Factors Influencing the Use of Digital Technologies in Transforming Learning Practices

by

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DECLARATION

This thesis contains no material published elsewhere or extracted in whole or in part from a thesis by which I have qualified for or been awarded another degree or diploma.

No parts of this thesis have been submitted towards the award of any other degree or diploma in any other tertiary institution.

No other person's work has been used without due acknowledgement in the main text of the thesis.

All research procedures in the thesis received the approval of the relevant Ethics/Safety Committees (where required).

ABSTRACT

This is an age where information is accessed, shared and communicated in new and increasingly different ways. Students have more access at home to digital devices and their applications than ever before and are entering school much more digitally literate. However, there remain many primary school teachers who are applying Information Communication Technology (ICT) in the classroom, but are not yet integrating it into classroom practice in a way that will transform learning. ICT continues to be used in ways that support current pedagogical practice rather than transform their practice. Despite the expectations of government, school systems and society to develop 21st century learning skills through ICT integration, this is not being realized. Teachers' slow uptake of pedagogical practices required to transform learning is still widespread and, considering the increase of digital devices in primary schools, remains an issue of concern.

This study explores ICT integration and transformative practices of five primary school teachers. It examines the complex set of factors that influence transformative learning practices at two Sydney Catholic schools. The study identifies lack of time, teacher attitudes and beliefs, the level of ICT resourcing and teachers' knowledge and skills of ICT pedagogical practice as the four major factors influencing transformative ICT practices.

The study concludes that taking advantage of teachers' positive attitudes to drive transformative learning practices using digital pedagogies is best supported by strategically planned opportunities providing time for teachers' personal learning as well as professional development. Furthermore, it concludes that knowledge and skills development of ICT pedagogical practices that actively engage students in creating knowledge to transform learning is enhanced in Stage 2 classrooms by an increase in the number of devices available

to students and teachers to support opportunities for teacher professional learning and importantly support the implementation of transformative learning experiences for students.

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CHAPTER 1 INTRODUCTION

1.1 Introduction

Society in general has seen explosive changes in Information Communication Technology (ICT) over the last two decades. This is a digital age where information is accessed, shared and communicated with great speed and in increasingly new and different ways (Baker, 2009). ICT is the catalyst for this information sharing and communicating and is widely recognised by governments as being central to a growing, competitive economy (Hague & Williamson, 2009). Governments acknowledge that ICT knowledge and skills development for students is critical to success in education (Johnson, Adams and Cummins, 2012), as they learn to become informed digital participants in the world around them (Hague & Williamson, 2009). The rapid development and changes in ICT and its use are leading society to question traditional educational practices (Kalantzis & Cope, 2012b; Voogt, Erstad, Dede & Mishra 2013). Most significantly, with the increasing rate of globalisation and to respond to higher social and economic expectations (OECD, 2005), governments have reconsidered goals for education to reframe teaching and learning and in particular the changing roles of teachers and learners (Zammit, Sinclair, Cole, Singh et al., 2008).

Australia's national educational vision as stated in the Melbourne Declaration on Educational Goals for Young Australians (Ministerial Council on Education, Employment, Training and Youth Affairs, MCEETYA, 2008), is committed to students becoming successful learners and creative and productive users of ICT for the development of 21st century learning skills including "creativity and innovation; critical thinking, problem solving, decision making; life-long learning; collaboration and communication; ICT literacy; consciousness of being a local and global citizen; and personal and social responsibility" (Australian Government, DEEWR, 2013, p. 4). The National Government through policies such as the Digital Education Revolution, has given assurance to fund ICT through support for infrastructure, including bandwidth and connectivity (Australian Government, DEEWR,

2013), and has prioritised programs such as the laptop program in secondary schools (Jamieson-Proctor & Finger, 2008) to assist making the national educational vision a reality. This assurance reflects a similar commitment of governments all over the world who have also invested heavily in providing access to ICT in schools (Hew & Brush, 2007).

To meet the challenge of creating successful learners with new kinds of capacities (Kalantzis & Cope, 2012b) and realize significant commitment to funding and policy direction, schools need to be places that deliver increasingly engaging and empowering learning experiences by integrating ICT into everyday practice to transform teaching and learning. It is especially important that students become informed and educated digital participants to be able to confidently interpret the world in which they live (Hague & Williamson, 2009).

1.2 Focus of the study

The expectation of ICT transforming teaching and learning and the reality in the classroom is very inconsistent, with a gap being recognised between vision and practice (Voogt et al., 2013). In spite of funding and government and systems' visions, it has proved to be a very slow and challenging process. There is concern that "the potential for ICT to alter how teachers teach and how children learn in Australian schools has not been fully realized" (Schiller, 2003, p. 171). Globally, there are similar concerns about low levels of integration of ICT (Levin & Wadmany, 2005) and scarcity of evidence that ICT is transforming learning (Cuban, 2001).

An increasing number of children come from homes that have ready access to digital tools (OECD, 2008). They interact with technology at a very early age and arrive at preschool with ICT competencies (Aubrey & Dahl, 2014). Children are entering primary school much more digitally literate, yet when they arrive "their principle modes of learning and exchange, pedagogical teaching/learning relations, revert to face-to-face verbal and print textual practices" (Luke, 2008, p. 2). It continues to be recognised that for teachers, "a significant

number still remain hesitant, reluctant and daunted by the rapid rate of technological change" (Phelps & Graham, 2008, p. 3). Many are still at the stage where they are applying technology to enhance their classroom practice but not using it to transform learning, demonstrating good progress but no transformation in teaching and learning (Welsh Assembly Government, 2008). Integration of ICT requires changes to practice (Orlando, 2013), however, pedagogical practices of teachers continue to be slow to enact transformation at the 'grass roots' or student and classroom level. "The use of the powerful technologies is often limited to sustaining rather than transforming educational practice" (Levin & Wadmany, 2008, p. 235). Teachers' slow uptake of pedagogical practices required to realize powerful teaching instruction, is still widespread and remains an issue of debate. This is reinforced in findings from research undertaken globally in 2011 by the Innovative Teaching and Learning Research Team:

> While we saw examples of innovative teaching practices in the classes we visited, a coherent and integrated set of conditions to support the adoption of innovative teaching was lacking in most of the schools and all of the systems in our sample. (ITL Research, 2011, p. 11)

1.3 Complex process of change

Adopting innovative practice requires change, which has been a topic of discussion and debate for many centuries. Since the ancient Greek philosopher Heraclitus espoused that the process of change was fundamental to the world, change has been debated, discussed and has been problematic for humankind throughout the ages. Change being an issue in contemporary education, is not a new phenomenon. It is a complex process that requires moral purpose, clear vision, time and relationships (Fullan, 1998). Teaching too is a complex process and change with ICT is distinctively complex. "This is because ICT resource innovations are continuously and rapidly changing. We are constantly being informed of new ways to work with, think with and use ICT" (Orlando, 2009, p. 42). The knowledge and skills required in the classroom is ever developing:

> Teachers are expected to work with ever advancing information and communication technologies to facilitate access to knowledge. ICTs demand time to assess the suitability of internet sources, new forms of teaching to be developed and a balance to be created between theory and practical skills. (Zammit et al., 2007, p. iv)

However, without productive engagement by teachers so that ICT becomes a seamless instructional tool utilized to create new learning possibilities, enhance achievement and extend interaction with local and global communities (MCEETYA, 2005), the vision of learners with capacities for a knowledge society (Kalantzis & Cope, 2012b) will not be realized.

The complexity of the issue is therefore very clear. There are demands placed on schools and teachers for high quality teaching (OECD, 2005). Not only do teachers have to respond to sophisticated views of 21st century learning and the diverse language, behavioural, social and learning needs of students but they are doing it while responding to changes in national curricula (McCormick & Scrimshaw, 2001) and with rapidly changing technology as tools for teaching and learning. "The role of the teacher is being transformed from one of primary dispenser of knowledge to one of being a facilitator of learning" (Angers & Machtmes, 2005, p. 773). It begs the question what is the way forward now? What are factors that are influencing this complex process of change to ICT practices that will transform learning? Are those factors now vastly different to the barriers found by researchers such as Ertmer in 1999? Factors influencing pedagogical practice today in classrooms that are now ICT rich environments, require exploration to identify what is delaying their implementation and what will enable their uptake to achieve transformational teaching and learning. This study sets out to explore those factors.

1.4 Significance of the study

Earlier research, Ertmer (1999) identified barriers to change in ICT integration. These include equipment, training and support as 'first order' barriers and beliefs and curriculum and

assessment practices as 'second order' barriers. Later research by Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur and Sendurur (2012), identified teacher beliefs and attitudes as the strongest barriers to ICT integration. Addressing these involves challenges to teachers personally and professionally since it engages with pedagogical beliefs and practices that had been formed from many years in educational settings either as students themselves or as teachers. Ertmer and Ottenbreit-Leftwich (2012) identified the pedagogy that supports learning through and with technology as the challenge that needs to be addressed. Focus on pedagogy to support ICT practices requires engaging with principles of transformational learning. These include knowledge of the learner and their diverse needs, developing a deep understanding and knowledge about contemporary learning, designing deep learning experiences and ways to assess these and making connections with and for the learner within a global community (Kalantzis & Cope, 2012b). It also requires engagement with system and school level development and support to assist teachers delivering improved ICT pedagogical practice in the classroom.

A study of this nature is significant to find not only what the influences are for delivery of ICT transformative practices but also how this can inform leaders in school and educational systems to navigate a way forward in developing successful, creative and productive users of technology. As a Principal of a Catholic school, I regard this is as having significant importance for developing teacher capacity to enhance learning and achieve improved outcomes. It is within this context of teaching and learning in Catholic primary schools that this study explores and sets out to understand "Factors Influencing the Use of Digital Technologies in Transforming Learning Practices."

1.5 Findings

This thesis, drawing on fieldwork across two schools and a wide range of literature, has four main findings. It finds that teachers' personal constructs, attitudes and beliefs about ICT that are not challenged by a lack of resources, positively influence learning using ICT

transformative practice.

It also finds that time is critical for changing teacher practice. Lack of time for professional development, teacher preparation, planning and creating as well as time for personal learning with digital devices hinders ICT transformative practice. Time is also an influencing factor for development of student ICT skills.

Resourcing is found to be an influencing factor in ICT transformative learning. Lack of devices is found to maintain teacher pedagogical practice at a functional level that supports teacher directed practices and decreases opportunities for the development of digital pedagogies. However, an increase in the number of devices and a one-to-one device program support open-ended and higher order tasks, allowing teachers to more effectively engage in facilitating the development of 21st century learning skills to support transformative learning. Finally, in an environment where pedagogical practice is found to support student-centred learning, transforming student learning is found to be hindered by lack of explicit knowledge and skills of ICT pedagogical practice.

Therefore, this thesis argues that transformational learning can be achieved by directly connecting and engaging with teachers' personal constructs in situated professional learning and development opportunities to build knowledge and skills of digital pedagogies.

1.6 Chapter Synopsis

This introduction has described the context for the use of ICT in schools, the expectations of governments and other stakeholders, the slow progress towards transformational learning and the complex issue of change in contemporary education. It has explained the significance of the study and named the findings.

Chapter 2 provides a review of literature to elaborate on the issues of ICT in education. Perspectives of the global and Australian educational context are outlined. The review looks at outside influences such as globalisation, government policy and curriculum that are driving change in the primary school setting. Factors that hinder teaching practice are

examined. These include resources, knowledge and skills, school structure and organisation, assessment and attitudes and beliefs as barriers to pedagogical approaches. Factors influencing ICT integration and pedagogical practice such as teachers' personal constructs, the school environment, leadership and vision and professional development are reviewed.

Chapter 3 describes the conceptual framework that is a model of what is to be studied. It provides a framework for variables affecting pedagogical practice to be examined through dimensions of new learning. Following a brief introduction the need for change in teaching and learning is examined. New Learning to meet the demands of the 21st century and its characteristics is explained and transformative education is defined. The chapter concludes with eight dimensions of transformative education.

Chapter 4 describes the methodology used to explore influences on ICT teaching practice. It begins with a description of the ethnographic research approach, the ethnographic techniques during the study and the role of the ethnographer. The research and sites participants are detailed. Data collection methods and data analysis are described and ethical considerations and limitations of the study are detailed.

Chapter 5 details the case study of one of the research sites. It explores in detail the Valley School site examining themes that have emerged from the data using the conceptual framework as a hook for those themes. They include teachers' attitudes and beliefs, pedagogical practice, hindrances to ICT pedagogical practice and leadership practices.

Chapter 6 details the case study of the second school site. It describes the River School site and examines themes that have emerged from the data including attitudes and beliefs, pedagogical practice, hindrances to practice, leadership and professional development.

Chapter 7 gives a brief summary overview of the study and its significance. It discusses the significance of the topic and details the findings relating to teachers' personal constructs, time, knowledge and skills and resources.

Chapter 8 is the final chapter. It lists the conclusions drawn from the study and names some recommendations for school principals and teachers and systems.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter examines a breadth of literature on the implementation of ICT in teaching and learning. It considers the following:

- The global educational context for ICT implementation in schools
- The Australian educational context for ICT implementation in schools
- Globalisation, policy and curriculum as drivers of change to pedagogical approaches
- Resources, knowledge and skills, school structure and organisation, assessment and attitudes and beliefs as barriers to ICT pedagogy
- Teachers' personal constructs, school environment, leadership and vision and professional development as enablers of ICT pedagogy

The aim of this review is to provide insight into the complex issue of ICT integration and critical factors influencing successful ICT pedagogical practice in the primary schools to transform learning.

2.2 Global Educational Context

Expectations from government and educational systems all over the world for ICT as a component for change in education are very high (Groff, 2013). Pelgrum and Law (2003) acknowledge that ICT was introduced as a tool to support the development of new capabilities and transformed competencies for students. Pedro (2006) calls for the further development of these new competencies to be taken into account when designing ICT innovations for the very New Millennium Learners (NML), those born into a world where digital technology is a necessary part of daily life

In a 2008 report about the direction for ICT in Welsh schools, it is acknowledged, "As a society, we are increasingly reliant on digital networks for information, entertainment and services. ICT knowledge and skills have become critical to economic development" (Welsh Assembly Government, 2008, p. 1).

Consequently, recommendations from this report led to changes in the strategic direction for ICT in Welsh schools that included increasing funding for an ICT unit to oversee and implement the report findings as well as implementing new national standards for leadership teams and all teachers in schools. These recommendations for change were symptomatic of a global acknowledgement of the importance of ICT in education and the need to support the capabilities of those working in schools to achieve high quality outcomes. In England, a summary report commissioned by the government, names improved access to technology in schools and colleges and "steady progress in e-maturity" (British Educational Communications and Technology Agency (Becta), 2008, p. 4). It proposes a future focus for the next phase to support ICT learning to bring about transformation in teaching and learning and improvement in student outcomes. This focus would necessitate enabling learners "to take greater control of their learning through access to learning resources at any time, and from anywhere" (Becta, 2008, p. 5). The report maintains that transformation would require ICT to be used in a way so as to support deep learning and higher order thinking skills, personalisation of student learning for all learners including the disadvantaged and those with special needs (Becta, 2008).

Voogt et al. (2013) find that educational systems across the world are aware of the changing needs of the learner in the 21st century for whom it is increasingly important to acquire the higher order skills of critical and creative thinking, problem solving, communicating and collaborating. Kinelev (2001) states, "the creation of an educational system capable of preparing people to live in a changing world is one of the crucial and urgent tasks of modern society" (p. 12). Producing informed and digitally literate students capable of interpreting the world in which they will live is a challenge for all educators (Hague & Williamson, 2009).

