essay, art work, or science project. Teachers will be asked to respond to the questions below:
   a. Can you describe the piece of work?
   b. What do you find interesting about this piece of work?
c. Why do you think this piece of work demonstrates capabilities and knowledge for the student?

d. How does this piece of work highlight the student’s skills amongst their peers?

e. Are other students in the class demonstrating similar capabilities and knowledge?

f. How has your awareness of the student’s capability in relation to this piece of work informed your teaching practices with him/her?

g. Are there any ways that knowing about the student’s capabilities has contributed to your overall teaching approach?

6. Teacher personal accounts (See Appendix E).

Each participating teacher received 6 questions by email in relation to their teaching background, experience in working with indigenous children, and knowledge and practices regarding ICT. Participant teachers were invited to respond via email to the six questions below with a paragraph of comment each.

a. Could you please detail your teaching background (years teaching, year levels and subjects taught, specialist subjects and/or particular interests, extra-curricular activities)?

b. What is your experience in working with Indigenous students in your classroom?

c. How is communication undertaken with families of Indigenous students in your classroom?

d. How do you incorporate ICT in your teaching?

e. How do you perceive the influence of ICT on Indigenous student engagement and learning?

f. What professional learning opportunities would assist you to respond to the diverse needs of your students?

7. Parent and caregiver forums (See Appendix F).

Forums were arranged where possible following protocols as agreed by each participating school. The purpose of the forums (informal, refreshments) was to provide background information for the study. The research team collected data from parents, house parents and family members of students involved in the TECP project through the forums. A semi-structured interview protocol was used to facilitate these conversations. The protocol was structured around the following questions:

a. What do you think children enjoy most at schools?

b. What ways do you think your children like to participate in reading?

c. Are your children using computers at home and at school (including mobile technologies)?

d. What do they normally like to use computers and iPhones for?

e. Do you think your child has sufficient access to computer technology at their school?

f. What is your understanding of your child’s participation in the iPad program?

g. Do you know of any computer technologies being used within your communities?
Procedures

After gaining approval from the Department of Education and Early Childhood Development Victoria (DEECD) and the Ethics committee of Victoria University to undertake the project, the following information dispersion and recruitment steps were followed:

1. Initial contact with schools was made by telephone to the principal, to discuss the overall project and to arrange for a note to be sent to the appropriate researcher regarding approval for the school’s participation

2. Teachers will be notified by letter placed in pigeon holes via principals, including ‘information to participants’ and consent forms. Consent forms will be mailed back to researchers via pre-paid envelopes.

3. Students were notified by letter sent to parents and caregivers via school address lists. All children recruited to participate in the research were contacted through invitation to parents and caregivers seeking the involvement of their child and themselves within the project. Parents and caregivers interested in having their children participate, completed consent forms at this time or submitted completed consent forms to the coordinator via pre-paid envelope or to be collected by the researchers at a later time.

4. Parents and caregivers were notified by letter sent via school address lists. Consent forms were mailed back to researchers via pre-paid envelopes or given directly to the researchers by school administrators.

Data collection, analysis and reporting have operated and will continue to operate within the following phases of the research project:

Phase 1. March-June 2012: School visits 1, data collection and analysis 1, interim report 1. During this phase participants were involved in the following manner:
   i. Schools. Initial consultation with Principals, Teaching staff, Koorie Education Support Officers, and CEO Indigenous support workers
   iii. Teachers. Responding to email communication and compilation of personal accounts.
   iv. Students. Undertaking school and project assessment.
   v. Parents and caregivers. Participating in forums, as arranged.

Phase 2. July-December 2012: School visits 2, data collection and analysis2, interim report 2. During this phase, participants are involved as per phase 1.


Participating schools were initially visited by researchers to discuss with principals and coordinators the outline and detail of the research, data to be collected, timelines and ethics requirements. Ongoing contact has been maintained with schools during the year through visits, email, telephone and attendance at school and cluster activities as appropriate. Data collection and communication was facilitated by the appointment of a program administrative assistant and a support officer in one of the school clusters.
Schools managed administration and data collection for the following measures: On demand test, student engagement survey, and writing tasks. Surveys and scored results were then provided to the researchers for data entry and analysis.

Teachers were emailed and invited to provide email responses to the researchers for the teacher personal account measure, work sample A questions, and work sample B.

TECP coordinators at each setting were asked to provide date of birth information and student attendance records.

Parents and guardians were invited to participate in school or cluster based forums. Family members that indicated a willingness to participate were contacted and a suitable time and location for the forum was determined. All family forums were audio recorded. In a number of the family forums, Koorie Education Support Officers (or their equivalent at the non-government settings) would also be participating members.

**Data Analysis**

The following procedures were adopted to analyse the data according to mixed methods principles.

1. On Demand and NAPLAN test results: Trend analysis of quantitative data relating to individual student progress. Inferential analysis will be completed after second assessment data is received
2. School-based assessments of student literacy performance: Trend and diagnostic analysis of quantitative data (including descriptive and inferential statistical procedures)
3. Student engagement survey: Quantitative analysis. Phase 1 and phase 2 data inferential comparison
4. Student attendance data: Trend analysis of quantitative data.
5. Student work samples including de-identified digital portfolios: Analysis of collected samples undertaken by teaching staff for trends, characteristics, and themes to highlight student learning. Teacher responses regarding work samples were analysed to determine themes in relation to specific knowledge and skills demonstrated by students involved in the TECP program.
6. Teacher personal accounts: Document analysis of themes, major points in relation to indigenous student literacy and technology skills.
7. Parent and caregiver forums: Analysis of reports and notes taken by the research team in relation to the opinions of parents and caregivers regarding student learning and engagement.

*Quantitative data* was analysed using correlation, *t* test, ANOVA and repeated measures MANOVA. Adopting an alpha level of .05, a medium effect size for the MANOVA and ANOVA (*f* = 0.25), and for the *t* test (*d* = 0.5), could be achieved using the estimated sample of 150 student participants.

*Qualitative data* analysis in this research will incorporate a directed approach to content analysis to extend current research and theory. It can also aid in the development of predictions about the variables of interest or about the relationships among variables, thus helping to determine the initial coding scheme or relationships between codes (Hsieh &
Shannon, 2005). This has been referred to as deductive category application (Mayring, 2000). All interviews will be recorded, transcribed verbatim and analysed using content analysis involving the directed approach.
Results

General Demographics

An overview of the demographic characteristics of the student sample is presented in Table 3. Demographic distribution for the entire sample of 116 students included 81 females and 35 males. The sample comprised 16 students at year 5, 18 students at year 6, 16 students at year 7, 19 students at year 8, 5 students at year 9, 1 student at year 10, and 41 students at secondary school level with no year level details. Overall, mean age of the student cohort for the TECP was 13.48 years.

Table 3. Student Demographic composition

<table>
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Student School and Spark Session Participation Data

Student Attendance for the 2011 and 2012 School Years

Student attendance data for the 2011 school year, semester 1 and Term 3 of 2012 was reported in Table 4. Data is presented as the average number of days absent for year level cohorts (percentage of total number of days in brackets) at a particular school.

Table 4. Student Attendance Data

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Student attendance varied considerably between school settings. During the 2011 school year the number of days absent ranged from a minimum of 6 days to 70.2 days between school year level cohorts. Overall, the general trend in attendance across 2011, Semester 1 2012, and term 3 2012 could be interpreted as a slight decline.
Student SPARK Attendance for the 2012 School Year

Student SPARK attendance data for the 2012 school year, semester 1 and semester 2 was reported in Table 5. Data is presented as the average number of SPARK sessions attended per student at a particular school.

Table 5. Student SPARK Attendance Data

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The results generally indicated regular attendance, however, noticeable variation of involvement can be observed between settings. The mean attendance per student for semester 1 was 3.4 sessions. Attendance during semester 2 decreased to a mean of 2.8 sessions.
Student Engagement

Results for responses on the student engagement survey are reported in Table 6. Descriptive results for each school and each year level at the school is presented.

Table 6. Student Engagement Results

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</table>

Descriptive results indicated that the majority of indigenous students responded to the questions in a positive manner indicating a moderate level of engagement within their school and education experience.