2.3 Australian Educational Context

Government policy for ICT integration in Australia echoes the same requirement and expectations as governments overseas. High expectations are evident in the government's national vision for education as it calls for improved learning outcomes for all. The Melbourne Declaration on Educational Goals for Young Australians (MCEETYA, 2008) proposes that all students must be assisted to become successful learners, confident and creative individuals and active and informed citizens. In a 2008-2011 joint statement, education ministers across Australian states and sectors agree, "Australia will have technology enriched learning environments that enable students to achieve high quality learning outcomes and productively contribute to our society and economy" (Australian Information and Communications Technology in Education Committee, AICTEC, 2008). The 2011 Gonski report that reviewed funding in schools lays down a direction for Australian education that aligned with educational systems around the world:

> In response to the world becoming a more integrated, technological and global community, students must not only master the core skills, but also develop a capacity for problem solving and decision making; creative and critical thinking; collaboration, communication and negotiation; and technology and innovation. (Australian Government, Department Education & Training, 2011, p. 33)

For these expectations to be realised it requires learning environments where students are creating and communicating information, working collaboratively, critically thinking and solving problems. Government policy states that innovations require evolving pedagogical practices (Australian Government, DET, 2011) that are student centred rather than teacher dominated (Australian Government, Department of Education Employment and Workplace Relations, DEEWR, 2013) supporting knowledge creation and sharing. Equally as important, it depends on active learners engaging with "state of the art tools that enable new forms of learning, collaboration, innovation and communication. Learning will be personalised, and not restricted by place or time" (AICTEC, 2008). Effective use of ICT is the cornerstone that

underpins the realisation of these expectations. Policy declares that "In this digital age, young people need to be highly skilled in the use of ICT. While schools already employ these technologies in learning, there is a need to increase their effectiveness significantly over the next decade. (MCEETYA, 2008, p. 5)

The integration of technology to improve student outcomes has seen financial support through the 2008 Digital Education Revolution (DER) policy designed to support the achievement of the national vision for ICT in schools. Orlando (2013) in her five year longitudinal study finds that this was realised in the investment of over $386 million to provide secondary school students with laptops. Since the implementation of these initiatives in Australian states and territories, schools have invested heavily in hardware for students K-6. The use of iPads, laptops and interactive screens in the classroom setting are increasingly offering instant access to a store of online resources. More recently the advent of Bring Your Own Device (BYOD) and Bring Your Own Designated Device (BYODD) programs in schools offer new opportunities to teachers and students. Increasing ICT in schools creates demands for more bandwith and improved infrastructure that governments need to deliver (Australian Government, Department of Education, Employment &Training, DEET 2013). This, in turn, imposes high expectations for the use of ICT in schools. These expectations contribute to driving the cause for changes in teaching practices that support digital pedagogies. It is acknowledged that providing widespread and consistent opportunities to implement autonomous learning, communicating and collaborating and problem solving using ICT to facilitate student success as lifelong learners provides challenges for 21st century educators (Pelgrum & Law, 2003). In moving to a student-centered pedagogical approach, the skills set teachers require has to be ever evolving to keep pace with developments in technology (Pelgrum, 2008). Voogt et al. (2013) argue that there are changes not only to what is to be learned but also to how it is to be learned. Pelgrum & Law (2003) advise that ICT needs to be used to support 'learning through ICT', 'learning with ICT ' and 'learning about

ICT'. It is widely agreed that these challenges are creating a gap between vision, policy and practice that has seen not all students experiencing the full benefits of the developments of ICT in education (Australian Government, DET, 2009; Becta, 2008; Jamieson-Proctor et al., 2006; Luke, 2008; Voogt et al., 2013). A transformation to a pedagogical approach in a technology rich environment that integrates and uses ICT to differentiate according to the needs of the student is required. Hague and Williamson (2009) and Yang (2012) argue that it is not a new expectation but one that is taking a long time to evolve.

It is acknowledged that successful integration of ICT in the classroom to meet the needs of the 21st century learner is a long and complex process of educational change (Tondeur, Devos, Van Houtte, van Braak and Valcke, 2009; Raby & Meunier, 2011). It is much more than providing devices and providing necessary infrastructure. Changes in education need to involve the areas of teacher knowledge and beliefs (Ertmer & Ottenbreit-Leftwich, 2012; Levin & Wadmany, 2005;) and this process then, by its very nature, is challenging (Chandra & Mills, 2015). McCormick and Scrimshaw (2001) find that it requires a high level of engagement with teachers' views of knowledge and personal constructs to a point where it brings about new pedagogical approaches. Voogt et al. (2013) find that an understanding of how pedagogy and ICT interact is needed to develop competencies and capabilities for the 21st century learner. A student-centered approach to pedagogy that is required, takes time to develop (Raby & Meunier, 2011). Levin and Wadmany (2005) find between three to five years is needed to sustain and embed this approach into a school. Introducing ICT does not immediately change the teaching and learning. Research has found that it takes time to move teachers through stages from beginning to integrate technology to becoming an exemplary integrator of ICT (Raby & Meunier, 2011). Others have described it as "a set of complex interacting influences" (Underwood & Dillon 2011, p. 322). For although it has been found that attitudes of primary school teachers are positive towards ICT integration, obstacles such as access, support and guidance often hinder the teaching and

learning (Niemi et al., 2013). Significantly Voogt et al. (2013) find that although teachers regard 21st century learning important, it is not necessarily transferred into their teaching.

2.4 Drivers of Change to Pedagogical Approaches

Globalisation

In their 2001 policy analysis, the Organisation for Economic Co-operation and Development (OECD, 2001) find that globalisation and rapid development in technology have led to the emergence of a knowledge economy demanding new skills and competencies. This is driving higher economic and social expectations of education (OECD, 2005), as systems all over the world strive for improvement. Bates (2008) holds a different view that in a competitive global economy education is "currently being transformed to better serve the cause of competition in an emerging world economy" (p. 278).

The OECD (2001) attributes the demand for higher competencies in education to globalisation and technology. In an essay on globalisation Zajda (2011) notes the increasing use of international standards and data to measure student achievement through the Program for International Student Assessment (PISA). Bates (2008) examining the effects of globalisation, cites compliance with international standards to determine quality in teacher learning and practice.

It is widely considered that participation in the knowledge-based society is enhanced by ICT access and skills (Zajda, 2011). An American study of parents in a K-6 school, found that they believed using technology would help their children achieve success in school and find employment (Ortiz, Green & Lim, 2011). Parents are ensuring access to technology at home "to keep their child 'ahead' or at least stop them 'falling behind'" (Livingstone, 2014, p. 7). Selwyn & Heusen (2010) find parents are aware that "the ability to make good use of ICTs is linked particularly with successful and effective engagement with education" (p. 137). Globalisation and successful participation in a knowledge-based society are driving changes to education and the pedagogical practice required to develop 21st century learning skills.

Policy

The recognition by Australian government and policy makers of the role of education in producing an economically competitive nation is driving the need for changes in policy, standards and funding for schools as noted earlier in this thesis. The Melbourne Declaration of 2008 acknowledges the vital role played by schools in ensuring ongoing economic competitiveness by promoting the intellectual, physical, social, emotional, moral, spiritual and aesthetic wellbeing of Australia's youth. Orlando (2013) argues that its vision advocates a constructivist approach to learning that is student or learner centered rather than a teacher focused approach. Government policy calls for challenging and stimulating learning experiences to develop creative, productive users of ICT to investigate and problem solve as young as in early childhood (Australian Government, DET, 2009).

Government policy clearly states in the framework for Early Childhood educators that Australian children from birth to five years become effective communicators by using ICT to access information, investigate ideas and represent their thinking (Australian Government, DET, 2009). This requires early childhood educators to provide a range of technologies and opportunities for ICT to be integrated into children's play experiences. In turn, this has implications for resourcing and the teaching and learning of ICT in primary schools as preschool children transition into a new educational setting that also has high expectations and must continue to challenge them.

Policies for K-6 educators promote a style of teaching and learning to meet the needs of the 21st century learner and ICT integration is integral to this implementation. Following the Melbourne Declaration in 2008 schools have been directed by frameworks to assist them in meeting the national vision of developing confident users of ICT. The 'Learning in an online world' series provided schools with direction for planning for the integration of ICT (MCEETYA, 2005; 2006). Sydney Catholic schools recognise the needs of 21st century learners and the role digital technology plays in contemporary pedagogy in their strategic plan

'Building on Strength' (Catholic Education Office, CEO, 2011). Its promotion of a learner or student-centered pedagogy through the integration of ICT recognises that students are members of the global community and need to develop the skills, knowledge and understanding to fully function in a contemporary world. These national, state and independent education policies and guidelines clearly indicate for educators the importance of and directions for the integration of ICT in classrooms. They are driving change in ICT integration and pedagogical practice.

Curriculum

Voogt et al. (2013) argue that meeting the needs of the 21st century learner demands significant changes to curriculum by redefining what is essential in a 21st century curriculum The new Australian Curriculum draws on international and national research to develop the ICT capabilities based on knowledge, skills behaviours and dispositions (Australian Curriculum, Assessment and Reporting Authority, ACARA, 2015). It mandates for Australian students from Kindergarten to Year 6 to investigate with ICT, communicate with ICT and create with ICT as they problem solve and work collaboratively across all Key Learning Areas. ICT does not sit in isolation. It is not a key learning area or a strand within each area but a capability that needs to be integrated across all subjects. ACARA (2015) state that ICT capabilities in the curriculum acknowledge the new ways that students build knowledge and interact with others and expect that these will be transferred to new learning environments.

In NSW, ICT is also recognised as a general capability for the 21st century by the Board of Studies Teaching and Educational Standards (BOSTES) in their syllabus documents. It is expected that students will investigate, communicate and create using ICT from Kindergarten to Year 10 across all Key Learning Areas. There are 55 outcomes for ICT listed in Early Stage 1, Stage 1, Stage 2 and Stage 3 that must be taught. BOSTES (2012) explain that ICT capabilities are specifically integrated across teaching, learning and assessment in

these areas to enhance student outcomes and provide "opportunities for all students to develop their skills to become competent, discriminating, productive, creative and ethical users of ICT". Specific teaching of ICT capabilities through integration across all learning areas is driving a need for a changing pedagogical approach to ICT.

2.5 Barriers to ICT Pedagogies

Resources

Hew and Brush (2007) in a systemic review of empirical studies from 1995 to 2006 in USA and other countries found that lack of resources was the most frequently cited barrier to ICT integration. Lack of resources includes the number of devices available to the classroom teacher, their access to available ICT, time and technical support. It is widely noted by other researchers that insufficient devices available to students limit the number of opportunities to integrate ICT (Pelgrum & Law, 2003; Smeets, 2005; Williams et al., 2000). Even in schools where there is innovation, lack of necessary infrastructure acts as a barrier to integration (Tondeur et al., 2009).

Lack of resources also includes situations where teachers have to compete with colleagues or students due to lack of planning or poor organisation of resources. In schools where there is a lack of devices booking resources requires a level of prior planning (Ertmer et al., 2012; Hammond et al., 2009; Lim & Khine, 2006; Williams et al., 2006). If this is not effective, it frequently means work cannot be completed within the rostered time made available. Hammond et al., (2009) find that for some teachers the inability to reliably access the internet in the home to research and prepare for lessons is a barrier to ICT integration. Lack of access to ICT in the home for primary school students (Volman et al., 2005) is also an issue, since home access to the internet or devices is often shared. Crook, Farrington-Flint, Harrison, Tomas and Underwood (2010) find that this restricts ICT use in some households and affects their level of engagement in homework or online tasks out of school hours since their access to ICT may be reduced or non-existent leaving students unable to participate and

complete tasks. It is acknowledged that equity issues such as these need to be addressed at a whole school or system level rather than be addressed individually by teachers (Underwood & Dillon, 2011).

Transforming practice requires the invaluable resource of time. For teachers finding time using new technology for their own learning is a challenge (Palak & Walls, 2009). In a study of Finnish schools Niemi (2013) finds time is a factor that challenges teachers' practice when trying to develop new practices and resources. Planning student-centered technology rich lessons "demands greater depth of planning" (Crook et al., 2010 p. 14) that is a significant outlay of teacher's time (Webb, 2004). Researchers agree that issues such as insufficient time away from face to face teaching to plan integration of ICT, to research sites needed for information gathering and practise new applications to teach concepts are barriers to ICT pedagogical practice (Kopcha, 2012; Lim & Khine, 2006; Moyle, 2010). In a Canadian study, time for teachers to develop curriculum and plan their lessons was identified as a "persistent barrier" (Wood et al., 2005, p.202).

A lack of technical support is also identified as a factor in this category of resources. Chandra & Mills (2014) in a study of ten experienced teachers in an Australian high school found that full time technical support is seen as an essential requirement for ICT impacting positively on their teaching and learning. In a 2012 study in K-6 US schools, these 'first order' or 'external' barriers to ICT integration were reduced but not eliminated (Ertmer et al., 2012). Lack of technical support at a school level may be due, not in a small way to the continued prohibitive cost of purchasing, servicing and updating technology as well as the set-up and maintenance of learning management systems in schools. Technological advances in the educational setting continue to necessitate significant budget and time considerations especially for continued training and support. Even though the use of Web2.0 tools enable greater participation and collaboration (Ertmer et al., 2012) these considerations continue to pose barriers to ICT integration.

Knowledge and Skills

Hew and Brush (2007) identify teachers' limited ICT knowledge and skills as a barrier to the integration of technology while teachers' lack of specific skills is given as a reason for not using technology. The absence of a "technology supported skills base" (Hew and Brush, 2007, p. 227) does not support the seamless integration of ICT and the development of digital pedagogy. "Teachers must have basic technology knowledge and skills in order to use technology in the classroom" (Ertmer et al., 2012, p. 432). Lack of knowledge and skills is found to affect teachers' confidence and personal competency when integrating ICT (Prestridge, 2012) and negatively impact the pedagogy required for effective integration (Moyle, 2010).

It is acknowledged that the introduction of digital devices does not in itself transform teaching and learning (Underwood & Dillon, 2011). Researchers agree that teachers require support to develop their knowledge and skills and improve ICT practice (Albion & Ertmer, 2002; Pelgrum, 2008; Tondeur et al., 2009). Effective ICT integration support occurs not in isolation but related to classroom practice and situated in the classroom (Levin & Wadmany, 2008). Development of knowledge and skills for successful ICT integration is found to take place overtime (Schibeci, MacCallum, Cumming-Potvin, Durrant, Kissane & Miller, 2008). Knowledge and skills also relate to teachers' ability to manage and organise the use of ICT in the classroom. Hew & Brush (2007) argue "The lack of technology-related classroom management knowledge and skills is another barrier to technology integration into the curriculum" (p. 228). The effect on the learner of good classroom management is most noticeable in a technology rich learning environment where use of devices can prove a distraction to students and affect the quality of the learning (Chandra & Mills, 2014). Understanding the connection between ICT, curriculum and classroom management is found to be a challenge for teachers (Albion & Ertmer, 2011) that can act a barrier to ICT pedagogies.

School Structure and Organisation

School structural and organisational factors related to leadership, timetabling and planning are identified by Hew & Brush (2007) as having direct and significant influence as barriers to the integration of ICT. Anderson & Dexter (2005) find rapid changes in ICT development and lack of expertise among school leaders are challenges for leaders of technology in schools. Poor leadership knowledge can hinder the integration of technology by teachers (Levin & Wadmany, 2008) while "transformed school practices" (Dimmick & Goh, 2011 p. 225) are unlikely without responsive leadership changes. It is acknowledged "that school leaders should provide administrative oversight for educational technology" (Anderson & Dexter, 2005, p. 51). This includes oversight, either directly or indirectly, of school timetabling which can have a negative affect on ICT integration, particularly in those places where there is a lack of devices for teachers and students.

Transforming practice requires planning, and it has been found that schools with poor leadership where planning and infrastructure are ineffective, do not demonstrate a high level of ICT integration (Tondeur et al., 2009). Rather than 'just in case' planning for professional development, opportunities for situated professional development (Chandra & Mills, 2014) require planning at leadership level. It is important "to provide continuity between what teachers learn and what goes on in their classrooms (Lim & Khine, 2006 p. 101). These opportunities need to be part of strategic school planning, regularly scheduled to meet teachers' needs as they are then more likely to put their new learning into practice (Lim & Khine, 2006).

Assessment

Dimmock and Goh (2011) note the need by governments to move towards to a knowledge-based economy is driving mandated curricula and assessment practices in schools. Assessment is identified as a factor that challenges ICT integration in the study by Hew and Brush (2007). One of the reasons identified as the cause of discrepancy between teacher

practice and belief relates to the "external constraints/barriers placed on teachers by pre-determined curricular or assessment practices" (Ertmer et al., 2012, p. 424).

It is currently the case that systems and schools support traditional achievement tests since nationally they are powerful levers for funding (Kay & Greenhill, 2010). However Kalantzis & Cope (2012c) find this traditional summative form of assessment is often at the expense of formative assessment that is in line with New Learning and development of 21st century learners. Learning that transforms requires assessment practices that will inform not what the learner knows but how it is known. It also requires different sources of assessment feedback from students, peers and teachers (Kalantzis & Cope, 2012c). Chandra & Mills (2015) argue that this type of assessment 'for' and 'of' learning is a challenge for teachers since it requires enhanced commitment to link it with ICT.

In their Australian research Jamieson-Proctor & Finger (2010) find "Teaching and learning in the 21st century requires teachers to capitalise upon the relative advantage of using lCT to enhance curriculum, pedagogy and assessment approaches" (p.13). Many teachers, however, indicate that there is a tension between 21st century learning skills such as developing collaboration, critical and creative thinking and problem solving and the mandated assessment regime (Crook et al., 2008). In her Australian research Moyle (2010) states "Educators have the freedom to develop the operational, cultural and critical dimensions to students' ICT literacy, but at the same time they are constrained by the external curriculum, assessment and accountability requirements placed on schools" (p. 28).

Attitudes & Beliefs

Ertmer et al. (2012) in the study of U.S. schools find intrinsic or second order barriers to effective ICT integration, that is attitudes and beliefs, to be, even among the award winning teachers, a challenge for them to be addressed. A reciprocal link between teacher belief and practice was found in a longitudinal study of six teachers in Israel over three years. "Teachers' knowledge and beliefs indeed influence and underpin their classroom practices,

but at the same time, classroom experience also influences the way their educational beliefs and knowledge are shaped" (Levin & Wadmany, 2005, p. 298). Palak and Walls (2009) in their study of technology using teachers in technology rich schools, found that the traditional beliefs of teachers limit students' use of ICT. It is the case that teacher beliefs are critical to ensuring ICT integration (Albion & Ertmer, 2002). Most significantly, deciding how to use ICT in the classroom, is underpinned by teachers' beliefs about students and their learning with ICT (Orlando, 2009). Ertmer et al. (2012) argue that although there is improved access to technology for teachers and students "little will be gained if second-order barriers (knowledge and skills, attitudes and beliefs) are not addressed" (p. 433).

Another factor that can be described as a barrier was noted in a large study of Queensland teachers. It finds that teacher confidence determines the level of student and teacher engagement with ICT in the classroom and that there is widespread resistance to change particularly among older teachers with lack of confidence using ICT (Jamieson-Proctor et al., 2006).

2.6 Enablers of ICT Pedagogies

Teachers' Personal Constructs

Research has shown that underpinning teachers' pedagogy are their personal constructs, "a complex amalgam of past knowledge, experiences of learning, a personal view of what constitutes 'good' teaching and belief in the purposes of the subject" (Banks, Leach & Moon, 2011, p. 336). To change teachers' pedagogical practice it is found that it requires "engagement with teachers concerning their views of knowledge (subject, school and pedagogic), as well as with teachers' personal constructs" (McCormick & Scrimshaw, 2001, p. 54).

Studies have found that successful ICT implementation is linked to teachers' attitudes and beliefs. "Teachers with strong beliefs in the pedagogical value of technology" (Ertmer, Ottenbreit et al., 2012, p. 177) have been observed to overcome barriers such as lack of

resources, time and support. Kersaint, Horton, Stohl and Garofalo (2003) in their study of Mathematics teachers examine their beliefs about the importance of technology and conclude that the successful implementation of ICT depends on their attitudes. Bullock (2004) finds that the attitudes of pre-service teachers are a major influence in their use of ICT for teaching and learning. Prestridge (2012) in a study in four Australian Catholic schools argues that teachers who believe in the relevance and importance of ICT to society, demonstrate digital pedagogical practice that involves collaborative problem solving and authentic learning opportunities essential for 21st century skills development. They are identified as operating with ICT in constructivist learner centred environments, able to embed ICT seamlessly into their teaching and learning. However, Orlando (2013) cautions against a "single-minded pursuit of constructivist practices alone" (p. 243) as they may hinder opportunities for learning about pedagogy in ways that still support knowledge development.

Teacher confidence is noted as an enabler of ICT integration. Jamieson-Proctor and Finger (2008) find a link between teacher confidence using ICT and student use of learning with ICT. Positive experiences with technology are factors that develop confidence with ICT and enhance their teaching practice. They typically occur over a period of time and are supported by school leadership so that fears are overcome and confidence develops (Ertmer & Ottenbreit-Leftwich, 2012). Teachers' positive personal constructs and views about ICT and teaching and learning are enablers of ICT pedagogies.

School Environment

The context or environment of the school plays a vital role in any plan to improve or implement changes to teaching practice. Hargreaves (2005) supports a school environment where teachers feel emotionally secure and ready to take a risk to encourage creativity. This requires conditions where teachers can work and learn together, where collegial relationships promote enquiry, critical self-reflection and a thirst for continuous improvement. It is a professional learning community where risks can be taken and actions affirmed. Change to

pedagogical approaches can be sustained if it occurs in a context where building capacity is valued and where teachers remain positive, supported and valued. In an Australian study researchers noted that professional development and in-class support are vital to the success of high level ICT integration and that teachers' learning journeys were enhanced through collaboration with colleagues and students (Schibeci et al., 2008). The school is therefore more than an organization but it becomes a professional learning community and openly values a learning culture. "Collegial relationships promote inquiry orientated practice and generate an environment of continuous improvement" (Harris 2003, p. 380). These provide conditions to focus on what teachers believe about good instruction and learning and help teachers to "restructure their classroom instruction in ways that are more problem-focused and student centered" (Ertmer & Ottenbreit, 2012 p. 180). Tondeur et al. (2009) find that teachers working in supportive communities integrate ICT into their teaching practice more often.

Leadership and Vision

Leadership is regarded as a critical factor in the development of ICT maturity (Condie & Munro, 2007) and a driver for sustained use of ICT in schools (Chandra & Mills, 2014). It is expected that principals are the key leaders of schools. AITSL (2014), in the work on principals' standards, note "They inspire students, staff and members of the community to continuously enhance the learning of all" (Australian Institute for Teaching and School Leadership, 2014 p. 6).

Principals are responsible and accountable for decision-making and planning, and the school wide integration of ICT (MCEETYA, 2006). Their role is a very complex one. Grady, (2011), names ten tasks in the role for principals as technology leaders as establishing vision and goals; carrying the technology banner; modelling technology use; supporting technology use; engaging in professional development focusing on technology; providing professional development opportunities for teachers and staff focusing on technology; securing resources that support technology use and integration; advocating technology use that supports student

learning; being knowledgeable and supportive of technology standards; communicating the importance of technology to school's stakeholders.

Crook et al. (2010), in their report that reviews learning practices in schools where ICT was successfully embedded, find good leadership is a critical factor that guides schools to successful ICT teaching and learning. An evolving vision linking infrastructure, curriculum, pedagogy and assessment also supports schools to successfully integrate ICT. Principals are the architects and communicators of a vision for teaching and learning (Otto & Albion, 2002). Tondeur et al. (2009), in a study of ICT integration in Belgium of 527 teachers across 68 primary schools, find that a shared vision about ICT use and integration is considered a critical building block in the process of implementing change. Law, Pelgrum and Plomp, (2008) argue, a common vision about pedagogy and the role of ICT needs to be established by leaders and teachers in their school. There should be shared decision making about ICT directions, staff development and technical and pedagogical support. In Singapore schools Lim & Khine (2006) find that school ICT vision and planning delivering teacher workshops, 'Best Practice' sessions and ICT mediated demonstration lessons focussing on authentic learning, improved ICT integration.

Principals determine structures needed to facilitate ICT integration (Tondeur et al., 2010), addressing technology support and network problems (Lim & Khine, 2006; Pelgrum & Laws, 2008) to create a school where a physical environment exists that is conducive to ICT integration (Lim & Khine, 2006). As leaders of the school, principals support and encourage teacher growth and the development of new competencies (Niemi et al., 2012).

"Today's school leaders need to be tech-savvy. Only those leaders who are informed, discriminating, creative and transformative will be successful in achieving systemic change in their learning organisation" (State of Victoria, DEECD, 2009, p. 15). They need to be knowledgeable about a broad range of ICT issues concerning devices that can be used in classrooms to the application of Web2.0 tools by students. It is becoming increasingly

necessary that principals become users of technology. However, being seen as a leader of technology is a new role for many principals who have had little experience themselves with ICT in the classroom:

> As leaders of school development, including integrated use of ICT, principals need to understand the capacities of new technologies, to have a personal proficiency in their use, and to be able to promote a school culture which encourages exploration of new techniques in teaching, learning and management. (Schiller, 2003, p. 172)

Professional Development

Acknowledgement that teachers require considerable support to develop pedagogic knowledge and skills (Law, 2003) is widely accepted:

> Far from being a simple process, ICT professional development necessitates not only personal and professional changes for individuals, but changes in school culture including institutional attitude and support for professional learning, reflection and professional discussion, readiness to embrace change, collegiality, trust and encouragement to take risks. (Phelps & Graham, 2008, p. 125)

With a changing role that sees teachers not only as knowledge and information providers but also as facilitators for accessing information as well as stimulators of knowledge production (Zammit, 2007, p. 5)**,** there is a call for different approaches to professional development. Prestridge (2012) suggests that successful professional development actively engage with teachers' pedagogical beliefs for interrogation and reformation. Phelps and Graham (2008) find in their action research conducted over two years that there is a strong case for professional development that provides teachers with opportunities to promote life-long learning by being self-directed. Levin and Wadmany (2006) find that even when working in collaborative school environments in technology rich schools, teachers respond differently to innovation with ICT. They conclude that ICT professional development "is an individual process, unique to each teacher" (p. 172). Schibeci et al. (2008), in their Australian research,

call for professional development that assists teachers to move from technical support to curriculum integration and develops knowledge and skills in pedagogical practice within a context of collaboration and reflection. Webb and Cox (2004) conclude, "The need for teachers' professional development is clear but enabling teachers to adapt their pedagogical reasoning and practices in response to learning opportunities provided by ICT is likely to be a very difficult and complex process" (p. 278).

This research responds to the issues identified in the literature relating to ICT integration in the educational context as well as globalisation, policy and curriculum driving changes to ICT pedagogical approaches. It engages with resourcing, knowledge and skills, school structure and organisation, assessment and attitudes and beliefs as barriers to ICT pedagogies. It also engages with teachers' personal constructs, school environment, leadership and vision and professional development as enablers of ICT pedagogies as it seeks to explore the factors that influence learning using transformative ICT practices in the school setting.

The following chapter outlines the conceptual framework that is a model used to identify factors influencing learning using ICT transformative practices. It identifies the need for change in teaching and learning and the concept of New Learning and its characteristics. The concept of Transformative Education and the characteristics of eight dimensions devised by Kalantzis & Cope (2012) to define transformative education are detailed.

CHAPTER 3 CONCEPTUAL FRAMEWORK

3.1 Introduction

This chapter will provide a broad conceptual framework that is a model of that which is planned to be studied (Maxwell, 2005) in order to identify factors influencing learning using transformative ICT practices in the K-6 setting. The framework lays the groundwork for examining the current educational context with its high expectations for ICT transforming education (Groff, 2013), as identified in the review of literature in Chapter 2. The framework presents a clear picture of the "map of the territory being investigated" (Miles, Huberman & Saldana, 2014 p. 45). It examines a theory of learning described by Kalantzis and Cope (2012b) that is grounded in the concept of learning occurring in a social context and its necessity, importance, and relevance in society today. This chapter details the eight dimensions and characteristics of this transformative educational approach. Relationships between these characteristics and how they "interact and interplay with each other" (Miles, Huberman & Saldana, 2014, p. 49) are identified. These characteristics noted in Figure 1, sit within the current educational context where global and local influences are drivers for change in ICT implementation in teaching and learning, and personal, school and system influences present as barriers and enablers to changes in ICT pedagogical practices.

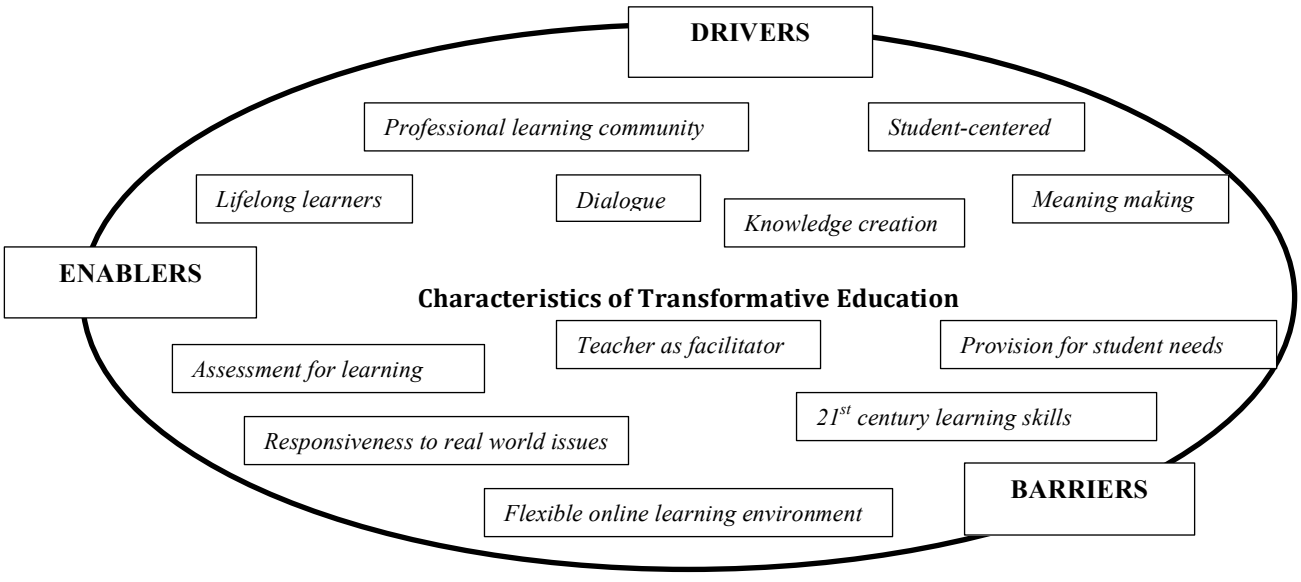


Figure 1. Conceptual Framework

Connections are made in the conceptual framework, between these factors influencing ICT implementation and pedagogical practices that have emerged from the literature, and the concept of transformative practice. These connections serve to inform the research (Ravitch & Riggan, 2012) while examination of the characteristics of transformative education (Kalantzis & Cope, 2012b) guide and direct the data analysis phase of the study (Ravitch & Riggan, 2012). This conceptual framework, therefore, is seen as influencing "the research process at all stages" (Ravitch & Riggan, 2012, p. 135).

3.2 The Need for Change in Teaching and Learning

The literature in this study presents the influences of globalisation driving high economic and social expectations of education (OECD, 2005). The needs of students for a successful and productive future in the 21st century world have changed and schools can no longer be seen as institutions that prepare students for occupations that will not exist when they enter the workforce (Voogt et al., 2013). Policy and curriculum are driving changes in ICT implementation to meet the needs of the 21st century learner. The highly paid workforce in the 21st century requires workers with a broad range of skills and competencies and as a result, attributes such as an ability to innovate and create are in great demand by employers, making university degrees no longer the guarantee they once were for success in the wide ranging job market (Wagner & Dintersmith, 2015). Today, knowledge is readily available through any device that can connect to the internet which makes the production of knowledge no longer the coveted domain of the teachers and schools. Research is increasingly showing that students in Australia and overseas are now making more extensive use of the ICT knowledge resources to research and create (Kozma, 2003). Therefore, both the skills set that students require for their future and the context in which they are to be practised are undergoing change (Hague & Williamson, 2009).

Consequently, to meet these changing demands of social conditions brought about by economics and politics, educational institutions are required to adjust and redesign the process

of learning making it more effective, engaging and appropriate to these contemporary times (Kalantzis & Cope, 2012b). As a result, "modes of teaching need to change because learners are changing by growing up in a digital world" (Anderson 2010, p. 21), that continues to bring a global perspective to teaching and learning. Indeed, one crucial role of the teacher integrating ICT is to engage students to work interactively with local and global learning communities (MCEETYA, 2005b). This component of the role as well as enhancing student achievement and creating new learning opportunities can only be achieved by integrating ICT with transformative pedagogical practice that places the learner at the centre of and the focus of the learning experience. The following examination of a theory of learning that positions the learner at the centre of the educative process, assists also to clarify and describe transformative pedagogical practice.

3.3 New Learning

The work of Kalantzis & Cope and the New London Group, the multinational like-minded academics who first met in 1994, contend that learning occurs in a social context and is a process that happens naturally by doing and thinking:

> Humans are born with an innate capacity to learn, and over the span of a lifetime learning never stops. Learning simply happens as people engage with each other, interact with the natural world and move about in the world they built. (Kalantzis & Cope, 2012b, p. 29)

This comprehensive view of learning that recognises the learner and the conditions needed for learning, underpin the theory of New Learning (Kalantzis & Cope, 2012b) that is used in this study to explore the breadth of the concept of transformative pedagogical practice. It is based on the concept that learning and knowing is grounded in everyday experiences that can be either familiar or practical experiences into which the learner is immersed yet relates to and draws on the their prior cultural experiences or acquired knowledge. Learning is a process of coming to know and understand at a social level that includes engaging in formal and

informal experiences, and "melding conceptualization with practical demonstration, analysis with application, experience with theorization" (Kalantzis & Cope, 2012c p. 86). This process proposes a critical focus on the learner who now adopts a role that is more active, one that engages both making and receiving knowledge. This focus on the learner produces a shift in the balance of agency (Kalantzis & Cope, 2012b) with the learner not simply retaining knowledge but also creating knowledge.