Inferential analysis of student engagement results for gender, school type, school level, and year level are presented in Table 7. Independent t-test analysis revealed no significant differences between groups on the basis of gender, school type, or school level. Results of a one-way ANOVA indicated significant differences in student engagement on the basis of year level ($F (4,67) = 5.526, p = .001$). Post hoc analysis (LSD) showed that the Year 5 group was significantly higher than all other year levels and the Year 8 group was significantly...
lower than all other year levels. The survey appears to be a reasonably accurate instrument when used over time. Student engagement with schooling depends on a number of variables including those present at school and at home and specific student interest. The isolation of such variables demands a longer term study with continuing student access to ICT and mobile technologies. Inclusion of Aboriginal and Torres Strait Islander students more thoroughly and extensively in school knowledge is an outcome of educational and curriculum change that will involve particular features at particular locations.

**Table 7. Student Engagement Survey Score Contrasts T1**

<table>
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<th>Non Gov</th>
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Repeated measures MANOVA revealed no significant differences in student engagement between test occasion 1 and 2. Post hoc contrasts revealed small significant differences between Year 5 and Year 9 students in engagement scores at both test occasions.
**General Academic Performance**

**On Demand Test**

Summary results for the On Demand tests according to school and year level are presented in Table 8.

Table 8. On Demand Results

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Descriptive results for On Demand test scores indicate that for the majority of the schools, students were performing at, or slightly below expected levels for reading. Further inferential comparisons will be completed following students completing the on demand measures a second time. Results of a repeated measures MANOVA indicated a significant improvement in on demand test scores across test occasions, \( F(1,31) = 8.595, p = .006 \). A small number of significant differences were observed in on demand scores between schools and year levels. Given the complex mix of factors operating in any classroom, it is difficult at this stage to directly correlate test results with ipad use. Such results however are a useful means of monitoring literacy progress when repeated over time.
NAPLAN scores are summarized in Table 9. Descriptive data is presented for the areas of reading, writing, spelling, and grammar. Test occasion 2 represents the students current year level scores if in year 5, 7, or 9, or the previous years scores if in year 6 or 8. Test occasion 1 represents the students scores from the NAPLAN test undertaken 2 years earlier.

Table 9. NAPLAN Results

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In general, the majority of students were performing above or at their expected levels at each test occasion. A small number of the students could be considered as performing below the expected national minimum standard. Repeated measures MANOVA revealed significant positive differences in all four NAPLAN literacy areas between test occasions. Specifically, reading, \( (F (1,21) = 27.845, p < .001) \); writing, \( (F (1,18) = 9.800, p = .006) \); spelling, \( (F (1,17) = 28.261, p < .00) \); and grammar, \( (F (1,17) = 12.335, p = .003) \). No significant differences were found in NAPLAN literacy score comparisons between schools or between year levels. Further NAPLAN points are required incorporating ipad usage for correlations to be made. An acceptable 68 percent match was found between NAPLAN data and student details submitted to Victorian Curriculum and Assessment Authority.
Targeted Academic Performance

Writing Task

Results for the specific writing task are presented in Table 10. Patterns of results when considered between school settings indicate a high degree of variability in the writing skills performance of the indigenous student sample.

Table 10. Literacy Achievement Results

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Overall results of a repeated measures MANOVA for test occasion, school, and year level variables demonstrated no significant differences in the writing test scores comparison at the school or year level. However, several small significant differences were found in total writing test scores between schools and between year levels. Although it is not possible at this stage to directly correlate writing results with iPad use, the task itself is a useful mechanism for reflecting on literacy progress and can be repeated over time.
Work Sample A

A variety of samples were provided including use of the Internet and written questions and review of films and countries. A number of positive comments indicated progress being made by students and in relation to their peers. Examples of evaluations provided by the teachers are:

The one thing that jumped out at me was the fact that she had brainstormed and set out her essay (in a rough draft) and then received feedback from her teacher before writing up a final copy. I have both draft and final copy so I can see the changes she has made from one to the other. I think this shows her skills in essay writing and higher order thinking.

Due to her extensive answers, there are some grammar issues with the piece but this is definitely a good standard piece of work for a year 7 student.

She can clearly respond to a movie in which is quite complex. Also her piece shows that she gained a great understanding of the movie based on her answers.

Teachers reported some influence on their teaching as a result of working with the students concerned and with their students generally. Examples of teachers' responses are:

It makes me aware of the type of work and responses I can set for her. Questions / answers activities seem to be a strong point of hers so I would make use of this skill.

Slowly extending her and introducing her to other forms of response to films such as power point presentations, posters or even a small oral presentation to myself or the class based on her answers.

Perceptions of Student Literacy and Technology

Teacher Personal Accounts

Many of the teachers working in the project have considerable teaching experience across a range of subject areas. However there is limited experience in teaching Indigenous children in both remote and urban communities. There is a commitment to assisting all children with their learning as highlighted in the following examples:

Our school is very supportive of diversity and we have students who come from a range of backgrounds and cultures. We take this into consideration when planning physical spaces and learning programs and ensure we provide a safe environment where students can all share their family's story and experiences.

Contact with parents is usually by telephone from the school office or by the teacher concerned. In some cases, fortnightly or term meetings are arranged as required.
A wide range of ICT is used across the schools including laptops, iPads, eboards, Internet, YouTube, digital cameras. In some cases, both classroom and computer room access is available. ICT is integrated into the curriculum sometimes as an encouragement as revealed in the following teacher response:

*ICT is valuable but should not be relied on; students need balance of other tasks which engage, for example reading, building models, physical manipulation.*

There is consistent comment that Indigenous students are enthusiastic about their use of ICT in relation to specific application and studies but more generally as well. This engagement can apply to both Indigenous and non-Indigenous students, as demonstrated by the following examples:

*I think the ICT is beneficial for all students' engagement and learning. Our students use iPads often in all learning situations - to help with learning and to present learning. The two indigenous students in my room are confident with the technology and are happy to share their understandings with their peers.*

*ICT is only effective if students are engaged in the work / topic. When engaged students are able to apply prior knowledge and explore topics using technology for information and concept exploration. I don't see a difference between the use of ICT with Indigenous or non Indigenous students. If the students see the value of what they are undertaking they will have a higher level of engagement.*

Teachers express the need for expanded professional learning opportunities regarding ICT use generally and for Indigenous students in particular. The following quote reflects this idea:

*Learning how science can be taught with appropriate Aboriginal knowledge construction, more crossing over between world perspectives, more on each language group represented.*

**Family Forums**

Family and community forums were held across the clusters. Overall, parents and community members appeared to be informed about the purpose of the TECP project and were pleased with noticeable improvements in student motivation and engagement. They welcomed the culturally relevant approach of the TECP project to the integration of iPads into student learning, however, they emphasized the importance of local involvement in decision-making processes when conceiving, designing and implementing projects involving Indigenous and Torres Strait Islander students.

In the following section perceptions of parents and community members are discussed about student engagement, access to technologies, patterns of technology use, as well as the impact of TECP on student learning and engagement. Emerging issues, suggestions for improvements and modification are also elaborated on.

**Student engagement**

Emerging patterns from parent forums suggest that the introduction of TECP project has contributed to “visible” results when it comes to student engagement. Parents reported that students looked forward to attending the SPARK sessions and when the arrived home they would say, “we had a fun
day” as opposed to “nothing much” happened when coming home from school. They reported that the program was a success and that the “kids loved it”:

*That is one of the most deadliest thing I have ever seen, because there is no forum that allows our kids to have these discussions.*

The SPARK sessions provided students with opportunities to engage with their own culture as well as to meet and cultivate friendships with other Indigenous children outside of school. They were able to work at their own pace, to be creative and to excel. Sharing and collaboration were intrinsic to SPARK learning. Laughing and singing together as well as encouraging each other provided additional motivation to do well and be supportive of each other. As one of the parents reported:

...if you did not know, you weren't made to feel inadequate or that you did not belong. And you were not called ..... it was all right then and other people in the group shared the information.