Furthermore, New Learning maintains that the natural development of learning is nurtured by the process of education that they describe as a relationship between teaching and learning. It provides the social contexts of the institution, curriculum and pedagogy so that deep learning and knowing take place. Education investigates the formal and informal learning process through which human beings come to know things and New Learning is about creating the social contexts in which that happens. It is, they propose, 'learning by design' with teachers as the designers of a learning process that needs to meet the changing demands of the 21st century (Kalantzis & Cope, 2012b). They put forward New Learning as a vision for the future of education that is a result of social, cultural and technological changes "throwing into question the relevance and appropriateness of the heritage institutions and practices of schooling" (Kalantzis & Cope, 2012b, p. 16).

Grounded in the proposition of New Learning that social, cultural and technological changes demand a new way of approaching the educative process, is the concept that "language and thinking are tied to people's experiences of situated action in the material and social world" (Gee, 2009, p. 198). It follows then, that as new ideas and changes are introduced, so too is the creation of new ways with words and new literacies, changes in forms of texts and in uses of language (Kress, 2000). The introduction of the term 'Multiliteracies' by the New London group has come to mean the two major characteristics of the very broad use of language in business and society today.

3.4 Characteristics of New Learning

The first characteristic is the differences that are recognised in making meaning due to factors such as culture, gender, content and life experiences etc. that require learners to understand these differences from one context to another. This can be seen, for example, in the current use of the word ‘sick’ which can have two totally different meanings depending on the culture, context and content in which this word is used. In order to make meaning of this word which depending on context, can be both a description of something or someone that is very positive and worthy of praise or a description of someone’s poor state of health. One needs to know the social context in which the word is being used to make the appropriate meaning from the word.

The second characteristic is multimodal meaning where text is no longer just the written form but applies to the linguistic, visual, audio, spatial and gestural patterns of meaning. Traditionally linguistic and written word were predominantly used as knowledge sources (Kalantzis & Cope, 2012b) however, multimodal sources such as images, diagrams, audio, videos and animation increasingly viewed on digital devices are more often than not used in K-6 across all key learning areas to make meaning and facilitate learning. In particular the disciplines of Science, History and Geography are communicated multimodally, drawing more frequently on the use of images, diagrams and videos to facilitate the knowledge process. Therefore, since changing social conditions have reshaped the way we use language (Taylor & Cranton, 2012) and represent and make meaning in our lives, Cope and Kalantzis (2005) argue that it is the responsibility of educators as designers of the learning process to also change literacy pedagogy in order to maintain relevance in society today and achieve equitable outcomes for learners. Teacher’s pedagogical practice would need to shift from ‘heritage practices’ to transformative educational approaches.

3.5 Transformative Education

The concept of learning that is transformative is underpinned by the adult learning theory of Mezirow (1991) who describes it as critical thinking and reflection of experiences that

changes beliefs, attitudes and emotions and help to make meaning. Mezirow's theory maintains that when thoughts feelings and actions are changed, transformative learning occurs. Later theorists, Morrell and O'Connor maintain that transformative learning changes our relationships with others and the natural world. "Transformative learning involves experiencing a deep cultural shift in the basic premises of thought, feelings and actions. It is a shift of consciousness that dramatically and permanently alters our way of being in the world" (Morrell & O'Connor, 2002 p. xvii). It influences actions through a process that produces a deeper level of meaning making and knowing (Sterling, 2010). During the learning process, perceptions that are based on personal experiences are examined, questioned and revised (Taylor & Cranton, 2012). These involve change at a very basic level (Brookfield, 2000). Newman (2012), however, contradicts these scholars and sees transformative learning as just plain good teaching and good learning. He equates it to equipping the learner with the skills, knowledge and understanding so that they are able to take control of their lives. In his work he cites the case of a university professor who at the end of a teaching program had used technology extensively and transformed her teaching practice. He also wrote of participants in a program who underwent transformation and could now understand themselves more deeply. These examples, he contests are simply where "the learners experienced significant change, but, there is nothing exceptional about that" (Newman, 2012, p. 38), nothing transformational. The problem, he states, lies with the word transformation itself. In Newman (2012), the author cites the work of Merriam, Caffarella, and Baumgartner (2007) who describe a "dramatic, fundamental change" (p. 130) when defining transformative learning. He maintains that this is excessive when learning is essentially about change anyway and suggests it be called 'good learning', 'good teaching'.

Although his theory and the examples cited relate to adult education, he argues a point that also has relevance to primary school educators, that as teachers if we are to help students to learn, then we need to engage in pedagogical practices that " help them engage with the

social and material world, and constantly reflect on that engagement" (Newman, 2014 p. 352). In all key learning areas, engagement with the world and reflection about that engagement is certainly good teaching and learning but like Newman, I would not describe it as capable of creating experiences that would be transformational.

For the purposes of this study, the central themes for transformative education are taken from the work of Kalantzis and Cope (2012b). Transformative education is an emerging, futuristic and optimistic approach to education requiring learner-centered pedagogical approaches (Pelgrum & Law, 2003) that allow teachers to make a contribution to changing society (Cope & Kalantzis, 2005). The teacher's focus is on the learner, actively supporting students to navigate media that has diversified and adjusted the way we use language, to develop skills for a workplace with new and ever evolving occupations and to come to terms with participation and engagement in a global and multicultural society. "Transformative education builds on the many insights of authentic pedagogy, to be sure, but ups the ante. It aims are no less than to change the life chances of the learner and to change their world" (Cope & Kalantzis, 2005 p. 68). It is therefore seen as more than challenging students to be reflective and critical thinkers. It requires a transformation in their ways of knowing and thinking.

Transformative education provides opportunities where technology can be used to create new meaning. Digital technologies, given the appropriate learning conditions, have the capacity to give students more agency in their learning as they are more able to direct the scope of their own their learning experiences. Transformative education can also provide new possibilities for where and how learning takes place (Wrigley, Thompson & Lingard, 2012). The school and classroom no longer have to be the only sites for learning, as technology potentially links the learner with a worldwide learning space. Students can connect with each other locally, nationally and globally. Learning can be mobile and can be used in learning environments outside the classroom and beyond, to virtual learning spaces thereby

challenging the notion of the traditional classroom space (Kalantzis & Cope, 2012b). Teachers can integrate technologies, using frameworks such as the Substitution Augmentation Modification Redefinition (SAMR) model (Puentedura 2006) that do more than enhance the learning through substitution and augmentation but transform it by modifying and redefining tasks that support transformative learning such as collaborating on online posts with students from around the world or producing blogs, animations or videos that can potentially be viewed by a world audience.

In their vast body of work Kalantzis and Cope maintain that transformative approaches to education require the roles of both teacher and student to change, with the focus firmly on the students who are creators and negotiators (Wrigley, Thompson & Lingard, 2012) of their own knowledge having a "…pivotal role in agency in the meaning making process" (Kalantzis and Cope, 2012a p.158). Their theory of New Learning views teachers engaging in approaches to ICT as knowledge 'experts' who manage and design the learning experiences encouraging ways of thinking that use authentic, "real–world texts, issues, ideas and problems" (Kalantzis and Cope, 2012b p.18).

Transformative education recognises that students' needs for 21st century learning are no longer met by a didactic approach to teaching where students are receivers of knowledge, not allowed to be agents of knowing. Students have a much more active role in their learning as they engage critically in activities such as project based learning, promoting learning that is negotiated rather than imposed. They take more responsibility for their own learning while the teacher moves from being a facilitator of learning to someone who identifies students' strengths and weaknesses and designs the learning opportunities that will create knowledge to meet student needs. The theory of transformative education recognises that students bring to the learning context a range of life experiences, languages, interests and intentions (Cope & Kalantzis, 2005) becoming knowledge makers as opposed to a didactic model of passively consuming or receiving knowledge. This opens the door for teachers to adopt pedagogical

practices that give their students greater access to opportunities to construct knowledge from many sources (Kalantzis and Cope, 2012b) and individually achieve "knowledge creation (student learning)" (Kalantzis, Cope & Harvey, 2001 p. 48). However, the extent to which this change in agency actually occurs in many primary classrooms is contestable since, as reviewed in the literature while there are factors that enable change at the school level such as personal constructs, environment, leadership, vision and professional development, there are pressures and influences on teachers at a local school level such as resources, knowledge and skills, school organisation, assessment and attitudes and beliefs that potentially interfere with innovative practices for knowledge creation.

Following is description of the key components of teaching and learning experiences, with ICT that can be described as transformative. Kalantzis and Cope (2012b) call these dimensions. It is the characteristics detailed in these dimensions and the way in which they interact with each other that will support the data analysis phase of this study.

3.6 Dimensions of Transformative Education

Kalantzis and Cope's (2012b) theory of new learning as transformative is helpful for explaining variables that influence student learning with ICT, and for better understanding of transformative learning in practice. They list eight dimensions or attributes of transformative learning that will be explored here. The characteristics of these components, with particular relevance to using ICT transformative learning approaches in the K-6 setting, are discussed. The first dimension of transformative learning is the architectonic dimension of location and space (Kalantzis and Cope, 2012b), which is underpinned by the premise that in the transformative education approach, learning is not restricted by physical boundaries. The increased use of ICT provides opportunities to no longer restrict learning to the classroom or to school hours but to enable learning to occur outside of school with students increasingly operating in a flexible and responsive online learning environment. Social networking and Web2.0 sites such as Twitter and YouTube are being increasingly accessed (White, 2008) and

used in teaching and learning in the primary school context. Students connect to programs and virtual worlds from their own home creating new learning environments that provide links to the world outside (Smeets, 2005) and provide flexibility in time and place (MCEETYA, 2005b). They are no longer only members of a school community but also learn within virtual communities in a variety of locations, building partnerships beyond the classroom. Traditionally designed classrooms and schools with low levels of ICT resources including hardware that is supported by inefficient connectivity and technical support, challenge this approach to teaching and learning. Appropriate infrastructure, and effective resourcing and planning that enable a high level of ICT integration in the teaching and learning process, would be present in schools and classrooms with characteristics of this architectonic dimension of transformative education.

The discursive dimension (Kalantzis & Cope, 2012b) of a transformative approach to education is characterised by the communication occurring in learning experiences that take place in the social context of teaching and learning. Crook et al. (2008) report that the introduction of Web2.0 tools has in particular, facilitated "...more collaborative ways of working, community creation, dialogue and sharing knowledge" (p. 11). With collaborative learning opportunities increasing (Johnson et al., 2015), the discourse changes from being one of command to one of dialogue (Kalantzis & Cope, 2012b) as students are likely to be more engaged in learning that involves group projects shared via an online platform, uploading or downloading files for sharing, communicating via email, twitter or Skype, blogging or the integration of social networking sites such as Edmodo and creating wikis or websites for a range of audiences. These learning experiences lend themselves to teachers designing learning environments that offer a range of configurations promoting dialogue for students as they work together. Teachers adopting transformative approaches to pedagogy regularly provide experiences that encourage students to work regularly in pairs, triads, small or large groups as opposed to the industrial model of the teacher's commanding presence at the front of the

classroom. These experiences support opportunities for more dialogue to occur not only between learners but also between teacher and learner.

The intersubjective dimension (Kalantzis & Cope, 2012b) describes the balance of agency between teachers and learners. As previously stated, transformative approaches using ICT have the capacity to provide students with greater agency in their learning and with that, greater responsibility for their learning as well. Early evaluative work of the Le@rning Federation's online curricular initiative found that this approach to pedagogy gave students choice and flexibility and allowed them to work at their own pace (Freebody, McRae & Freebody, 2006). Ertmer et al. (2012) found that " by putting the responsibility for learning on students' shoulders, and employing technology as a motivational tool, students were succeeding beyond expectations" (p. 434). However, in order for this to happen the needs of the student have to be identified by the teacher and planned sequences of authentic activities to facilitate and scaffold their learning have to take place. Kalantzis and Cope (2012b) contend that for transformative education " the deepest learning occurs in an environment of reciprocity and sociability. This is a context in which learning is a matter of negotiation rather than imposed subject contents, and where students are meaning makers as much as they are meaning receivers" (Kalantzis & Cope, 2012 p. 72). They add that it requires a carefully planned system for providing affirmation and incentives to the students, evaluating work and communicating progress with students and parents. Successful implementation of this component in conditions found in many primary schools where the ratio of teacher to student can be one to thirty or more, or where diverse behavioural and cognitive learning needs are challenging, is realistically most difficult even for very effective and experienced teachers. Although it is known that ICT enhances motivation and engagement in learning (Condie & Munro, 2007) and has the potential "...to contribute to the power of learning environments and to stimulate pupils' active and autonomous learning" (Smeets, 2005, p. 353) ICT alone will not sustain engagement and deep learning. What needs to happen for transformative

education is a change in role for the teacher who has "to cede power to students" (Crossley & Corbyn, 2010 p. 123). The teacher then has the potential to become a facilitator of learning whose beliefs and attitudes encourage learners to be independent, autonomous and learn from each other. These are characteristics of the intersubjective dimension.

In transformative education the fourth dimension, the socio-cultural (Kalantzis & Cope, 2012b), relates to the personal background of the students and the differences between them. It takes into account personal attributes such as a student's gender, race, physical and mental characteristics, diverse learning needs, languages spoken and culture. These attributes can affect learning outcomes and the level of engagement in the social context of a group or classroom. Students' needs are attended to by the teacher, when planning learning pathways for transformative learning. These personal attributes can be classified, among others, as gender. A study in the Netherlands in primary education found gender differences to be small in students' use of computers (Volman, Van Eck, Heemskerk and Kuiper, 2005). Research conducted in Canada and Australia by Luu & Freeman (2011) found that significant differences in scientific literacy between genders did exist when using computers at school and at other places other than home, favouring boys.

Ethnicity is another attribute. Ethnic differences too were found where primary students from an ethnic minority background, had less access at home to computers or the internet than the majority of students in general (Volman et al., 2005). These differences can have an effect on confidence, successful learning outcomes and students' level of social interaction with peers as well as engagement with ICT applications (Volman et al., 2005). When teachers create learning conditions and context that are supportive of individual learners' personal attributes, experiences and needs, the process of learning occurs (Crick & Wilson, 2010). Moreover, encouraged by the culture of the school and a positive learning environment, it has been found that for students with diverse learning needs "appropriate ICT

assists greatly in enabling them to better access the regular class curriculum by providing a range of different physical or educational supports" (Forlin & Lock, 2006, p. 6). Kalantzis and Cope (2012b) maintain that in a transformative approach to education the socio-cultural dimension "...identifies and negotiates alternative learning pathways to common goals, appropriate to students' capacities, as formed by prior learning, meeting their needs and satisfying their interests" (p. 73).

Dimension five is proprietary (Kalantzis & Cope, 2012b). According to the authors, the key features of this dimension are open and transparent teaching and learning. Teachers work as members of professional learning communities, cooperating, collaborating and linking with colleagues developing confidence and motivation, and better access to resources and research (Scrimshaw, 2004). Collegial relationships with peers promote an environment of continual improvement (Harris, 2003). Shared resources, knowledge and experience within communities of practitioners are characteristics of this dimension for teachers, and provide opportunities for them to enhance their own ICT learning experiences (Schibeci et al., 2008). These experiences take place in an environment where teachers themselves feel secure and ready to take risks with creativity (Hargreaves, 2005). Most significantly, in a transformational approach to teaching practice this type of learning environment is vital to ICT integration (Schibeci et al., 2008).

Student learning is more collaborative as they too communicate, share with and learn from their peers and others in local and global environments (MCEETYA, 2005b). These collaborative practices are becoming more widespread as ICT is integrated into student-centred learning environments with an "increasing use of collaborative learning approaches…leveraging technology to connect teachers and students inside and outside of the classroom" (Johnson et al. 2015, p. 7).

In the proprietary dimension of transformative learning, student and teacher learning that is collaborative, has the potential to happen anywhere and anytime in effect giving the student increased ownership and control over the knowledge making process.

Dimension six is the epistemological dimension (Kalantzis & Cope, 2012b) that is concerned with ways of knowing. According to the authors, in a transformative approach to education, students learn not from information delivered by the teacher but by engaging first hand with real world issues and problems, arising from their background and experiences making learning active, engaging and experiential. Knowledge making occurs then as students think critically and creatively using higher order thinking skills and problem solving capacities to find solutions to authentic, real world issues and problems. They construct new knowledge from multiple sources (Kalantzis & Cope, 2012b) incorporating multimodal ways of making meaning and knowledge including linguistic, visual, audio and spatial modes (Cope & Kalantzis, 2005).