According to one of the KESOs the program attracted even those who would not be “regulars” at school:

*I think that the program was actually good, it did engage the kids. The kids wanted to be there. Kelly*(pseudonym), who would miss Monday and Tuesday at school, showed up on the Wednesday, caught the bus from Deniliquin, because the iPads program was on.*

Parents and community members were full of praise when talking about the approach implemented by the facilitator of the SPARK sessions, David, who integrated the use of iPads with inspiring activities that celebrated Indigenous peoples and culture. The iPads provided students with a platform for exploring new ways of telling stories, composing and singing songs, and opened up opportunities for sharing and preserving Indigenous culture. David and his team creatively meshed tradition and culture with the acquisition of 21st century literacy skills. The pedagogical approaches utilized in the SPARK sessions resembled traditional Indigenous pedagogies that included learning from the Elders through storytelling and role modeling, as well as integrated and experiential learning strategies the focus of which was on improving literacy skills through authentic learning experiences. Building rewarding interpersonal and intrapersonal relationships was a crucial component of learning. According to one of the LAECG representative:

*David formed a great relationship with all those kids, he was just amazing.*

*I think that was the best thing about it, the point-of-view that, when David was up speaking with such passion I think a lot of the older boys got a lot more out of that than the younger boys, and the older guys got a lot more out of that than actually doing any work on any iPad.[sounds of agreement] Taking pride in their own culture and taking the step up to now sort of be the generation that kicks on and sort off leads.*

Outstanding Indigenous People from local communities were invited to inspire learning, build confidence and promote deeper understandings of Indigenous culture, connectedness with the community and the environment. Forum participants thought that the involvement of respected community members had a significant influence on children’s self-respect and self-worth. As one of the KESOs, whose child also attended the program put it:

*The actual sessions were more important than the technology. To see how proud they were.*

Outside the SPARK sessions sports activities appeared to be the most engaging of all at school: “….sport, sport and sport. Any sport”, parents said. Recently, however, digital technologies have opened up a new dimension of possibilities for learning, and school has become more engaging, more enjoyable for more students. One of the parents reported with excitement about changes in her child’s attitudes towards reading and writing since the introduction of the iPad program:
...they had written a whole story, they’d happily sit down a read a book, because this is the new technology and they were getting right into it and really enjoying it.

...he wouldn’t write in his book, but in the iPad he’ll write you a story no problems and he’s produced some really beautiful work about his family and leaders in his community and people that he looks up to and he’s just done some really beautiful work.

Being connected to the Internet at school seemed to have amplified these experiences and provided students with convenient access to information, which in turn transformed learning into a more engaging activity:

They’re forever getting information on the phone or whatever, more than going to a textbook and doing the same.

They want to know something straight up, or Google something, just chk-chk-chk [sound of typing] and it’s there for them.

Access to technologies

Parents reported a diversity of experiences related to accessing digital technologies. Both in schools and family homes access varied from poor to adequate: “There’s not nearly enough. Way too much chalk n’ talk in the classroom”.

Despite parents’ perceptions, conversations with school principals from both government and independent schools participating in the TECP project revealed that providing students with access to technologies was of high priority. Technology access ranged from access to wired personal computers in labs and electronic white boards in classrooms to wireless mobile devices such as netbooks or iPads. The Education Revolution introduced by the Rudd Government, enabled the provision of notebooks for most senior secondary school students. Parents’ comments reflect the above patterns of technology use in schools:

...basically year 9s and 10s have netbooks at this campus, the year 7s and 8s don’t, but there are heaps of computer rooms that teachers book them into but it’s been really handy that my group of girls, when I have them for dance, they all have iPads, we had enough for the whole group of them. So, it has been handy. Even if you had a few, one between two, you can still do some stuff with them.

...in year 8 she doesn’t have a netbook, so using an iPad was handy for her year level, her year level doesn’t have netbooks

They have an interactive whiteboard but I don’t think they use it much and they have iPads but I don’t know whether they’re allowed to use it much.

Unfortunately parents’ reports of home access to technology in Indigenous and Torres Strait Islander families painted a less optimistic picture. Access was limited and in most cases did not involve Internet connectivity. Some parents had a work laptop with a prepaid wireless dongle, which was occasionally used by their children to complete homework or play games:

Well, he hasn’t really got much access to your computers at home, I’ve got a computer but I use it for work, I won’t let him on it much, and he’s never really had video, I don’t know the names of the things [laughs], the video games...

Often good access to technology at the school was multiplied by readily available technologies at home, which increased opportunities for learning and networking as the following excerpts indicate:
There’s three computer labs, and trolleys of laptops and things like that.

They’re actually rolling out many more sets of iPods and iPads. Which is really starting to get them up. we’ve got a group of teachers who are working from year 7s and 8s that the iPad will almost be your thing.

He’s been using computers since he was two. He’s almost finished with his third PC, he’s got a windows machine and a mac, and they’re both connected to the internet all the time -

According to participants, limited access to the Internet impacted on the quality of learning experiences. Most parents admitted that students were more likely to access the Internet at school than at home:

He has his own computer in his room but it doesn’t have internet or anything. So they probably tend to use the Internet at school more, because it is free.

For those being connected to the World Wide Web at home had introduced new challenges related to cyber safety:

There’s an awful lot who have extremely limited internet, with dad standing over your shoulder watching you while you www., or have no internet at all, and for very good reasons.

According to Participants, the networked computer usually occupied a central place in the family room so that parents could monitor usage:

…we didn’t have a computer until the eldest was in year 9 and the computer was ALWAYS in the family room. It was not allowed anywhere else except the family room.

They’re all in the lounge room as well, so they can’t do anything without us seeing what they’re doing. None in the bedrooms!

Some parents used computers as a behavior management tool:

That’s how I punish him. He does something wrong. I take the internet off him, I change the password, one of the access points to ‘no internet for jack’ just to taunt him. [laughs] Or move his internet completely.

Patterns of technology use

Parents and KESOs talked about patterns of technology use at schools, which ranged from dressing up old practices with new technologies to integrating them into innovative ways of learning:

I think being so big and being so busy it’s very curriculum driven, and the fastest way to get stuff across is still standing there and giving the information. The boys use a lot of technology in presentations, but they don’t use a lot of technology for actual learning.

We were talking a little bit at the other school and they were saying that they’ve actually started uploading their textbooks to iPads and that’s how they’re doing textbooks these days.

Mostly the textbooks that are on the booklist have a CD, so they don’t have to lug their books home all the time, they just put the CD onto their computer. Most of those books have also got an interactive website, so they can go onto the website at home and do their homework, and do some extra work as well.
They integrate that into their actual learning, your textbook will be on your iPad, everything will be on your iPad, and they you do your work on it and export it. Because I think we’re lagging a little bit behind.

The emergence of social networking technologies had impacted on ways of communication and collaboration amongst youth. In particular the rise of social networking tools had been very popular with secondary school students. Parent responses indicated that the most often used applications included Facebook, YouTube, Skype and Twitter. Facebook was often accessible on mobile devices for free and allowed students to communicate with friends and relatives across the states and territories. Parent’s however appeared to have limited understanding and control of their children’s use of social networking tools:

Well, he’s on it, ’cause he got on it for school I think.

He’s never used it on my computer, I don’t think. But he talked to his cousin a few times on his phone.

Mixed feelings had emerged about the usefulness of Facebook. Some parents were really excited about opportunities to connect with friends and family, some were concerned about risks involved in meeting and befriending strangers in cyberspace:

I use it all the time. I use it for work, home, family contact. I’ve developed a really close relationship with the boys through the use of it, and tea families. People that I don’t want to know don’t know what I’m doing or what I’m up to.

Yep. For work, I’m supposed to be on Facebook but I’m not, I just don’t see that it’s necessary, you know, why should millions of people know what you’re doing?

I don’t want you on Facebook, I lot of things happen, a lot of nasty people out there that will do things, so he deleted his page and everything else, I’m not a techno-freak I have trouble.

The impact of TECP on student learning

Parents were generally satisfied with the impact of the TECP project on their children’s learning. They reported perceived improvements in motivation and engagement. The Spark sessions took learning beyond mainstream classrooms and provided Indigenous students with opportunities to connect with each other and with members of their local communities within the context of their own culture:

...it has been a really, really good program. He has loved every minute, but he’s developed in it as well. Like I said It’s not just about what he’s doing on it, when I went into the program and I saw him up there singing...that takes a bit for him to do and that sort of stuff. And he felt very comfortable there, there were a lot of people who he had no idea who they were, and it was just an opportunity to connect, to see who else was around in the community.

Learning with iPads proved to be a powerful catalyst and a fun way to tackle those less favourite activities at school. Parents noticed improvements in problem-solving, literacy scores and self-confidence:

Jack* loves the TECP, loves the iPad, he’s a more hands-on kid, he can sit there with Lego Mechano, can nut out a problem, whereas he finds it really diff in the classroom, I’ve found this this year with Jack worked on self-esteem, the last four years he’ been in trouble a lot of the time....
...if it’s something that’s really appealed, usually a hands-on thing, the iPad stuff he’s told me more than he ever has about what he does in class.

...probably learn better with project-based, where it’s their own interests.

...it has worked for her, because her mid-year report in English she skyrocketed, and I noticed with the other girls that they went up with their literacy, there’s only a few girls that stayed the same.

Especially when you can see that your child has potential to do well in that area, if they really like it, not saying it has to be used inappropriately it could be used really well like he loves building on the iPad, creating stuff on that, even the story writing stuff he really enjoyed doing stuff.

All parents agreed that iPads had been a popular and intuitive medium for learning, helping children to be more self-directed and curious:

It’s very, very popular. My older son, he likes to do the car guide, all that sort of things, he’ll read anything like that more than a textbook, actually. And because the car guide’s accessible on the iPad, he reads it all the time.

...anything to do with the iPad, Jack* excels, he really loves it he’s even got a program with the tables and he’ll sit there with that.

According to some, innovative uses of technologies, such as collaborative and project based learning, as well as the ability of completing work at home had a positive influence on student learning:

.....probably learn better with project-based, where it’s their own interests

It’s so easily accessible, too, you don’t have to go down to the museum if you want to know something.

.....he brings it home and uses the stuff he’s done through the program, build stuff on that, whatever happened that he’s learned.

Issues identified by parents and community members

Despite the overall satisfaction with the program a number of issues had been raised by community members. These involved the community not being part of the decision-making about the project, the lack of involvement of Koori Education Support Officers (KESOs), unsustained connection between the Spark sessions and school work, and limited access to iPads.

Community leaders such as Elders, and members of the LAECG expressed their concern about the lack of consultative processes prior to the implementation of the program:

If you are not a part of the decision-making and initiation of programs as a community, you are not truly engaged in it.

Community leaders would have liked to see Koori Education Support Officers given more responsibility in facilitating student learning within the TECP project. In their views, KESO’s should have taken a leading role in translating Spark experiences into school-based activities:
We were utilised to make sure that the kids got there, to get there ourselves and look after the kids. But we were not actually engaged in the whole discussion in the outline of the program. What are we actually going to do here, how the kids are going to benefit?

Not all KESO’s had access to the iPads which also further complicated their ability and acquisition of necessary digital literacy to assist children with their tasks:

But if we, the KESOs would have had access to them [iPads], maybe the kids would have been up to date with their work, with everything.

Community forums also revealed that most schools did not allow their students to take the iPads home, thus denying families the opportunity to embrace the TECP journey with their children. This evoked feelings of not being trusted. Not being able to share the joy of learning with new technologies also prevented parents from taking advantage of these new technologies themselves, thus becoming part of the bigger picture of closing the gap:

If the kids were able to take those iPads home anyway, to work with their parents, and that would bring the parents into it.

A need to continue improving the program was also expressed across the board. A number of recommendations were however maid. These included more consultations with the community, more defined roles for KESO’s in projects involving Indigenous students, improved access to technologies, promoting cultural understanding by using local resources and more support to schools and teachers to be better prepared for these important initiatives:

And I think, because the program, this is obviously the first year that it’s running, so there’s obviously things that can be fixed up, that’s the idea of the first year of running a program, you look at things that did work and didn’t work, and escalating the things that did and getting rid of the things that didn’t.

Most parents and community members participating in the parent forums emphasized the importance of implementing consultative processes when planning for and designing learning experiences for Indigenous and Torres Strait Islander students. Besides consultations with Elders, and LAECG members this would involve utilising the expertise and experiences of KESOs. One of the Elders used the following example of a successful partnership where Indigenous protocols and expertise are valued:

I would say more consultations with locals, but if you are talkin' about schools, as far as I am concerned, KESOs are the experts in Aboriginal affairs, and Maureen* is a classic example, Maureen never comes to this town, she calls in and you know, she find out what's going on, and if there is a problem, she is the first person I call. That's the kind of support....

Parents also highlighted the need for more access to new technologies. In particular access to Internet connectivity so that children from Indigenous communities can collaborate across schools, states, even internationally. Using the affordances of mobile technologies and tablet devices could promote better approaches to learning as well as capacity building in the community. More convenient access to technologies, more time spent on experimenting and learning with them and through them could potentially multiply the benefits across the curriculum. Additionally, having access to technologies at home would provide students with more time to work on and complete their projects:

If they had projects to do, they still did not have those iPads with them to complete the projects at home. That was really important. I understand this is a pilot project, you know, there is a lot of things to iron out if we do it again, but, um, you know, those kids should have had those iPads at home.
One of the highlights of the TECP project was its ability to tap into community resources and create an engaging learning environment for Indigenous and Torres Strait Islander students. This approach was welcomed and celebrated by the community and has provided a powerful source of motivation for the students. Parents suggested that these positive practices could be further improved by inviting local community members to serve as role models:

*If we new what they were planning for the year, we could have hooked them into the right resources for their topics and themes, especially local resources. We are about sharing with our kids. You know a role model does not have to be someone they see on TV, or someone who is playing footy, we have role models in the community. So even to talk to them about how You know the Honor Roll staff and that... We brought that up and we changed the way the information is shared or whom we want them to learn about.*

The need for promoting intercultural understandings, while respecting Indigenous protocols for communication and community engagement was also highlighted by participants. The potential for harnessing the power of digital technologies to preserve and share local culture was also recognized:

*Is there an opportunity for us to get down or record our local stories? When Elders aren't around anymore, you know so they can share their stories, this is the time when they can do that, an opportunity for us to do it with the technology. And keep our culture going.*

Finally, parents and community members expressed the need for the provision of ongoing access to the iPads for Indigenous students following the conclusion of the TECP project:

*Honestly, if you kind of roll it out into communities, let the communities use it.*

*Interesting data it would be how many Indigenous children will utilise and access those iPads in the following years? It would be interesting to see how many of our children will get the opportunity to utilise those iPads, the iPads themselves over the coming years?*
Case 2: Spark Sessions

An innovative digital media, youth engagement and story telling program called Spark was supported by the Technology Enriched Curriculum Project. Students used tablet and other technology to collect, document, record and tell stories from their own culture and communities. Based on the acclaimed Voices From The Cape (Community Prophets DVD, 2008) the program has a training function in terms of the creative use of new media technologies as well as a number of guiding principles that establish respectful learning environment. These principles include partnership with community and families, youth engagement through hands-on use of digital media, intergenerational communication and recognition of Indigenous learning systems. With the advent of new multimedia technologies the meaning of literacy has been expanded to include not only linguistic texts, but visual, audio, spatial and gestural texts. In addition, multimodal texts are also encountered that combine elements from all text types such as in the production and viewing of films. Beginning with an authentic learning project negotiated with students, the Spark Program involved culturally relevant and culturally responsive pedagogies and encouraged collaboration, self-direction, independent learning and critical thinking.

The Community Prophets team visited each of the three project clusters for a total of eight days throughout 2012 to work with students in the operation of equipment and the development of their digital stories. Overall, project goals included the production of an ebook and a CD of songs written by students to tell the stories of community members or young people in the community, or important events in the lives of community members and history of the community. Activities included an introduction to equipment, media and technical language, developing knowledge of the medium and content knowledge, interviewing techniques and the formulation of questions, the gathering of stories and the incorporation of cross-cultural links involving issues such as colonisation, land rights, stolen generations and constitutional matters. This enabled students to enhance an understanding of culture and issues affecting all Aboriginal and Torres Strait Islander people. A 3-day professional learning program was conducted for teachers and included guests Archie Roach, Lou Bennett and Gary Foley. Use of iPad programs included iMovie, GarageBand and ComicLife.