An important characteristic of this dimension therefore, is the teacher's application of their knowledge of their students' needs, competencies and capabilities to design these learning experiences so that students are enabled to become learners "exploring subject matter through the act of creation rather than the consumption of content" (Johnson et al., 2015, p.14). In transformative education, this places a focus for the teacher on assessment for learning so that they can create conditions that engage students "with how they best learn" (Crossley & Corbyn, 2010 p. 95) and provide them with authentic learning opportunities that will allow them to take responsibility for their learning. It is here that student voice can be heard in so much as the teacher's knowledge and assessment of their needs, abilities and styles of learning help to determine and co-design the learning experiences (Anderson, 2010) that reflect students' personal needs and interests (Johnson et al., 2015). There is a focus on assessment that is formative rather than summative in learning that transforms, giving priority to information about not what the learner knows but how the learner knows it. It also requires

student voice in the feedback stage as well as learners engage in self-assessment and peer assessment experiences (Kalantzis & Cope, 2012c).

Dimension seven is pedagogical (Kalantzis & Cope, 2012) relating to ways of teaching to develop the attributes and dispositions of lifelong learners in formal, informal and self-directed learning experiences. According to the theory of New Learning, it is about the shaping of the learner to become someone who is aware about self, can create knowledge through inquiry and problem solving, can draw on resources, collaborate and pass on knowledge (Kalantzis, Harvey & Cope, 2001).

The role of the teacher in the pedagogical dimension is to respond to students' needs by designing, scaffolding and managing learning through the implementation of current curricula and contemporary learning approaches in K-6 such as inquiry based learning, providing a framework for developing higher order thinking and deep learning. Strategies such as open-ended questioning and challenging thinking supports the learner to reflect on their own learning and develop knowledge and understanding of how they best learn. "The teacher's role involves supporting learners' need to reflect explicitly on the learning process (developing metacognition), facilitating self-regulation and allowing learners to gain greater control over their own learning" (Condie & Munro, 2007, p. 29).

The final eighth dimension is moral (Kalantzis & Cope, 2012b). This component relates developing a 'kind of person', one who has the skills and ability to succeed and be productive and sustainable in the 21st century. They will be interconnected and discerning (Kalantzis & Cope, 2012b). The development of skills that support learners to work with flexibility in a global climate of change is a characteristic of this dimension. The role of the teacher is to develop an understanding of this 'kind of person' and provide learners with opportunities to move between different ways of knowledge making to develop attributes and skills such as perseverance, problem solving, collaboration, creativity and innovation that

equip them for lifelong learning. This will create informed and capable successful learners able to confidently interpret the world in which they live (Hague & Williamson, 2009). These eight dimensions of transformative learning and the characteristics of each component that have been outlined (Figure 1) will be used to inform the data analysis phase of the study.

This study of the pedagogical practice of teachers, explores the use of digital technologies in Stage 2 classes in two Sydney Catholic schools. It provides a platform to examine and answer the following research questions:

- How is ICT being used to transform learning?
- To what extent is learning being transformed?
- What are the influencing factors enabling or hindering transformative practice?
- In what ways can these factors be addressed?

In the next chapter the methodology used to explore factors that influence learning using ICT transformative practices will be detailed. It will provide the design of the ethnographic case study undertaken in this research. Following an introduction, ethnography will be described. The techniques used in ethnography will be listed and the role of the ethnographer will be explained. A detailed description of the research sites and the participants will be presented. Methods for data collection and analysis undertaken, ethics required and the limitations of the study will be explained.

CHAPTER 4 METHODOLOGY

4.1 Introduction

Research conducted was a qualitative ethnographic study that provided insight into the issue of ICT pedagogical practices of a group of teachers in Catholic primary schools. Ethnographic research is described by Hammersley (2006) as a "form of social and educational research that emphasises the importance of studying at first hand what people do and say in particular contexts" (p. 4). This particular research design provided opportunities to gain information about teaching practices that focused on the integration of ICT across key learning areas in Stage 2 primary classrooms in metropolitan Sydney. Data gathered was examined and interpreted to see the aspects of the case more clearly (Neuman, 2011) thereby providing insight into the possible challenges to pedagogical practices in ICT transformational teaching and learning and in turn assist the identification of conditions that may overcome any challenges.

4.2 Ethnography

Ethnography is an approach to social research, with origins in the disciplines of anthropology and sociology that involves field research that is "first hand exploration of the research settings" (Atkinson, Coffey, Delamont, Lofland & Lofland, 2007, p. 4). Anthropologists in the nineteenth and twentieth centuries conducted fieldwork, living in the communities of those being studied for very long periods of time, involving themselves in daily community life, undertaking interviews and collecting artefacts used by those being studied (Hammersley, 2006). Sociologists from the Chicago School of Sociology in the 1920s undertook an ethnographic approach to research in studies of small urban and rural community settings employing case study and statistical methods of data analysis (Hammersley & Atkinson, 2007). These traditions of ethnographic research provide debate "within and across disciplinary boundaries" (Atkinson et al., 2007, p. 1). Sociologists cite ethnographic fieldwork over long periods of time, as central to anthropology since the early

twentieth century (Hammersley & Atkinson, 2007). They also argue the lack of attention by anthropologists to documentation and research methods prior to the 1980's (Hammersley & Atkinson, 2007). While, on the other hand, 1920-1950 sociologists from the Chicago School researching how lives were shaped "by the developing urban ecology" (Hammersley & Atkinson, 2007, p. 16), developed an approach, in the way they studied their subjects, that was similar to anthropological research.

With this "complex history" (Hammersley & Atkinson, 2007, p. 17) within anthropological and sociological disciplines, it is not surprising that ethnography does not have a standardised meaning. It is however, regarded as a research approach, (Atkinson et al., 2007; Hammersley & Atkinson, 2007) not a method. It is an "inquiry process" (Erickson, 1984, p. 12), "a way of thinking about social research" (Mills & Morton, 2013, p. 9) that is exploratory, open-ended and occurring in a natural setting (Hammersley & Atkinson, 2007). Ethnography involves a range of methods to collect information with a major focus on participant observation (Hammersley & Atkinson, 2007) to achieve "new insights" (Erickson, 1984, p. 12). It provides a useful approach for "eliciting knowledge from informants" (Frank & Uy, 2004, p. 271), answering questions about participants' perspectives (James & Busher, 2013), "remains flexible and responsive to local circumstances" (Hammersley & Atkinson, 2007, p. 11) and provides possible conclusions rather certainties (Erickson, 1984).

The strength of ethnography is seen by some as "its focus on people and lived experiences in schools and classrooms" (Mills & Morton, 2013, p. 10). It is a useful approach for school-based research since the data collection methods employed support engagement with reflection and reflexivity in pedagogical practices (Youdell, 2010). Detailed descriptions of the research context and participant engagement in 'in depth' interviews and open-ended conversations allow the researcher to capture the dynamics of the classroom and reflect on the emerging insights into educational settings (Mills & Morton, 2013). The detailed real life representations (Youdell, 2010) that are subsequently produced allow the reader to make

connections and comparisons (Mills & Morton, 2013) with their own practice and in their own educational setting.

4.3 Ethnographic Techniques

Ethnography is best understood by firstly looking at techniques or methods employed by researchers to generate data about people as they act in their local, familiar settings. Mills & Morton (2013) describe ethnographic techniques as "interwoven practices of being, seeing and writing" (p. 8) traditionally involving personal experience through participant observation which is, as mentioned previously, a key ethnographic technique. It requires taking part in the daily organisation of the setting in the study, developing relationships with the subjects and observing what is going on (Emerson, Fretz & Shaw, 2011). Observation and participation, techniques are interaction rich (Emerson, 2009). They enable the researcher to spend periods of time in the field with the research subjects doing as they do in their natural setting, rather than a setting that has been created for them. The researcher is able to gain trust, conduct interviews, ask questions, take field notes, record in systematic ways what has been observed and create detailed written accounts in order to "replicate some of the subjective knowledge of the world under view" (Atkinson et al., 2007, p. 32).

Ethnographic methods or techniques, within a school setting, are shaped by the context of the site. Observations typically take place over a period of time due to issues such as timetabling, school events, assessment and reporting processes that can affect access to the site. A researcher asking questions or taking fieldnotes could possibly interfere with student focus and attention. Therefore these matters were taken into account in this study when scheduling observation times. Interviews were planned at a time that impose minimal or no disruption to regular teacher practice. Furthermore, interviews and observations worked in conjunction with each other with interviews preceding observations to gain deep knowledge of teacher practice and alignment of their beliefs and understandings with their practice. Ethnography requires more than observation to provide detailed accounts and interpret

meanings and experiences that may not be obvious in all aspects of interaction (Emerson, 2009). Interviews are also a frequently used effective technique in ethnographic research that allows the researcher to explore perspectives of the teachers in the study and give them a voice (Hammersley, 2006). In depth interviews that can be unstructured, semi-structured, open-ended, a combination of formal and informal, are designed to understand people's perspectives, provide opportunities for the researcher to listen and produce data that allows inferences to be made about what people say and do (Hammersley, 2006; Maxwell, 2013). They can be conducted with individuals or focus groups allowing the researcher to undertake active and engaged listening and be more of a "participant listener than observer" (Forsey, 2010, p. 561). Interviews are most commonly recorded, with transcripts written at a later date, which not only frees up the researcher to facilitate close listening and develop relationships with participants in the study but also serves the purpose of 'member checking' enabling interpretations to be checked for accuracy by the participants (Frank & Uy, 2004).

To complement and support participant observation and interviews, various kinds of documentary evidence are collected. These can include official, publically available or personal documents and artefacts that serve to dovetail participant observation (Jachyra, 2015). In school–based ethnography these may come from a variety of sources such as the school itself, the participants involved and the students. School documentation can include but not limited to school policy and procedure documents, staff handbooks, school timetables and published school reports. Participant documentation can include current and past teaching programs, assessment tasks and relevant record-keeping data. Student work samples in a variety of key learning areas are also important sources of data.

4.4 Role of the Ethnographer

The setting for the study can influence the actions of the ethnographer as they engage in the primary method of fieldwork "forming relations with others through interaction" (Emerson, 2009, p. 536). For some researchers, especially those working with young children, a period

before the fieldwork where research participants are able to become familiar with them can yield high quality data (Barley & Bath, 2014). There are others though who argue that this sort of social engagement has led to problems with objectivity and bias and that in whatever setting the role of the ethnographer is to "attempt to make the familiar strange, and the strange familiar" (Atkinson, Delamont & Coffey, 2003, p. xxxii). It is widely acknowledged however, that social interaction and relationships are integral to ethnography and close relations with participants in a study can "provide clues to understanding the more subtle, implicit, underlying assumptions that are not often readily accessible through observation or interview methods alone" (Emerson et al., 2011, p. 39).

The ethnographer's role is to work through a process of exploration where "where boundaries between research stages that other research strategies consider to be fairly bounded, such as data collection and analysis, become blurred" (Barley & Bath, 2014, p. 192). The researcher needs to be able to move freely backwards and forwards between these stages to remain open-minded and flexible to opportunities for new information as they present themselves. This idea of continuity, it is argued, also applies to the concept of "the familiar and the strange, between the social positions of the 'insider' and 'outsider'" (Atkinson, Delamont & Coffey, 2003, p. 8).

Insiders undertaking research are familiar with the setting, may be able to ask more in depth questions and produce a more authentic understanding of the subjects and their context (Johnson-Bailey, Lee, Kee, Ntseane & Muhamad, 2010) and may be able to facilitate development of participant and researcher relationships (Barley & Bath, 2014). However, they can also come with assumptions and theories based on professional experience (Drake, 2010), may be too close to ask probing questions (Merriam et al., 2010), may align too closely with individual subjects or focus groups (Atkinson et al., 2003) or may present their research subjects in an unfounded favourable position (Hammersley & Atkinson, 2007).

On the other hand, outsiders have an advantage in that they present with an

unfamiliarity and strangeness to the subjects and their context. They may be more objective (Atkinson et al., 2003), more curious and able to ask probing questions and not aligned with any cliques or groups allowing participants to answer and discuss freely, therefore able to retrieve more information (Merriam et al., 2010).

Researchers because of their age, gender, ethnicity, personality, their relationship with subjects, the research site, the time or subject being studied, can be both 'insider' and 'outsider at the same time' (Emerson et al., 2011). They manage the complex research process by moving backwards and forwards along a continuum with multiple dimensions depending on aspects such as location, subjects and time (Mercer, 2007). The role of the ethnographer therefore, is to "balance between engagement and distance" (Atkinson et al., 2003, p. 31), merge the understanding of the insider with the curiosity of the outsider and "learn perspective through incongruity" (Atkinson et al, 2007, p. 31).

The ethnographer's role is also to do more than report their insights but also analyse and generalise (Fine, 2003). Their task is an interpretative process (Denzin & Lincoln, 2011) to create knowledge by taking the sights, sounds, hesitations, silences (Atkinson et al., 2003), experiences, actions and practices from the setting to construct a context. This is achieved through literary genres of narrative and vignettes from which patterns and insights can be determined "...conveying the vitality of the experiences within a framing that allows reader to make connections and comparisons" (Mills & Morton, 2013, p. 9).

Since ethnography studies first hand what people do or say (Hammersley, 2006), it is a widely and frequently used approach in education. Some ethnographic studies have maintained a focus on people and their experiences in classrooms, schools and institutions, while others studies have focused on educational policy and ideas (Mills & Morton, 2013). It is a flexible and responsive approach well suited to ever evolving and changing principles, teaching and learning practices and policies in education.

To gain first hand knowledge and deep understanding of ICT teaching practices in

primary schools, an ethnographic case study approach to research was undertaken at two schools. Essential elements of the study were social interaction (Emerson, 2009) through the exploration of experiences and practices of five primary school teachers in a naturally occurring context (Angers & Machtmes, 2005) by undertaking participant observation, interviews and document collection. This provided rich forms of data that were used to describe and interpret meanings of actions and practices (Jachyra et al., 2015). Observations provided an insight into the actions of the participants (James & Busher, 2013) and took place in the classrooms and Library over extended periods of time in an intermittent but regular manner, following teachers in their natural environment as they integrated ICT as a learning tool for students in year 3 and 4. At both research sites these observations focussed on "individual voices and perspectives" (Craft, Cremin, Hay & Clack, 2014, p. 19) as well as the activities and classroom practices of the teachers as they interacted with other colleagues and students across a range of teaching and learning experiences in the key learning areas of English, Mathematics, Religious Education, Science and Human Society and Its Environment (HSIE). This approach provided a platform for a detailed focus of ICT practices that could potentially assist the uptake of integrating ICT practices at a transformative level.

I have spent many years in primary school education with over a decade as a primary school principal and so my experience throughout the period of fieldwork and the data analysis stage was both familiar and yet strange (Atkinson et al., 2003). Being an 'insider' made many features of both sites 'natural' (Marty, 2015). The classroom setting and working closely with teachers and students was a very familiar experience and as an 'insider,' with prior understanding of content and context, I frequently experienced opportunities to ask more meaningful questions (Merriam et al., 2010). Being an 'insider' also facilitated the development of relationships with the study subjects (Barley & Bath, 2014) since technical educational language and jargon was freely used during observation and interview periods without having to be explained to me by the participants. This also potentially assisted in

allaying the concerns of the teachers being observed and interviewed by a principal, since as an 'insider' I was able to engage in empathetic dialogue with them and comfortably exchange ideas within their field of experience (Mills & Morton, 2013). It also facilitated connections being able to be made during formal and informal verbal interactions that produced a more authentic understanding of the participants and their context (Merriam et al., 2010).

At the same time however, it was necessary to adopt a practice of entering the field without any expectations of what may be seen or occur. At times, particularly during recorded interviews, I found it necessary to step back (Maxwell, 2012) so as not to over identify with participants (Atkinson et al., 2003) but instead to be sensitive to the privileges afforded as a researcher (Emerson et al., 2011) in creating knowledge in an educational setting.

This position as 'insider' was balanced by the experience of being an 'outsider' to the particular classroom settings and a stranger to the study participants. There was an advantage in not having 'in depth' knowledge about the participants or sites in so much as I was able to ask somewhat probing questions in an attempt to make the strange, familiar (Maxwell, 2012). My role as researcher, 'being there' (Landri, 2013), in a more passive observational position in the classroom, became quite different and participatory during the course of observations as the situation required. This flexible and responsive approach can be a strength of ethnographic research (Hammersley & Atkinson, 2007). "The field researcher must be able to take up positions in the midst of key sites and scenes in others' lives in order to observe and understand them" (Emerson et al., 2011, p. 37). My knowledge as an insider 'being there' made this possible.