As reported from one participating school, 'boys only used the ipads for the storytelling with David. The literacy levels for boys on the project did benefit from the intense editing and drafting used in the project and vocabulary and grammar also improved as a result of the one to one time with the individual boys. The pride the boys had for their work was significant and this became a motivating factor for the completion of their stories. I am confident if we use this format in the future (with I pads), we will also end up with work that is of a higher standard than work produced without such intervention. Work samples seem to suggest that the word count for stories is substantially higher using the technology as well. As a project to significantly address some key issues for Indigenous students, I cannot praise it enough! It gave us an opportunity to work closely with our very diverse cohort of boys, learn about the important social history and challenges they face and cement together the mob at our school. This in itself is priceless....'
Firmly locating the epistemological paradigm for Aboriginal and Torres Strait Islander Education in regular schooling remains difficult because of the different conceptions and definitions of the term. A working consensus regarding epistemology, or that branch of philosophy concerned with the nature of knowledge and learning, where knowledge comes from and how learning occurs, is required to frame discussions regarding issues of truth, values, belief and knowledge so that fair and reasonable evaluations of learning can be made and recognised. Research methods need to be in close alignment with epistemological understandings and research outcomes need to be considered in relation to questions of truthfulness, credibility and consistency. More broadly, these matters are also central to the Westminster-derived legal system in Australia where citizens are called upon to provide honest and accurate evidence regarding the most significant aspects of social life. Expanding his theory of communicative action for example, Habermas (1992a) wrote about civil society and democracy and how the law deals with ‘facts and norms’ in establishing due process. This followed his theory of language, communication and meaning (Habermas, 1987) and his work on discourse ethics that valid claims needed to meet the approval of all participants in a discourse. While this is a general principle, the law allows for the dissenting voice of judges on each case to not be discounted but to be seriously considered, documented and studied for strengthening of legal precedent and understanding.

In discussing the issue of quality in research, Seale (2003, p. 173) notes the view of Guba and Lincoln that research should:

.. develop ‘more sophisticated’ understandings of the phenomenon being studied (‘ontological authenticity’), be shown to have helped members appreciate the viewpoints of people other than themselves (‘educational authenticity’), to have stimulated some form of action (‘catalytic authenticity’) and to have empowered members to act (‘tactical authenticity’).

This approach to authentic research opens up discourses between Aboriginal and Torres Strait Islander communities and non- Aboriginal and Torres Strait Islander researchers regarding different cultural perspectives of society and knowledge. It enables a mutual framework of what is real and genuine to be agreed and established. The word ‘catalytic’ as used above has most likely been taken from an early paper of Lather (1986, p. 67) where she seeks to resist the domination of positivist methodologies and introduces the notions of construct, face and catalytic validity. Lather describes catalytic validity in Freireian terms as knowing and transforming reality such that participants ‘gain self-understanding and ideally, self-determination through research participation.’ Research concepts and practices of this type are supportive of Aboriginal and Torres Strait Islander knowledge formation.

In relation to the above matters, this research project has involved both affirming and limiting features. Adopting an Aboriginal and Torres Strait Islander epistemological frame of reference and a mixed methods approach, the project has attempted to assemble a variety of evidence that respects community voice and possibility. While the project is concerned with
Aboriginal and Torres Strait Islander children in schools, procedures and interpretations have not been imposed that knowingly distort family perspective. A significant limitation of the study involved the lack of time overall but particularly for the establishment phase during which more extensive conversations and consultations with all participants should have been undertaken. This view was reported by a number of parents and schools.

Issue 1. That research projects involving Aboriginal and Torres Strait Islander peoples need to ensure appropriate initial discussion between communities, schools and research teams so that research purpose and methodologies are agreed and that communities are able to participate throughout the duration of the project.

In a general sense, approaches to knowledge, curriculum design, teaching and assessment across schooling will enhance learning when there is alignment with the culture and experiences of all participants. That is, learning is most profound when the epistemologies and pedagogies of school connect with the epistemologies and pedagogies of students. On this basis, Information and Communication Technologies and Pedagogies should enhance and connect with Aboriginal and Torres Strait Islander epistemologies and pedagogies as best they can be defined within particular locations. As described earlier, Indigenous philosophy generally involves the interrelatedness of all aspects of the universe, cycles of experience, ‘seeing’ the perceptions of nature, intimate connection with and belonging to the land, family and community stories and oral traditions, careful listening and patience and the seeking of relationships between events. Traditions of living are passed on from generation to generation by Elders and other community members. Indigenous epistemologies and pedagogies are clearly distinct in the main from those of non-Indigenous society and regular schooling that rely on linear cause and effect, detailed analysis of specific and isolated issues to relieve doubt and a distinct separation of the physical and metaphysical. To be culturally inclusive of Aboriginal and Torres Strait Islander experience, ICT and ICP need to be evaluated carefully to support these principles and to move past the mere manipulation of given information within the regular curriculum. This issue is taken up in more detail in the final section of the report.

Issue 2. That Information and Communication Technologies and Information and Communication Pedagogies in schools need to reflect, support and enhance the cultures and knowledges of Aboriginal and Torres Strait Islander peoples.

From a Freireian perspective, holistic and culturally inclusive technologies should be supportive of Indigenous literacy. Nakata (2003) has alerted us to the dangers of a racist anthropological model of difference that establishes Aboriginal and Torres Strait islander inferiority. However he also notes that good teaching practice is good for all students indicating that the principles of cultural inclusivity should extend across the curriculum for everyone. It should not be expected that any technological application will automatically support Aboriginal and Torres Strait Islander learning and many may have obvious or covert assimilationist tendencies. What is termed ‘social media’ has been rapidly diffused across Australian society with mobile phones for example enabling ready contact between people and with large numbers involved with messaging-type programs. There is no reason why such diffusion should not involve Aboriginal and Torres Strait Islander communities as well and indeed, there are advantages. Involvement of students with digital story telling, still and video cameras, sound recording and the like appears to be most successful. A distinction must be drawn between common usage social media and the use of such applications for epistemological and culturally inclusive curriculum in schools. As Freire pointed out above.
‘If learning to read and write is to constitute an act of knowing, the learners must assume from the beginning the role of creative subjects’ so that it becomes possible to reflect ‘on the profound significance of language.’ Incorporation of culturally relevant ICT and ICP across the curriculum should support this process. While data reported here are not extensive or conclusive of the use of technology, it does suggest modest levels or progress in relation to student engagement, test results and writing. More substantial experience by students with specific applications is required to elaborate their impact on literacy and learning.

Issue 3. That electronic tablet devices support literacy progress and engagement with schooling of Aboriginal and Torres Strait Islander children when applications are culturally inclusive and respectful of local community culture and knowledge.

Connecting country and place with school content is not always easy to do, but is essential for epistemological and cultural harmony. For example, Yunkaporta and Kirby (2012, p. 210) point out the difference between Aboriginal perspectives and themes in school: ‘A genuine Aboriginal perspective can bring Aboriginal Community and place-based orientations to the study of mainstream content, no matter what the theme is.’ The role of Elders is central here and given that many Elders and community members do not have ready access to school, it follows that this process continues at home and within community activities. Questions of access to ICT is an equity issue for all schools, but it seems appropriate that access should be provided for Aboriginal and Torres Strait Islander students at home particularly for cultural and literacy use. Bringing school and community closer together in this way will be strongly supportive of educational programs and engagement with schooling. Parents had definite views that portable technological equipment should be available at home.

Issue 4. That Information and Communication Technologies should be available for school use and out-of-school use so that Aboriginal and Torres Strait Islander families can participate for educational and cultural purposes including literacy and school engagement.

In discussing the ‘cultural interface,’ Nakata observes the difficulty of participants being able to maintain their own cultural understandings and intellectual positions while at the same time, being open to the challenges and uncertainties of history and difference. If this was an easy process then intractable issues of prejudice, bias and discrimination would have been dealt with some time ago and with more harmonious relations as an outcome. In considering similar problems, Habermas (1992b) described ‘public spheres’ as forms of democratic association where citizens meet and discuss issues of community importance. These associations are not formal decision-making organisations, but exist mid-way between legislative institutions such as local councils and the court system and state and national parliaments. In Australia today, groups such as trade unions, sporting clubs, art societies, neighbourhood organisations, schools and universities and the like could constitute public spheres of discourse that enable citizens to become involved with issues of the day. The anthropologist Turner (1967) also explained the concept of ‘liminality’ as the encountering of different experience and rituals whereby identity, values and understanding become ambiguous and confusing, until such time as new thinking emerges. It is possible that new thinking will not come forward if current ideas are too strong or intransigent, or the ‘liminal’ experience is not sufficiently collegial.

As noted earlier, information and communication technologies can contribute to community processes of discourse and engagement provided that they are designed with such features in
mind. ICT programs used in schools do not necessarily embody these features, but those that encourage language, narrative and expression have an important role in engaging all children in all subject areas. For Aboriginal and Torres Strait Islander children, such applications and pedagogies provide important ‘cultural interface’ and ‘liminal’ experience for literacy and numeracy and can connect language and symbolic acquisition with formal learning. Tablet technologies with appropriate experiential applications can provide flexible environments at school and home for exploring culturally inclusive issues and open up new perspectives of knowledge and learning. The school curriculum will need to be sufficiently flexible and integrated to allow this to occur. As discussed in the literature review, ICT and ICP are emerging processes for learning that should benefit all children.

Issue 5. That Information and Communication Technologies and Pedagogies can support the experience and investigation of different cultures from different community perspectives enabling Aboriginal and Torres Strait Islander children and non-Aboriginal and Torres Strait Islander children to more deeply appreciate diverse knowledge, customs and viewpoints.

There is little argument that high quality and continuing professional learning should be available for teachers regarding all aspects of their work. This is particularly so for all teachers concerned with Indigenous education and the social and cultural complexities involved. Schools need to have a clear view of their model/s of knowledge, teaching and learning and how connections can be made across all subjects with the key features of Indigenous epistemologies. This necessitates continuing contact with local communities and the participation of Elders and other community members in the life of the school. Working with Aboriginal and Torres Strait Islander organisations is also strongly encouraged, together with a systematic review of the literature. Incorporating ICT and ICP across the curriculum for all schools still requires a major epistemological effort and is certainly complicated within diverse classrooms. The key issue to be considered here is whether the latest technology is seen as merely another platform for the delivery of predetermined subject content, or whether new avenues to understanding and learning can be designed. In this regard, the initial hope by some educators that the introduction of the microcomputer into schools in the early 1980s would in effect reconstruct both learning and schooling for greater inclusivity, has not been realised. There is an extensive literature on building teacher capacity in general including the practice of professional learning teams in Victoria (Vale, Davies, Hooley, Weaven, Davidson & Swann, 2010) and professional learning communities in the United States (DuFour, DuFour & Eaker, 2008).

Issue 6. That teachers should be able to access professional learning programs including those designed and delivered by Aboriginal and Torres Strait Islander people and that support the education of Aboriginal and Torres Strait Islander children and the innovative use of Information and Communication Technologies and Pedagogies with Aboriginal and Torres Strait Islander children.

Debate regarding the nature of research and the selection of appropriate methodologies continues to be highly contested around the world. Experiential and qualitative research is a very active field with new forms of data gathering being constantly devised to meet specific circumstances and problems. Different tendencies in the social sciences and humanities such as linguistic, cognitive and participatory give rise to different understandings of how we interpret the world and generate different methodologies. Positivist and quantitative research continues to rely on more traditional approaches to measurement and to not place emphasis
on questions of human value and belief within which dilemmas are situated. To resolve this dichotomy, methodologies that involve mixed methods have emerged so that a range of different data sets can be available. This approach seems to be appropriate for research programs involving Aboriginal and Torres Strait Islander communities because it does not impose a particular perspective and allows a range of experience to be considered. While different weightings may be given to different data, mixed methods research needs to be able to analyse and interpret research data in a holistic and integrated manner if it is to move beyond traditional dualities. Research methodologies are of course enacted by researchers in the most respectful way they can in relation to the research environment; it is the approach of the researchers that is crucial, not so much the methodologies selected.

**Issue 7.** That mixed methods methodologies are most likely to be respectful of Aboriginal and Torres Strait Islander culture, knowledge and learning and recognize the history, language and perspectives of Aboriginal and Torres Strait Islander communities.

In considering a major theme that runs throughout the report and above issues, we turn in the final section to Indigenous identity. To introduce this aspect of the discussion, we quote Smith (1999, p. 126) at length where she describes ‘multiple layers of belonging’ as ‘nested identities,’ a personal and community perspective that has important social and educational implications:

> When visiting New Zealand in 1996, African American historian Bernice Reagon Johnson visited a Maori community and, in response to discussions about the significance of land to Maori identity, described her own community as one held together by song rather than by territory. An Aborigine friend also made the comment that ‘we sing the land into existence.’ For Maori, there are several ways of identifying one’s Indigenous ‘community.’ One commonly used way is to introduce yourself by naming the mountain, the river, the tribal ancestor, the tribe and the family. Through this form of introduction, you locate yourself in a set of identities which have been framed geographically, politically and genealogically.
Case 3. The Echuca Parent and Community Forum

Echuca is located in the Murray-Goulburn Region, where the Yorta Yorta people live. Central to the ancestral home of the Yorta Yorta Nation is the Murray River which is surrounded by wetlands, creeks, rivers and lagoons. Echuca means “meeting of the waters” in Yorta Yorta language and is the administrative centre of the region catering for the educational needs of the Indigenous and other local students. The indiscriminate invasion of the ancestral land by European settlers as well as the destruction and mission management of local Indigenous communities in the last 200 years resulted in a strong sense of community and Indigenous Identity in the region. Community members maintain a firm voice in negotiating the future of the Yorta Yorta Nation, including other Indigenous communities, in Echuca and beyond. This includes matters of education and initiatives involving Indigenous children, such as the TECP project. Part of the research of the educational features of the TECP project was to hold a discussion forum for parents and listen to their views about their children’s experiences of learning with iPads in culturally relevant contexts.

The Echuca Parent and Community Forum had raised important questions about ethical and cultural issues related to implementing projects conducting research with Indigenous participants. In particular it highlighted the need for continuous consultative processes that are respectful of local Indigenous protocols when working with members of Indigenous communities. In this regard, consultation and community involvement in the initial stages of the TECP project could have been more extensive to strengthen community support for the program. This affected student participation as well as timely collection of qualitative research data from parents and community members. Through prolonged negotiations the local community was assured that research practices would reflect local protocols for communication and community engagement. Extra time allowed for more detailed community response and the collection of important qualitative data. Apart from parents, this involved the inclusion of community leaders such as Elders, LEACG members and KESO’s in the discussion about the TECP project. The research included forum participants in the analysis of data and verification of findings.

The Echuca parent Forum was held in mid December, 2012 at the Echuca TAFE in hot (39°C) weather conditions. Community leaders were invited by a representative of the Local Catholic Education Office. Eight community members came together to voice their opinions about the perceived impact of the TECP project on student learning and engagement as well as the potential of the TECP for capacity building in the community. The overall response to the project was positive. Parents and community members however highlighted the need for sustained community involvement when designing and implementing educational programs for Indigenous students.
7. CONCLUSION: RECOGNISING INDIGENOUS IDENTITY IN SCHOOLING

The Technology Enriched Curriculum Project (TECP) has been an innovative project designed to incorporate new approaches to literacy and school engagement for Aboriginal and Torres Strait Islander students using Information and Communication Technologies and Pedagogies. It emphasized situated learning in culturally inclusive contexts through the application of mobile technologies and tablet platforms. While there was limited time to establish the detailed understandings, relationships and procedures required in a complex project of this type, there is sufficient relational evidence to suggest that ipad technology can support student learning and engagement. Further longitudinal research is required to study the complex mix of social and educational factors that constitute culturally inclusive learning environments and the continuing participation of Aboriginal and Torres Strait Islander families, students and in particular at school level, Koorie Education Support Officers. Mixed methods research methodologies with equal value being given to each data set provide an appropriate knowledge paradigm for cultural recognition and respect. Recommendations contained in this report support the initial work undertaken by TECP being extended and taken to the next stage.