However, it needs to be acknowledged that 'being there' (Landri, 2013), as a researcher who is also a Principal at a school in the same region, may have presented a challenge for the participants. Although having reassured teachers at the outset that my study was not a report to their Principal about their practice but rather an opportunity for me to observe current ICT practice in another setting, they may have experienced initial discomfort.

I was aware therefore that I needed to practise sensitivity and perceptiveness (Emerson et al., 2011) so as not to allow my presence to contaminate what was seen and heard (Emerson et al., 2011). It was crucial that my position as researcher, 'being there' (Landri, 2013) in the classroom, initially assuming, a more passive, observational role evolved, through negotiation with participants, to one that became more participatory (Barley & Bath, 2014; Jachrya et al., 2015), engaging with teachers at a level that promoted trust and attempted to mitigate any feelings of discomfort.

Barley and Bath (2014) acknowledge that the role of a researcher is to be aware that principles of familiarisation need to be practised by being continually reflexive and thinking critically about their evolving role. A strategy described by Mercer (2007) as an "interviewing style that is less gregarious than my natural disposition" (p. 11), effectively limiting a researcher's contributions to conversations, was practised during the interviews with teachers. This meant 'holding back', waiting for the participant to fill the void in conversations that took place. During the data analysis stage, so as not to present the subjects and their practices in an unrealistic favourable light (Hammersley & Atkinson, 2007), it was important to always return to the data to see and feel what was there. The researcher's role is to actively listen to what the data was trying to say (Maxwell, 2012), balance principles of similarities and differences (Barley & Bath, 2014) and shift between positions of being an 'insider' and 'outsider' to keep the familiar strange and the strange familiar (Atkinson et al., 2003; Atkinson et al., 2007; Hammersley & Atkinson, 2007).

4.5 Research Sites

In order to identify factors that influence learning using transformative ICT practices this study investigated two sites, the Valley School and the River School. A case study for each of those schools was undertaken.

Valley School is a two streamed Catholic primary school in the western Sydney suburbs with an enrolment of 330 students both male and female. The students draw from a

variety of cultural backgrounds with over 50% identifying as having a language background other than English (LBOTE). The school employs twenty-five teachers in full time and part time roles. The Principal and Assistant Principal do not have a teaching role. The eLearning Coordinator is a member of the school's Leadership Team as well as the Mathematics Coordinator and Year 3 teacher.

The school is in the first year of a BYODD program. It designated the device and the model to be used in the program as an iPad as a result of Catholic Education Office (CEO) Sydney policy supporting devices that are 'WiFi only iOS devices', such as iPad, iPod and iPod Touch. Students in Year 3 and Kindergarten at Valley school provide an iPad, purchased by their parents that is brought to school for educational use. The school's own BYODD Policy does not allow students to bring in devices other than that designated by the school.

Preparation for the program followed the CEO system guidelines that included staff and community consultation, school resourcing allocation to ensure equity for students not able to bring a device and providing a device for staff in the program as well as purchasing of apps required for school owned devices. The guidelines also advised provision for staff professional development, providing parents with a list of apps to be installed on the student's device, communicating to parents their responsibilities and expectations for care and maintenance of the device, preparing the students by having appropriate user agreements in place and ongoing evaluation of the program. These CEO requirements were guidelines only and schools entering into the BYODD program while not having to abide by any mandatory requirements, were strongly urged to undertake the suggested procedures.

The school's Mission Statement acknowledges 21st century learning skills by promoting the development of students who are self directed learners, risk takers and problem solvers. The school wide pedagogy (SWP), practised by teaching staff, values and promotes lifelong learning and personalised learning for its students. It is expected that all teachers will

develop these qualities in students by planning and delivering teaching and learning experiences that engage the students in higher order thinking and challenging their learning by the creative use of technology. Teachers refer to the SWP in their programming documentation (see Appendix B).

The second research site is the River School. This two-stream Catholic primary school is also located in Sydney's western suburbs. It has 315 students enrolled from Kindergarten to Year 6 who come from more than forty countries and very diverse ethnic cultures with 94% of students having a Language Background Other Than English (LBOTE). The school itself is situated in a low socio-economic area and employs twenty-seven teachers across the grades in full time and part time roles. The school has appointed a Stage 2 teacher who has the role of eLearning and Mathematics Coordinator while working full time in the role as classroom teacher in year 3. Innovative teaching and learning practices are stated in the school's Mission and Vision statements with a particular focus on dynamic and challenging learning opportunities and promoting creative and critical thinking experiences through a framework of thinking and problem solving skills development.

The school names personalised learning and meeting the individual needs of students as part of its vision. It has created an SWP that promotes lifelong learning and offers a rich, diverse and differentiated curriculum. This SWP develops divergent thinking and builds the problem solving, communicating and critical and creative thinking skills capacity of learners to equip students for the challenges of an ever-changing world. It utilises 'Design Thinking' as a framework for developing these skills that are developed as students move through a carefully planned and sequenced knowledge making process. Teachers refer to the principles of this framework in their teaching program (see Appendix A).

The school supports staff with whole school professional development opportunities, facilitated by outside consultants and the leadership team, in a methodology for creative

problem solving that is used as a framework to inform and improve teaching practice at the school.

Both schools have well documented plans, policies and practices promoting teaching and learning with and about ICT that are informed by two CEO documents. The first is the system strategic plan that sets out improvement priorities for Catholic schools with direction for resourcing and school management of ICT and pedagogical principles and practice for ICT integration (Catholic Education Office, 2011). The second promotes authentic learning for teachers using 21st century learning skills of collaboration and communication, creative thinking, reflective thinking, questioning and multimodal literacy skills, and problem solving (Catholic Education Office, 2008). Both of these papers are designed to be used by leaders and teachers in schools to plan, organise and deliver ICT in a Catholic school setting in light of the Federal Government focus on learning and improving student outcomes with ICT following the Digital Education Revolution.

Both schools are also supported by the CEO's appointment of ICT Support Officers (ISO) employed by the CEO system to provide primary schools with necessary technology support. The ISO's role is to respond to staff requests for support that have been logged onto the ICT self-service portal. This portal is deployed system wide. They also maintain the school's server and network infrastructure, the wireless network and maintain school and system desktops and school owned mobile devices. They do not service student owned devices in BYODD programs. The ISOs are deployed to all primary schools relative to student population and work in the River and Valley schools for three days each over two weeks. This position serves to support schools, in particular the eLearning Coordinator, who is not forced to deal with technical problems experienced by teachers and students. However, since support is sometimes not available in a timely fashion, as the ISO is not permanently onsite to troubleshoot, the eLearning Coordinator can still become involved with some

problems relating to passwords and connectivity. This impacts on the eLearning Coordinator's time, taking away valuable teaching and preparation time.

4.6 Research Participants

Following Ethics approval and applying a purposeful sampling strategy (Patton, 2014) teachers were enlisted from Stage 2 at two schools. This strategy was applied since the study would be involving a relatively small number of participants who needed to be "information rich and illuminative" (Patton, 2014, p. 138). Following CEO research recommendations volunteer schools from the Sydney CEO were sought in the first place via email to school Principals within one of the three regions of CEO schools. This region was chosen, on advice from my CEO Regional Consultant, as it provided a rich context for the study. Schools in this region were in different stages of ICT integration and were located in proximity to the school at which I am Principal. The school Principals at both River and Valley schools indicated via email their approval for research to be undertaken on their site. Principals at both schools were known to me as Principal colleagues. Teachers in Stage 2 at two schools were then approached by their Principals and asked if they were willing to take part in the study. Stage 2 was chosen by the Principals at each school, as this was, coincidentally, the stage in which the eLearning Coordinator taught.

The purpose for the study, to explore factors influencing ICT pedagogical practice, as well as the voluntarily nature of the study, was made very clear at the outset to both the Principal and teachers. Individual permission was then sought from the five teachers who volunteered, four female and one male, all with varying years of teaching experience and an age range between 25 and 45 years old. At Valley school the eLearning Coordinator and teacher were appointed to teach Year 3. At River school the eLearning Coordinator and teachers were appointed to teach both Year 3 and Year 4 students across Stage 2. Student participation, parent consent and information notes were given to each teacher to hand out to students to be signed.

Sensitivity to the "context being studied" (James & Busher, 2013, p 13) was practised when arranging days and times for interviews and class visits. The very busy workload of a primary school teacher as well as an awareness of the role of the eLearning Coordinator, which involved days out of the classroom fulfilling other responsibilities, was always considered during the period of fieldwork.

For the purposes of anonymity in this study, each school, teachers and students were given pseudonyms. The two participants in the study at Valley School, Miriam and Monique, are full time and experienced teachers each with a class of 28 students. As noted previously, these participants are in the first year of a BYODD program with their Year 3 students having access to their own iPads. The teachers plan together collaboratively and cooperatively for the use of ICT as a tool for instruction and assessment across all key learning areas. They both hold a belief that ICT is a valuable learning tool. 'It definitely does increase engagement and motivation in the students in class (Miriam, interview Valley School, March 2015).

At the River School Christine, Colin and Connie work cooperatively across a cohort of 99 Stage 2, Year 3 and 4 students. Teaching programs are planned collaboratively and digital devices including iPads, laptops and Chromebooks are shared across the grade. During the study, Connie began maternity leave and was replaced by a relief teacher who agreed to participate in the study through classroom observations.

4.7 Data Collection

"Data for educational research needs to be collected within the school context" (Jeffrey & Troman, 2004, p. 536). The time frame for the study provided five visits to each school (see Appendix D) to conduct interviews and experience events and circumstances (Emerson et al., 2011) in a classroom context without interfering in the regular activities of the teachers and their students. It ensured sufficient opportunities for collecting multiple forms of data (Bowen, 2009), at both schools and in a regular manner (James & Busher, 2013) to support an in-depth understanding of each teacher's ICT practice.

Open-ended interviews, typically included in ethnographic research (Gallagher, Wessels & Ntelioglou, 2013), occurred on two occasions at each school for no more than forty-five minutes and were recorded using a digital device. They took place in a dedicated room and provided opportunities to give depth to the exploration of teachers' personal beliefs, attitudes and teaching experiences of, and with ICT prior to observations of teaching practice. Teachers' schedules and their availability were always taken into consideration when planning for interviews. Opportunities were given during the course of each interview to expand on answers given and the open-ended questions were framed to encourage subsequent rich dialogue and uncover detailed understandings and experiences (Jachyra et al., 2015). The first set of interviews was with all five teachers. The questions were designed particularly to establish effective connections and engage with them in productive discourse around ICT pedagogical practices (see Appendix E). The second set of interviews was only with the eLearning Coordinators at both schools. The questions asked provided an opportunity to explore and understand the coordinator's role (see Appendix F). Interviews were transcribed as close as possible to the event while the experience was still fresh to ensure authenticity (Emerson et al., 2011).

The first set of interviews was then followed, on different occasions, by three classroom observations of one hour each that spanned a period of three terms. This was designed in order to preclude the "danger of reactivity" (Hammersley, 2006, p. 5) thereby avoiding any potential misunderstanding of what was actually taking place in the classroom. Since I was a practitioner in the field being undertaken, it was essential to prevent assumptions being made following the interviews:

> Especially on first entering the field, the researcher identifies significant characteristics gleaned from her first impressions and personal reactions. With greater participation in that local social world, however, the ethnographer becomes more sensitive to the concerns and perspectives of those in the setting. (Emerson et al.,

2011, p. 81)

Following a brief analysis of the interview data to identify any differences in teacher responses from their interview to their classroom practice, lessons in a variety of key learning areas including Religion, English, Mathematics, HSIE and Science were observed. The data collection process during fieldwork provided opportunities for me to have a "non-participant observation role" (Barley & Bath, 2014, p. 188) in the classroom at the beginning while 'getting to know' and establishing rapport with teachers and students. This process "supported becoming familiar with teachers' practices with ICT while developing collegial trust" (Orlando, 2013, p. 235). As this period of immersion (Hammersley, 2006) took its course, participant observation (Angers & Machtmes, 2005; Emerson et al., 2011; Hammersley, 2006; Jachrya et al., 2015) depending on the lesson, involved moving around the classroom among the students and teachers and answering questions from students. This provided opportunities for taking descriptive fieldnotes that were accounts of my observations (see Appendix G). These accounts were handwritten and then recorded electronically as close to the event as possible. They provided "a distinctive resource of preserving experience close to the moment of occurrence and for deepening reflection upon and understanding of those experiences" (Emerson et al., 2011, p. 61). Furthermore, they also served as opportunities to observe differences that surface between teachers' classroom practice and their responses to the interview questions, that is, what they say and what they actually do.

Before the classroom observations began, one of the teachers at the River School went on maternity leave and did not participate any further in the study. While I was able to observe the students in her class as they interacted with students in the other two classes, my observations of teacher practice at River school were conducted with the remaining two teachers only.

The process of observations and subsequent field notes was the same for all teachers and began by observing and writing about a variety of situations and interactions in the

classroom, moving to a focus on narrower issues relevant to exploring the pedagogical practices of the teachers. These observations were written up soon after leaving the setting to produce “fresher, more detailed recollections” of events (Emerson et al., 2011).

A final interview with the eLearning Coordinators at both schools (see Appendix F) was recorded and later transcribed. This interview was not planned at the outset of the study but introduced in order to clarify and understand some perceptions and interpretations that I had gathered following the initial interviews. I deemed it was necessary to clarify classroom procedure unique to the sharing of devices and the somewhat cyclical nature of learning activities (Hammersley, 2006) that result in particular activities occurring only on certain days or weeks throughout the school term. It was also introduced to prevent the possibility of assumptions and reactivity when interpreting meaning (Emerson et al., 2011; Hammersley, 2006; Yin, 2014) about the level of school based support given to teachers. The Coordinator’s role supporting eLearning in each school was also clarified.

Teaching program documents from the eLearning Coordinators were emailed to me. Since both schools had engaged in a process of collaborative planning with colleagues for their teaching programs, these documents provided the outcomes, content and strategies implemented by all teachers during the lessons observed. They were used as one source of multiple data to interpret and identify themes and issues and seek “convergence and corroboration” (Bowen, 2009, p. 28). Being aware of what Yin (2013) calls ‘contrary evidence’, avoiding bias of possible preconceived notions or ideas by the use of a range of data sources was practised during the period of data collection.

During the period of fieldwork, contact was made with teachers via email to the eLearning Coordinator and Assistant Principal at both schools. This ensured that the leadership team at each school was kept up to date with the process of researcher visits and possibility of school activities or events interfering with the research procedures. It supported the process of introductions and becoming familiar with teachers as well as developing trust

(Barley & Bath, 2014; James & Busher, 2004; Orlando, 2013).

4.8 Data Analysis

Data analysis was undertaken during and after the data collection phase of fieldwork. As a first time researcher, a foundation approach (Miles, Huberman & Saldana, 2014) was employed using codes to label texts to create descriptions (Cresswell, 2012) and then as prompts to support deep reflection of the data (Miles, Huberman & Saldana, 2014). Analysis began with careful line by line reading of the transcribed interviews, lesson observations and program documentation. They were then coded initially based on a list of words arising from the research question, the literature review and the conceptual framework. Examples of some codes used included 'resourcing', 'professional development', 'learner-centred', 'school planning', 'pedagogy' and 'creating knowledge (see Appendix H). Reflecting on these codes revealed some gaps and caused me to introduce a second interview with the eLearning Coordinator to clarify my understanding around pedagogy practice observed that I had observed and professional development from the recorded interviews. Codes were revised and developed during the course of the fieldwork (Miles, Huberman & Saldana, 2014) and anecdotal notes and jottings made, indicated other issues to be taken into consideration relating to the data.

A second phase of coding was carried out to make sense of the data by grouping the codes into similar categories or themes as patterns emerged. Some of the themes were 'Personal Constructs', 'Pedagogical Practice', 'School Culture', 'Professional Development' and 'Leadership'. It was important at this point to keep returning to the data to check for reliability. This data was analysed and synthesised across both case study sites to be able to write statements reflecting the findings of the study so that could be reliably transferred to other contexts.

4.9 Ethics

This study produced ethical issues that emerged and changed during the research (Stutchbury

& Fox, 2009). One of these issues involved a position of power since the participants knew of my position as Principal at a Catholic primary school in their region. In order for them to feel comfortable in my presence while observing their teaching practice and for their responses to be a source of valuable data, it was important at the outset to build rapport (Jachyra et al., 2015), negotiate with (Barley & Bath, 2014) and establish an understanding of equal relationship (Merriam et al., 2010). At the same time, it was important not to compromise being able to engage critically with data by becoming too close to the participants (Sikes, 2007). "The ethical practice in research is intended to ensure research projects are based on trust and respect amongst their members working together for a purpose" (James & Busher, 2013, p. 204).