Consideration of the three research questions that formed the basis of this study and analysis of data have been undertaken holistically and with regard to the face, construct and catalytic principles of validity that underpin credibility and truthfulness. In relation to Question 1 (What is the relationship between educational and cultural factors that impact on literacy and engagement for Aboriginal and Torres Strait Islander children in regular classrooms?) a number of factors have been identified in the literature review and have been supported by the data collected. They include the incorporation of Aboriginal and Torres Strait Islander ways of knowing, holistic approaches to knowledge, curriculum design and pedagogy and the respectful participation of local communities, families and Elders. Acting on these features of cultural inclusiveness is a difficult task for all schools and will require whole school approaches over time. While Question 2 (How does the introduction of Information and Communication Technologies into classrooms impact on the literacy and engagement of Aboriginal and Torres Strait Islander children in regular classrooms?) refers to ICT generally the specific literature base is not extensive. However literature and data indicate that Aboriginal and Torres Strait Islander communities appropriate ICT in the same way as other Australians. The question does not specify mobile technologies such as laptop computers, iPhones and tablet devices, the latter being still relatively new. School and parent participants were supportive of mobile technologies, but there is an urgent need to ensure culturally inclusive and user-generated content for learning purposes. Question 3 (How does altering the matrix of educational and cultural factors for Aboriginal and Torres Strait Islander children in regular classrooms impact on new understandings of literacy and engagement by Aboriginal and Torres Strait Islander children, parents and community?) draws on the Freireian concept of language and literacy adopted by this study, a major aspect of which is further developed in this section. The central issue being raised here is that of ‘new’ understandings of literacy and engagement through mobile and other technological pathways into language and learning. A snapshot of possibility has been provided by this study whereby local community members, families and children are finding ways of utilizing new applications for their own benefit.
There are certain risks in attempting to provide some brief overview comments regarding complex research issues, especially those involving Indigenous and non-Indigenous peoples living and working together within organizational procedure and regulation. We do not wish to intrude on matters that are sensitive and may offend. Dodson (2003, p. 32) for example has pointed out that ‘For Indigenous peoples, there is no doubt that self-determination and self-identification are their inherent and inalienable rights. In both this country and internationally, the principle of self-identification has been enshrined in the law.’ However for those citizens who have a deep commitment to social justice and educational equity there is no choice but to express thoughts and proposals as clearly as possible for discussion and response. For non-Indigenous researchers, the task of looking deep within personal understanding and to recognise elements of racism and colonialism to decolonise accepted methodologies and practices (Smith, 1999) is immense. We begin therefore with the view of Wilson (2008, p. 69) that, for Indigenous people, ‘research is a ceremony.’ This indicates that the development of knowledge needs to respectfully involve the participation of all those who are concerned and the bringing together of appropriate combined experience and understandings. From this perspective, it is clear that all research regarding Indigenous issues should include Indigenous researchers. Connecting such a view with the research literature and defining a broadly ethnographic methodology, the research has been structured around relationships, explorations, interpretations and relational analysis of culture and education as experienced by participating school communities. It is emphasised that this approach does not centre on the study of particular groups of people.

According to van Maanen (1988, p. 127), ethnographic ‘critical tales’ are ‘strategically situated to shed light on larger social, political, symbolic or economic issues,’ not necessarily to provide answers to specific issues and problems. Positioned therefore within culture as ‘systems of meaning,’ the argument of Williams (1989) seems appropriate, that culture involves current and emerging meaning and direction for communities. Williams writes, ‘These are the ordinary processes of human societies and human minds and we see through them the nature of a culture: that it is always traditional and creative, that it is both the most ordinary common meanings and the finest individual meanings’ (p. 4). In this passage, Williams sees culture as a way of life that is ordinary or encountered every day, fixed yet dynamic. A culture of this type is relational with other key ideas in society such as learning, art, democracy, transformation and is not restricted to persons of wealth and privilege. The connection between culture and meaning raises research questions of epistemology, ontology, axiology and methodology, also identified relationally in the conversation of Wilson (ibid, p. 70) regarding how meaning is actually constructed in the human domain.

From these considerations, the construct of Indigenous identity has emerged as a theme throughout the research. The phrase ‘Indigenous identity’ is used here in its global context and is taken to denote a consciousness or world view or set of perspectives that are distinctively Indigenous. It has been mentioned previously that Indigenous philosophy involves in part an interconnected view of the world, belonging to the land, kinship relationships, family and community story telling and oral conventions of knowledge and learning by Elders and other community members. The lack of an articulated and shared understanding of an Indigenous world view is perhaps the major problem and barrier to insight if productive and shared work at the ‘cultural interface’ is to proceed for research projects and in schools and other organisations. Bridging the concept and practice of Indigenous identity with the reality of schools and the formal curriculum can be guided by ‘8Ways’ (2012) whereby ‘Teaching through Aboriginal processes and protocols, not just Aboriginal content, validates and teaches through Aboriginal culture and may enhance the
learning for *all* students.’ In addition, the ontological and epistemological ways of being, knowing, valuing and doing listed earlier, can be investigated across the ‘Common ground between mainstream and Aboriginal pedagogies’:

- Learning through narrative
- Planning and visualizing explicit processes
- Working non-verbally, with self-reflective, hands-on methods
- Learning through images, symbols and metaphors
- Learning through place-responsive, environmental practice
- Using indirect, innovative and interdisciplinary approaches
- Modeling and scaffolding by working from wholes to parts
- Connecting learning to local values, needs and knowledge.

As the above points indicate, incorporating Indigenous identity into the school curriculum is not the same as seeking to Indigenise the school curriculum. Rather it involves a specific approach towards knowledge and learning that builds upon local culture and experience and which can be applied in all subject areas. As such, it constitutes an approach to literacy and to schooling engagement that is essentially epistemological in character but which may generate some tensions with current pedagogies. For example, more experiential ‘modeling and scaffolding by working from wholes to parts’ may not be regular practice in either literacy or numeracy, where more inductive and step-wise techniques may be preferred, including the use of ICT and various tablet stratagems. Learning needs to involve the whole child, family and cultural connections such that holistic meaning becomes available to enhance identity. Under these conditions, it may be possible to begin with small projects or pilot studies that provide experience for teachers and students in ‘mind-sized’ bites and from which progress with learning can be evaluated. Such work may not result in an immediate epistemological ‘paradigm shift,’ but it may mean that taken-for-granted non-Indigenous approaches will be challenged to some extent making greater participation and inclusion possible. Personal experience of the ‘cultural interface’ and ‘liminality’ discussed above then becomes accessible to frame further change and improvement.

At this stage, it is important to reflect again on the relationship between these key ideas of ‘cultural interface’ and ‘liminality’ and the notion of the ‘public sphere’ raised by Habermas. In their discussion of language, learning and the impact of digital technology, Gee and Hayes (2011) detail what they call ‘three social formations’ (pp. 121-131). They suggest that the ‘oral social formation’ allows for interpretation that is ‘dialogic, interactive and flexible.’ Next, the ‘literate social formation’ enabled records of previous exchanges to be kept and to provide reference points for future proposals. Such records are often decontextualised (across time) and are considered differently than in the ebb and flow of conversation. Gee and Hayes then describe the ‘digital social formation’ that allows the oral and the literate to be combined and negotiated by users. It is these features that begin to break down the roles of authority and institution and which potentially at least can return citizens who may have been excluded to more respected and participatory positions. A ‘digital identity’ emerges. However as processes of globalization and technologising have continued the strength of the public sphere and relationships within the public have become eroded, with greater emphasis on the individual and the local. It may be however that digital and social media will tend to recover notions of community and public as the channels of communication and expression are recouped by the citizenry. For Indigenous communities, this possibility is significant as less formal, more conversational and culturally inclusive literacy is accepted, contact with family and community often dispersed is maintained and connections with the dominant society can
be explored in ways not feasible before. In this fluid context that is still being worked through, Gee and Hayes ask prophetically whether ‘modern social media (is) giving rise to ‘new global publics’ (p. 131) or to new forms of separation and isolation. For Indigenous communities and families, this question applies to the ‘public sphere’ of school and to the public practice of literacy.

Finally, we note recent work being conducted in Australia that illustrates how many of the principles described above can be applied at the university level. Kutay, Mooney, Riley and Howard-Wagner (2012, p. 47) outline their ‘Indigenous On-Line Cultural Teaching and Sharing’ project that is developing a ‘web repository of narratives from Aboriginal community Elders, Aboriginal students and staff at the University of Sydney,’ so that such narratives can then be ‘embedded in relevant scenarios within online, single-user interactive games to teach about kinship.’ It is intended that the materials will support ‘different professional learning contexts such as law, social policy, health and education.’ Respecting community narratives and being encouraged to build scenarios that embody them, is an approach towards learning that is congruent with the philosophy of Nakata and Yunkaporta and a process that can be supported by ICT and ICP across the curriculum. Enabling different world views to co-exist around the big ideas and contestations of the day is a major contribution to social progress that formal education pursues and one that must include Indigenous culture and knowledge. Looked at in this way, Indigenous identity becomes a crucial factor in comprehending Australia itself and knowledge production. While there may be differences in conceptualising time, space and origins, these do not prevent counter views entering perhaps tentatively into a harmonious relationship and establishing the basis of new knowledge, values and satisfaction. Rather than being an added ingredient, Indigenous identity should be considered as a reconciling democratic construct of learning and ‘systems of meaning’ for all citizens regardless of social class, cultural background, or creed.
APPENDICES

Appendix A

ABOUT YOU, YOUR FAMILY AND YOUR FRIENDS

Please put a X in the box that describes you

1. Are you: □ female □ male

2. What year level at school are you in?
   □ Year 5   □ Year 6   □ Year 7   □ Year 8   □ Year 9

THINKING ABOUT SCHOOL

When you answer the following questions, YES! means you definitely agree with the statement, yes means you agree a bit, no means you disagree a bit and NO! means you definitely disagree.