In line with ethical research protocols, all participants were told at the outset about the context and purpose of the study. They were informed of the voluntary nature of participation and the provision for withdrawing at any time without repercussions. Information forms were distributed and written consent forms were signed by Principals, teachers, parents and students.

Students' participation in the study was respected. Following written parent permission being given, students were informed about the study (Barley & Bath, 2014) by both their parents and teachers and although they were aged from eight to ten years of age, consent forms were signed by them. Barley & Bath (2014) argue that the ability to give consent should not be "based on age but rather experience, confidence, type of research and the researcher's expertise" (p. 184). Although teachers rather than students were the focus of this research, observations of students as they engaged with digital devices to complete tasks was important to the data collected about teacher practice. There were many opportunities for observation from a distance and there were also periods of "participant observation" where students' questions were answered and they entered into conversations.

All signed forms were collected and securely stored (Craft et al., 2014) by the

researcher. Written fieldnotes and observations and transcribed interviews were password protected and stored electronically.

During the study, sensitivity and consideration to the school and classroom setting (Emerson et al., 2011; James & Busher, 2013) and teachers and students being studied was practised when arranging interview times and class visits through awareness of the school's and individual teachers' needs and time constraints.

4.10 Limitations

An "ideal length of time in the field is difficult to establish" (Jeffrey & Troman, 2004, p. 537) and in this relatively brief research, with a small amount of participants, time and access limitations were faced (Hogan et al., 2011). However, selecting five teachers who were information rich (Patton, 2014) provided a source of valuable data and was an essential element in overcoming these limitations to the research. Purposeful sampling (Patton, 2014) provided teachers who were practitioners of ICT at differing levels of teaching experience including the eLearning Coordinators at both schools whose role was to lead and support eLearning. This variety added depth to the study. Being present to capture the 'dynamics of the context' (Jeffrey & Troman, 2004) in the five classrooms provided rich opportunities for observational fieldnotes directly related to the study. Observation of a breadth of teaching and learning opportunities that covered a variety of key learning areas was achieved by a flexible arrangement of visits to the sites at various times during the study. This also enabled the gathering of valuable data while supporting a method of overcoming time and access limitations.

In a study where the researcher was a practitioner in the same field, it was important to reduce the impact of potential biases (Bowen, 2009). Therefore rich data was collected from a variety of sources for the purpose of triangulation (Bowen, 2009; Stutchbury & Fox, 2009). It was collected from interviews that were recorded and later transcribed, from observational fieldnotes taken over the three sessions and from teaching program documentation. These

data collection tools supported a method of corroborating findings during the analysis stage and thereby minimising limitations in the study.

This chapter has provided detail of the research methodology for this study. It detailed a background description of ethnography and the ethnographic techniques used to gather data and the role of the researcher. A description of the research site and the participants was provided. The chapter concluded with a description of the data collected, the limitations and ethics of the study.

The following chapter is a case study of the Valley school. It details the experiences and observations made during visits to the site. It provides valuable insight into factors influencing ICT transformative practice in a Sydney Catholic primary school.

CHAPTER 5 A CASE STUDY OF VALLEY SCHOOL

5.1 Introduction

In its first year of the implementation of a BYODD project, the Valley school provides a rich data source for exploring factors that influence learning using ICT transformative practices. The school, as part of the Sydney Catholic school system where the development of eLearning is a stated priority (CEO, 2011), made a considered decision to introduce a 1:1 iPad program in 2015. This would be implemented in Year 3 and Kindergarten classrooms and subsequently extend to the whole school over the next three years. It was supported in the implementation of this program by education officers, advisors and technical support from the CEO Sydney and regional offices, as well as having access to key policy and procedural documents previously mentioned. The school researched key applications to be used for teaching and learning that needed to be preinstalled by parents on each iPad prior to bringing it to school in 2015. Throughout the course of that year, additional applications were reviewed and added.

An interim report into the Catholic Education Office primary schools BYODD pilot program (Appendix C) concluded that schools beginning this new ICT program experience many ‘teething problems’. These included planning efficiently for the maintenance and safety of devices while onsite and reliable connectivity due to an increased number of devices. Problems also included an initial increase in workload for teachers, heightened parent expectations for safety of the iPad and improved outcomes considering the cost invested in the device. Providing time and money for teacher professional development and teacher support conclude the list of problems that were faced by pilot schools (CEO, 2013). These consequent issues, following the introduction of a program such a BYODD, make the Valley school and the teachers’ rich sources of data for a case study of factors influencing learning with ICT.

Another factor that contributes to the school as a data rich site is the participants themselves. Both teachers were appointed to Year 3 by the school Principal for the first year of the BYODD program. Miriam, who is also the school's eLearning Coordinator, leads the implementation of the program and Monique, her grade partner, states that since she was chosen to go on the program, despite being an older member of the teaching staff, that she is able to troubleshoot and solve problems with the students' iPads and that she is 'learning every day, becoming more confident' (Monique, Interview Term 1, 2015). This vote of confidence in being chosen creates a confident mindset for the teacher taking on such an innovative program. Jamieson-Proctor et al. (2006) in their study in Queensland State schools found that teacher confidence impacts positively on the student use of ICT.

This case study analyses factors at the Valley school that influence ICT transformative learning. The teachers' attitudes and beliefs and their pedagogical practice is analysed. An analysis of hindrances to ICT pedagogies and leadership practices at the school is also presented.

5.2 Attitudes and Beliefs about ICT

"Adoption and use of technology in the classroom is determined by teachers' attitudes and beliefs" (Angers & Machtmes, 2005, p. 780). At the Valley school, both teachers speak positively about the use of technology, the implementation of the BYODD program and its positive impact on ICT classroom practice. Monique describes her experiences on the program as being 'fairly smooth sailing' considering the 56 iPads that have now become learning tools in the Year 3 classrooms. She maintains an understanding and supportive approach to the typical demands of the students:

> **Lyn**: You never get to a point or ever reach a point where it's disheartening?
>
> **Monique**: No I guess like I suppose when they have their iPads out there's a

> lot of 'Miss….' so I don't get to see a lot of what they're doing on their iPads because I'm constantly 'Ok I'll change your password' .....I'll do this ...so there's that constant troubleshooting. When they've got their iPads I tend to be doing that a lot. Um you know that can be a bit frustrating but by the same token if I've been able to work that out, you know these will become less and less. We really are baby steps too because this is our first year. (Interview, Monique Valley School, March 2015).

Monique is admitting the frustration she faces with the necessity to regularly troubleshoot with student devices but is retaining a positive and pragmatic attitude. She is viewing the interruptions as problems that she is able to solve and predicting that they will become fewer.

Her positive approach towards troubleshooting aligns with classroom practice as noted during an observation session:

> The internet on the Apple TV screen is not working so teacher asks a particular child if he has the site on his ipad. He does so and the site appears on the screen for all students to see. Children attend well to the screen as the teacher continues to explain the meaning of the place names. (Observation 1, Monique Valley School, April 2015)

Monique is able to call upon her own ICT knowledge and skills to find a solution to her connectivity problem that does not interfere with the students' learning. In fact, she uses a particular student's ICT competencies to support the learning of his peers. This positive and effective approach to problem solving acts as a facilitative factor, providing an opportunity to actualise Monique's stated beliefs about the benefits of ICT as a learning tool that interests and excites her students.

Whilst this optimistic attitude to interruptions and problems is engaging with positive personal constructs as (McCormick & Scrimshaw, 2001) these types of challenges are shown, during the classroom observations, to interfere with lesson objectives. When teaching time and teacher attention is given over to solving password or connectivity problems, it becomes a problem solving experience for the teacher alone while students are observed to engage in 'off task' behaviours. These include chatting among themselves or interrupting the work of others while the teacher troubleshoots for them. They are consequently delayed in starting their tasks or interrupted during them by technical problems they can't solve themselves in a timely manner. Lack of engagement with set tasks then increases the necessity for the teacher to implement behaviour management strategies. These draw attention more frequently to negative student behaviours and encourage one student during the Human Society and Its Environment (HSIE) lesson to remark "I should do it in a quiet place using iMovie" (Observation 2, student Valley School, July 2015). Since, at times, more time is spent working through technical problems rather than applying knowledge to arrive at transformational learning, the knowledge making process is delayed by the reliability of the resource underpinning the learning intention.

The teaching process is also affected as Monique has to engage in redirecting students to 'on task' behaviours rather than facilitate their learning. She had to remind her students, "Boys are you covering those themes because every time I see you, you're doing nothing" (Observation 2, Monique Valley School, July 2015).

These challenges caused by the unreliable ICT devices and difficulties accessing the school's learning management system that Monique faces in the early stage of implementing a BYODD program are not characteristics of conditions for transformational learning. Kalantzis and Cope (2012b) describe these architectonic dimensions as characterised by a level of resourcing and infrastructure that enables a high level of ICT integration. Students'

inability to access information not only delays the learning process but creates distractions to students' learning.

Miriam, also engages with positive constructs when she expresses her belief about the value of the iPad as a learning tool:

> Lyn: You believe it is valuable as a learning tool?
> Miriam: Yes definitely it's valuable. It definitely does increase engagement and motivation in the students in class. You know sometimes it can be distracting in terms of testing out new apps and not really sure what they're doing all that sort of thing but I think that most of the time it's definitely valuable. We can definitely see an increase in only 5 weeks that the motivation is there for learning. (Interview, Miriam Valley School, July 2015)

Her stated belief in the value of the device and its relevance for learning through increased student engagement and motivation is a critical factor, as argued in Prestridge (2012). Miriam's belief in its use to promote engagement and motivation is aligning with her daily practice of designing planned sequences of learning activities using Google slides and integrating the use of the iPad across all key learning areas. This alignment of engagement with learning, is also enacted in the technology integration during Instructional Rounds that she plans for her colleagues in her role as eLearning Coordinator to build teacher capacity: "We want to show that we're using our devices across all KLAs and still trying to instil the same skills so no matter what the KLA is. They're still showing collaboration, problem solving, all those sorts of things" (Interview, Miriam Valley School, March 2015).

Miriam acknowledges the positive effect of the device on increased student engagement and motivation. However, she also acknowledges the ease with which it distracts

students from their learning. This is observed during a Mathematics lesson as a group of children are given a task to locate multiplication and division games on sites using their iPads. While some engage more fully, “Look. There’s a Year 3 site” (Observation 1, student Valley School, March 2015), others become easily distracted by the images and other information they view as they explore and are consequently less productive.

Her colleague shares the same view about the distractive qualities of the iPad acknowledging in her interview, “They don’t often finish because they get into, they see something else... it’s so easy to get off track when you’ve got an ipad open” (Interview, Monique Valley School, March 2015).

Although the teachers’ positive attitude and beliefs are driving the implementation of ICT in the classroom, the distractive effect of the device is having a negative effect on student learning when they are not able to apply perseverance to complete set tasks. As a result, their knowledge making process is negatively impacted and the teacher has to pause frequently to encourage students to refocus on the task at hand.

Kalantzis and Cope (2012b) describe development of the ‘kinds of persons’ demonstrating attributes of perseverance as they move between different ways of knowing. Students allowing themselves to become distracted with their own personal device as a critical learning tool, not yet able to move efficiently between stages in the knowledge making process, are not displaying attributes of transformational learning.

The very context of the introductory year for a BYODD classroom requires both teachers and students to navigate together the breadth of possibilities for the iPad as a learning tool. The teachers’ positive attitudes and beliefs about towards learning with ICT are proving useful for managing and working through the inevitable challenges encountered, particularly in the initial period of introduction.

At the same time these challenges can also provide a platform for students to learn problem solving skills, flexibility and adaptability as Monique explains:

> When I say problems I mean like little issues that come up, it's been really good because we all collaborate together and then someone will say… like the other day a boy discovered, 'You can put a pictures on slides' but then it turns out that if you do that you have to convert it to Powerpoint. So then they couldn't collaborate and share anything. When they're collaborating they can work on the same document. So they have to make that decision 'Am I going to keep it as a power point and add pictures and make it look gorgeous or are we all going to collaborate?' So out of all these issues we've been having that I can't solve because I'm not the techno guru um a lot of learning is happening, a lot of discussion. (Interview, Monique Valley School, March 2015)

This situation is requiring students to be discerning and exercise choice. Are they going to individually produce an attractively presented piece of work or are they going to collaborate in partnership with their classmates to complete the task? The decision may depend on the task requirements or if not, it may come down to personal choice. It is requiring however, that students engage fully with the task to determine the most appropriate method for recording. Lankshear and Knobel (2011) maintain "as teachers, our role is not simply to be technocrats"(p. 36).

The teacher's positive attitude as a learner is providing an effective model for her students of how to approach learning with and through ICT. At the same time she is also providing relevant contexts for supporting their knowledge and understanding of learning about ICT. By acknowledging her own limitations and accepting an offer of help from one of her students when she is having trouble displaying an image on her iPad she is modelling vital attributes for 21st century learners. The teachers' own personal constructs are fostering an understanding that they too are learners and accept they don't have all the answers. They are open to learning from their students. Supported by their attitudes and beliefs teachers are seen to be "letting go of their position of command… allowing that things will go wrong"

(Kalantzis & Cope, 2012b, p. 73). Teachers' personal constructs, their beliefs and views about ICT and its place in teaching and learning, are influencing factors of ICT transformative learning.

5.3 Pedagogical Practice

Twenty- first Century Learning Skills

Monique describes her approach to ICT pedagogical practice as influenced by 21st century learning skills. She acknowledges the importance of her students developing the skills of collaboration and problem solving as they engage with the new curriculum. She describes some characteristics of her choices for learning experiences:

> Lyn: So what choices of learning experiences or strategies to work with the children do you use? Why do you choose them?
> Monique: With ICT? As I said we've always got it in their mind that it's not something that they can do with pen or paper. Always keeping in mind the new curriculum of being 21st century learners who collaborate, who problem solve sort of thing so that's what we've got. We've got a PLC at the moment about um and our inquiry question is how can you know we get them to be 21st century learners using a range of apps, collaborating and all that. So that's normally what we think about. Trying to get them to not just sort of you know fill out a worksheet or play a game. Getting them explaining their learning and reflecting what they've learnt, demonstrating what they've learnt through technology as well. (Interview Monique Valley School March 2015)

Monique is relating how she positions her students as participants in the knowledge making process and alerts them to that by bringing it to their attention that they are not just substituting pen and paper for an iPad. This is serving to encourage the development of

learners who are called upon to challenge themselves. Monique describes a student-centered approach to pedagogy that demonstrates awareness of the conditions for more active makers of knowledge as they engage in learning and then demonstrate their understanding. But what does this look like in the classroom?

Creating optimum conditions for student-centered learning requires a shared understanding around expectations of student engagement. When students are expected to be collaborating on a task in English, many of them are quite content to leave it to the more confident students in the groups of three to complete most of the task. Two students are observed to sit quietly and watch while their friend records in 'Book Creator' a response task to a recently read text requiring the use of descriptive language, "Once there was a mysterious forest that had a vicious bear (sic) his name was biter (sic) his hearing wasn't very good, (sic) he was half deaf." When asked what happens with the story when it's finished, they reply, "When it's finished we share it. Then the teacher can mark it" (Observation 3, student Valley School, October 2015). There is an expectation by the teacher that they collaborate but no demonstrated understanding by the students of what collaboration looks like or their individual roles and responsibilities in the group. The story that will be shared among all three is predominantly the work of one student and they are content to acknowledge the work as their own. Therefore, the task designed to be collaborative has thus become one that is cooperative.

Student-centered learning engaging in the development of 21st century learning skills such as collaboration and problem solving requires a level of understanding by the teacher of what these look like in practice. The teacher needs to clearly understand the purpose and design of the task and articulate this to the students. It is successfully achieved at another time however, when students demonstrate a much better understanding of negotiating a collaborative task and problem solving. During an observation session, they work independently through a series of tasks in a HSIE lesson. One of the tasks is to create an

advertisement for a significant Australian tourist site. For this they collaborate with friends to work together and negotiate their roles to make an iMovie adding text, images and voice. Another pair of students working on another task, complete writing their dialogue and ask a student to video them as they introduce the 'Bungle Bungle News'. A student working by herself is using 'Google Earth' to locate the site of the Big Merino as she researches non-aboriginal place names.

An approach to ICT pedagogical practice that is influenced by development of 21st century learning skills, requires shared understanding of what it can look like in the classroom, knowledge of the purpose and design of the task and expectations of students. Teachers are designers of pedagogy and students are co-designers of their learning (Kalantzis & Cope, 2012b). Monique's description of her student-centred approach is a reality in the classroom however, without a shared understanding of what this entails being demonstrated by the students, not being co-designers in their learning, successful transformation of learning does not always occur.