(Circle one choice for each question)

1. I try hard in school                  YES! yes no NO!

2. There are lots of chances for students at my school to get involved in sports, clubs and other activities outside class
   YES! yes no NO!

3. Doing well in school is important to me
   YES! yes no NO!

4. Teachers notice when students are doing a good job and let them know about it
   YES! yes no NO!

5. At my school, students have a lot of chances to help decide and plan things like school activities, events and policies
   YES! yes no NO!

6. My teachers are fair in dealing with students
   YES! yes no NO!

7. Continuing or completing my education is important to me
   YES! yes no NO!

8. I feel very different from most other students here
   YES! yes no NO!

9. I can really be myself at this school
   YES! yes no NO!

10. Other students in this school take my opinions seriously
    YES! yes no NO!
<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>no</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. There’s at least one teacher or other adult in this school I can talk to if I have a problem</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Student activities at this school offer something for everyone</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Students have a say in decisions affecting them at this school</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Students at this school are encouraged to take part in activities, programs and special events</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I am encouraged to express my own views in my class(es)</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Most of the students in my class(es) enjoy being together</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Most of the students in my class(es) are kind and helpful</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Most other students accept me as I am</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. I feel like I am successful in this school</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. I feel I belong at this school</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. I feel I can go to my teacher with the things that are on my mind</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. In this school, teachers believe all students can learn</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. In this school, students' ideas are listened to and valued</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. In this school, teachers and students really trust one another</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. In this school, teachers treat students with respect</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. This school really cares about students as individuals</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Most of my teachers really listen to what I have to say</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

28. In the last 3 months have you participated in any of the following activities **at** school? (this does not include lessons)  
Tick all that apply
29. In the last 3 months have you participated in any of the following activities outside of school? (this does not include lessons) Tick all that apply

☐ Sport
☐ Drama
☐ Debating team
☐ School band, orchestra or choir
☐ Student representative council
☐ Clubs

☐ Music or choir
☐ Youth group
☐ Community service

30. What is the most important thing for you at school? Tick only one box.

☐ Getting good marks
☐ Playing sport
☐ Having good friends
☐ Enjoying myself
☐ Drama or music

☐ Other ________________________________
WHAT DO YOU THINK ABOUT TELEVISION?

TV is a mental health hazard

TV helps people to relax

Many television programs are basic and boring

The most powerful education tool today is television

Develop a piece of writing presenting your arguments for or against television. Your piece of writing will be judged on the way you develop your point of view in a reasonable and convincing way and how effectively you express your reasons.

Use a piece of scrap paper for your planning and any rough work.
Writing Task - Television

My suggestion would be that each English class asks the students to complete this task during an English class in February.

Test Administration guidelines

Time: 40 minutes

Materials required

Scrap paper for planning
Paper to write their response
Pen or pencil
Cleared desk space

Students work on their own for the writing tasks even if they are used to discussing and planning co-operatively.

Have the students record their student identity number on the page.

Say:

Today you are going to do a writing task. Record your student identity number on your response sheet. There is a sheet with a few prompts about television. You are asked to:

Develop a piece of writing presenting your arguments for or against television. Your piece of writing will be judged on the way you develop your point of view in a reasonable and convincing way and how effectively you express your reasons.

You will be working on your own. You can use scrap paper for planning and you have 40 minutes to complete the task.

After completion of the writing task:

We will need each school to send the Indigenous students writing tasks to us. They will be assessed by an external marker using the NAPLAN criteria. Please ensure they have written their student number on each sheet and they have not included their name.
Appendix C

Hello to the Teaching Staff at TECP School

Thank you for your continuing involvement in the Technology Enriched Curriculum Project (TECP).

As the next step in the research, could I please ask that you select and consider a work sample for Student A. (a student involved in TECP)

A work sample should be chosen that clearly demonstrates the capabilities and knowledge incorporated by Student A. It does not have to be produced from working with the iPad and can be selected from any learning area such as an English essay, art work, science project, music, or dance performance.

It would be great if the work sample is a piece that demonstrates that they are performing above their peers within this area of learning. (Covered by Q4)

I will be grateful if you could briefly respond to the following items:

1. Can you describe the piece of work?
2. What do you find interesting about this piece of work?
3. Why do you think this piece of work demonstrates capabilities and knowledge for Student A?
4a. How does this piece of work highlight Student A’s skills amongst their peers?
4b. Are other students in the class demonstrating similar capabilities and knowledge?
5. How has your awareness of Student A’s capability in relation to this piece of work informed your teaching practices with him/her?
6. Are there any ways that knowing about Student A’s capabilities has contributed to your overall teaching approach?

Yours sincerely
Appendix D

Hello to the Teaching Staff at TECP School

Thank you for your continuing involvement in the Technology Enriched Curriculum Project (TECP).

As the next step in the research, could I please ask that you select and consider a work sample for Student A. (a student involved in TECP)

You are asked to select a work sample produced from use of the iPads that clearly demonstrates the capabilities and knowledge incorporated by a student. While produced from using iPad applications, the work sample can be selected from any learning area such as digital story telling, music or dance performance, an English essay, art work, or science project.

It would be great if the work sample is a piece that demonstrates that they are performing above their peers within this area of learning. (Covered by Q4)

I will be grateful if you could briefly respond to the following items:

a. Can you describe the piece of work?
b. What do you find interesting about this piece of work?
c. Why do you think this piece of work demonstrates capabilities and knowledge for the student?
d. How does this piece of work highlight the student’s skills amongst their peers?
e. Are other students in the class demonstrating similar capabilities and knowledge?
f. How has your awareness of the student’s capability in relation to this piece of work informed your teaching practices with him/her?
g. Are there any ways that knowing about the student’s capabilities has contributed to your overall teaching approach?

Yours sincerely
Appendix E

Hi Teachers in the TECP,

Great to meet up with you at SPARK last Friday. As I mentioned I am hoping you would be able to provide responses to a small set of questions regarding how you integrate ICT into your teaching and with your students including those from an Indigenous background (see below).

I would be really pleased if you could type your response into a return email against the items listed below and return those before the 15th of June. If you have any further questions please feel free to contact me. I am including the teacher consent and information forms just in case you have not got copies. If you could sign the consent and scan and email it back to me or give it to Roger to file that would be great. Your involvement in this part of the bigger project is really appreciated.

Regards

Prompts for reflection:

• Could you please detail your teaching background (years teaching, year levels and subjects taught, specialist subjects and/or particular interests, extra-curricular activities)?

• What is your experience in working with Indigenous students in your classroom?

• How is communication undertaken with families of Indigenous students in your classroom?

• How do you incorporate ICT in your teaching?

• How do you perceive the influence of ICT on Indigenous student engagement and learning?

• In your opinion, what professional learning opportunities would assist you to respond to the diverse needs of your students?

Regards
Appendix F

*Invitation to have a chat regarding children using information technology*

Dear Families,

My name is Tony Watt and I am working as part of the Technology Enriched Curriculum Program that involved your child. I am hoping that you would be able to join with me in a casual discussion regarding how you think that your child and other children are using information technology as an important component of their formal education, and as a key part of their day to day social life and activities. I will pose a few questions such as

1. What do you think your children enjoy most at school?
2. What ways do you think your children like to participate in reading?
3. Are your children using computers at home and at school? What about mobile phones similar to an iphone?
4. What do they normally like to use computers and iphones for?
5. Do you think your child has sufficient access to computer technology at their school?
6. What is your understanding of your child’s participation in the iPad ICT program? Has your child mentioned what they have been doing in that program?
7. Do you know of any computer technologies being used within your communities?

We will work towards keeping the conversations as informal as possible. The information you will provide will make a great contribution toward an improved understanding of how we can use information technology to provide great learning opportunities for young people at school.

Kindest Regards


Elizabeth Hartnell-Young & Frank Vetere 2008: A means of personalising learning:
incorporating old and new literacies in the curriculum with mobile phones, Curriculum Journal, 19:4, 283-292


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