Knowledge of the Student as a Learner

Miriam reveals an approach towards ICT pedagogies that is influenced by her knowledge of her students and their strengths as learners, in particular the ability of one of her students:

> Lyn: So what or who influences your ICT practice?
>
> Miriam: (Laughs) Amm. I think it's probably, um, I think it's the kids in my class. They, um, push me to always wanting more. And I think that, um, I have, I have one severely autistic child um and he is..absolutely amazing with technology. He is designing an app at the moment. So I kind of feel like I need to not be up to his standard, because I don't have that kind of brain but to constantly be able to challenge them in terms of even inquiry, um you know, saying 'That's a chair. It's a chair and it's been made to sit on what else can you use that chair for?' So just extending them in that way

> in terms of thinking outside the box and saying 'Yeah that's an iPad and yes it has apps on it but what else can you do with that iPad? Like it has to have more than one use. It can't be just something that's a single use. It's got to have something else you can do with it. What else can you do with it?' So whether it is a specific app, or the iPad or the camera or whatever it is, yeah, I'm trying to get them to be that outside the box thinkers and inquiry minders so that, you know, when they see something they can say I can do this, this, this, this and this with that, rather than yeah it's a green screen app so I can only make a green screen video. That's it yeah. (Interview, Miriam Valley School, July 2015)

This response is describing an approach to pedagogical practice that is driven by a connection with a student who 'pushes' her to enhance and extend their learning. Her knowledge of the attributes of this student is allowing her to design the way her students will learn named as the 'knowledge' element of their School Wide Pedagogy (SWP) in the teaching program. Knowing this student, his prior experiences and his interests, is creating opportunities for Miriam to engage this student in challenging activities at his level of need, making allowances for different learning styles and allowing him to share knowledge and work on different things at different times.

At the same time Miriam is also revealing what she sees as her own limitations and narrow knowledge, attempting to find a way to work with these perceived shortcomings by fostering critical thinking with her students. This reflects an approach to pedagogy underpinned by an understanding that acknowledges thinking and inquiry as processes in learning. Miriam's desired outcome for her students is that they develop thinking skills to create meaning therefore she talks about extending them by providing opportunities to see beyond what is actually there in front of them and imagine what else it could possibly be. She

is creating an image for us of students also thinking about what else may be possible when using ICT as a tool for learning. Encouraging students to examine, question and consider 'what else' they can do with a device is providing opportunities for them to engage in a knowledge process. They are moving from experiencing the known to exploring and experiencing what is unfamiliar and new (Kalantzis & Cope, 2012b). By asking 'What else can you do with it?' the students are given opportunities to critically reflect on what they know and apply that knowledge to create something new. It is creating conditions for students to move beyond an experience of using ICT as a tool to produce the same, which is a feature of authentic education, to an opportunity for innovation and applying creatively, which are elements of transformative education.

While being driven by a pedagogical approach influenced by the needs of one student, all students' needs are equally important. During classroom observation of a Mathematics lesson, the students most 'at risk' for learning are supported in their student-centered task by the Special Needs teacher. Shapes are placed on carpet using masking tape and children record on the app 'Pic Collage' their estimate and actual area after they placed a series of 10cm squares in the shape. They are able to complete this task with assistance. Other students have mixed results using the same app for an activity placing images on a background and recording their length. One student discerns the composition of the background for her mathematical recording before she adds the title. "I'm going to choose a mathematical background. If I have a colourful background I won't use a colour text" (Observation 1, student Valley School, March 2015). She is then able to move independently around the room to take images of shapes. However, other children completing the same activity are not able to self regulate sufficiently choosing to spend more time being distracted by images on their camera roll to select for their background rather than complete the task independently. During the same lesson, clarification is needed for many students trying to locate suitable apps already on their device for their multiplication and division task:

> What files can't you use on an ipad?' The children either didn't respond or responded incorrectly to which the teacher added 'Flash. If a game has Flash or Adobe Flash you can't use it on your iPad. Look for another. That's why you are looking for a site and not an app because sites don't need flash. (Observation 3, Miriam Valley School, March 2015).

Some students who continue to persevere with trying to use an app to complete the task eventually end up looking on with others in the group who have accessed an appropriate site. Scaffolding the task to support students with less technical skills and understanding would assist them to achieve success when independently using apps on their iPads.

In another situation, however, Miriam's knowledge of the personal attributes and talents of her students is taken into account and negotiated in the learning context. She explains how she uses ICT to engage her students in Science:

> Lyn: So the direction for leading ICT is sort of coming from your own passion and what you want the children to achieve.
> Miriam: I mean um yeah I think, I don't know that ICT is the passion. I think it's the, I prefer to call it kind of more um allowing kids to show how they learn. So giving them opportunities in different ways so um ICT is not the only way. So I have some amazing artists for example in my classroom so when the Science inquiry project came about from the eBook it wasn't just inquire about something and get up and do a presentation. And it was about OK, if you don't want to do a presentation, make me a model or make a life cycle of some sort. So it was whichever way I can get you to share your information (Interview 2, Miriam Valley School, Term 3 2015).

Miriam's identification of her students' interests and abilities is influencing the ways they come to know and learn. Rather than mandating an oral presentation as proof of learning she adopts a student-centred approach by providing opportunities for student voice and choice. This is allowing them to represent their thinking and apply their knowledge in a form that is most meaningful to them. This may be making a model or a representation of a life cycle, depending on the student's own preference. This practice is also found in the HSIE teaching program that explores Aboriginal life (Appendix B). The program states that children are able to choose a task, based on their own inquiry question or choose from one of four tasks. They are also able to choose their mode of presentation, within given applications such as Google Drive, iMovie, Powerpoint, Glogster, Bubblus or Wordle to present their assessment task.

A learner-centred approach to pedagogical practice that encourages development of the "capacity to take responsibility for one's own learning" (Crick & Wilson, 2010, p. 362), supports lifelong learning skills and is a characteristic of the moral dimension of transformational education. For this approach to successfully transform learning, it requires a shift in the balance of agency with teachers ceding power to the students (Crossley & Corbyn, 2010) allowing them to be more actively involved in the knowledge making process (Kalantzis & Cope, 2012b). Teachers need to facilitate knowledge creation:

> Only through student-directed modes of learning can learners acquire 'productive' skills, problem-solving skills, independent learning skills and/or skills for lifelong learning. Learning has to be organized in such a way that learners can learn how to become (more or less) architects of their own learning processes, with the help of professional coaches (teachers and others). (Pelgrum & Law, 2003, p. 31).

Planning and programming for students to have choice to create an inquiry based on their personal interests and to choose a mode of presentation depending on their level of expertise, engages them in this HSIE unit as architects of their learning. However, in other key learning areas that were observed the balance of agency in the design of these activities mostly

remains with the teachers. Although students are observed in English and Mathematics to be actively involved working on different activities, in preferred locations, with like-minded peers and at different times, the process of knowledge making is not as open ended and mainly controlled by the teacher. In these skills based strands of writing, reading and mathematics students are not seen to be "co-designers" (Kalantzis & Cope, 2012b) of their knowledge making.

Knowledge of Students' Prior Learning

Transformative education requires new meaning (Wrigley, Thompson & Lingard, 2012) to be made by the students in their ways of knowing and thinking. This requires an approach to pedagogical practice that consistently takes into account "finding out about learner's prior experiences, interests and aspirations" (Kalantzis & Cope, 2012b, p. 73). The teacher is then able to engage them in work that is of interest and not in something they have mastered previously or that is beyond their level of ability at that point in time. Finding out what all children know or don't know after the teaching program is designed, does not provide immediate opportunities to build on the strengths of all the learners as Miriam discovers during the course of the teaching cycle:

> Lyn: You've talked about the SAMR model before whereabouts on that do you think most of your practice is at the moment?
> Miriam: We're in our early days and because the kids didn't really...although they had experience with Drive last year, they didn't really have the experience of sharing documents. They didn't actually know that you could all work on the same document at the same time…. although we did start that later his term it's definitely shown us those who have those skills and those who clearly need more practice and assistance in it.

> (Interview 1, Miriam Valley School, March 2015).

Miriam is realising the range of levels of her students' understanding of sharing documents with their peers. For these students, to engage in learning with ICT that will take them to a new level of understanding, pedagogical practice that is informed by their prior learning is required. Learning experiences requiring a more sophisticated skill level needs to be planned with full knowledge of students' level of technological skills.

The value of planning a unit of work from a position of sound knowledge of students' prior learning, is experienced, in hindsight, by Monique:

> Lyn: Tell me what have been your experiences using ICT in the classroom and as a result of that...well what were the results of that?
> Monique: Well I guess a lot of the troubleshooting but I guess a lot of the problems I've had with them is assuming they know things. For instance last week I said could you email me something. Well they didn't know how to email. So that's Year 3. They weren't sure a lot of them. Some of them did. They didn't know how to email so we sat down on the floor with our iPads and I put my email address and we practised emailing. So that sort of thing where I assume they do know how to do something (Interview, Monique Valley School, March 2015).

As a teacher in her first experience for several years on a Year 3 class, she is assuming technical understanding and skill that her students do not possess, and planned the lesson accordingly. When the discrepancies in the perceived and actual skill sets are recognised, the lesson's learning intention is changed and the students' are instructed how to send an email and set about practising that skill. Consequently, this is slowing down the learning process

and the approach to transformative education. Although the teacher recognises and attends to the students' learning needs during the lesson, opportunities for innovation, creative application and transformative learning are delayed. Knowledge of the students' prior learning and building on their strengths as learners allows for learning pathways "appropriate to students' capacities" (Kalantzis & Cope, 2012b, p. 73) a characteristic present in transformative learning.

Discourse

Implementing an approach to pedagogical practice that is transformational requires a new level of communication and discourse in the learning environment. Dialogue between learners as well as dialogue between teacher and learner takes place. It is characterised by students actively engaging with peers, working collaboratively on eLearning tasks, sharing reflections of their learning with teachers and classmates and demonstrating their learning while the teacher facilitates the learning by questioning and challenging to guide the learning process (Crick & Wilson, 2010). "The old teaching discourse of command becomes the new learning discourse of dialogue" (Kalantzis & Cope, 2012b p. 71).

Miriam finds that for this to happen, it initially requires a change of thinking on the part of the students, especially around the function of the iPad. She recounts:

> They're not quite collaborating as such at the moment because it's quite new to them at the moment to have it in the classroom as a learning tool. So I think to change the thinking I guess, is maybe the right word, of this iPad or tool being a toy to being a learning device. (Interview 1, Miriam Valley School, March 2015)

Collaborative learning is a characteristic of the proprietary dimension of transformative education (Kalantzis & Cope, 2012b). Miriam admits that students have not yet developed their understanding about the iPad as a tool for learning and therefore they are not demonstrating learning that is being transformed by the level of communication and collaboration in the knowledge making process.

It becomes evident to her during the course of the term though, that the thinking is changing as the students' discourse, even on the playground, focuses on their learning. She recalls interaction between students, "They're walking out to the playground talking to each other 'Oh did you see what I did on that app? Have you tried this?'" (Interview 1, Miriam Valley School, March 2015). Students in the class openly use each other as advisers on their work, "Have I got that right Ollie?" (Observation 2, Monique Valley School July 2015). This type and level of interaction between peers is frequently observed and heard as part of their learning experiences. ICT is utilised during plenaries at the end of Mathematics lessons providing opportunities for student interaction. Students use 'Air Server' to display the websites they have discovered for multiplication and division and engage their peers in the maths activities they discovered. While collaboration is not observed there is a high level of cooperation between students that is observed to be supporting their learning and "lateral communication between students" (Kalantzis & Cope, 2012b, p, 71) is observed.

The level of discourse between student and teacher is also evolving with technology allowing the communication to happen not only during the course of a lesson, as Miriam notes, "They're emailing me so that's quite nice. I think they're appreciating the, um, fact that they can be in contact and ask questions" (Interview 1, Miriam Valley School, March 2015) Student communication with the teacher is beginning to occur outside the classroom. They are not co-located inside the classroom (Kalantzis & Cope, 2012b) yet they are connecting with their teacher. Students are not at the stage where they are regularly sharing their learning with the teacher but are using their device as a tool to support their learning. The teacher's role to is evolving. They are beginning a new discourse of dialogue with their students (Kalantzis & Cope, 2012b).

Monique encourages explanation and reflection as part of the learning process that is a value added capacity of the iPad. She explains "getting them explaining their learning and reflecting what they've learnt, demonstrating what they've learnt through technology as well.

(Interview 1, Monique Valley School, March 2015). This explanation aligns with her practice encouraging her students as part of her plenary at the end of a literacy lesson to practise reflective thinking. “How do you feel about the way you worked? Do you feel you worked well or do you feel you could have worked better?” (Observation 1, Monique Valley School, March 2015). The depth of self-examination in the reply cannot be gauged as it becomes a rhetorical question posed for students to reflect on that day in silence. The opportunity to be self reflective is offered by both teachers. In a maths lesson one of Miriam’s students is heard to ask herself out loud as she completes the reflection activity at the end of a learning sequence, “What do I need help with?” (Observation 3, student Valley School, October 2015). She is engaging in self reflection that promotes a deeper understanding of what she knows. These types of assessment activities with a source of feedback other than the teacher, are formative rather than summative and are assessments for learning (Kalantzis & Cope, 2012c). They are characteristics of the proprietary dimension of transformative education. While students were not using any device to record electronically, they were reflecting on their level of engagement and understanding in a learning task that required the use of their iPad.

5.4 Hindrance to ICT Pedagogical Practice

Schibeci et al., (2008) in their study of primary teachers conclude that time is a critical factor in ICT progression and necessity to challenging existing teacher practice. Miriam cites time as her biggest hindrance to ICT pedagogical practice:

> Lyn: What do you think is the biggest hindrance to your ICT practice in the classroom?
>
> Miriam: Time. Time is massive. I think um that once the kids become more confident with using their device and all the apps that are on there I think it will be a lot easier. But I think that the kids are still so excited that they have an iPad at school. It’s theirs and they don’t have to share it with

> anybody it's just still so exciting but I think the time it takes for me as a teacher to create and think of different ways where I can use the apps and the iPads. Planning….and also to because you can plan things on websites when you know you've got laptops in the classroom but they don't always work on the iPads. I've done it before where I found this great website. This group can play this maths game. I'll just make a QR code, where they can scan it and get straight onto the website that way there's no time for them to be finding the right site and googling it and all that sort of stuff. Then you realise they go to scan the QR code and it uses flash player or something. So then they can't get onto it. They can't play it. So it's let's wait a second I'll go back and find something else. So it's just that whole making sure that everything works. (Interview 1, Miriam Valley School, March 2015)

Time is significant here, for both the teacher and students are learners using ICT, albeit at different stages. Miriam notes she needs time to create, think and plan her teaching program. When implementing such an innovative program as BYODD, she requires time to explore apps and sites to make sure that the learning experiences are going to work efficiently in the classroom to maximise teaching and learning time. More time to prepare a learning task may have avoided students running out of time to complete their work, as Miriam recalls, "Yeah. So it was just so hard for them to do, they didn't have enough time to go further with that inquiry. They ran out of time" (Interview 2, Miriam Valley School, July 2015).

The students too, need time to become more confident with their device. In the first year of the BYODD program, they need time to develop technical skill and understanding at the same time as learning to use their iPad as a learning tool rather than a game device. Monique reminds her students after their English lesson, "When we use technology, it is a

learning tool, a fun way to learn but we still have to do the task we were asked to do" (Observation 2, Monique Valley School, July 2015).

Monique also notes time as a challenge, "I mean, me finding time to get to know all the apps they we've downloaded because they've had to have a certain amount of apps downloaded when they came in, in January" (Interview 1, Monique Valley School, March 2015). This lack of familiarity with the teaching tool challenges the teacher's ability to be a designer of pedagogy an important characteristic of the pedagogical dimension (Kalantzis & Cope, 2012b). She sees herself as a co-learner but does not have sufficient time to practice. She was then assured by her grade partner that, "they'll (students) know what to do" (Interview 1, Monique Valley School, March 2015). This alleviates her concern about her lack of preparation.

However, it is the device itself and its limitations with the function of Google apps on the iPad, that Monique finds the biggest hindrance to ICT pedagogical practice:

> I think the ipad has limitations...last year I used Macs with my kids. We still used Google apps so we could still use apps at certain times and I allowed them to download a few games at times. If I allowed them to they could play and so you still have Google apps. So just at the moment I'm finding that a little hard you know with the ipad but that might just be me. (Interview 1, Monique Valley School, March 2015)

Monique's prior experience with a different device is challenging her practice but she is persevering none the less. Adopting a new tool for teaching and learning takes time. The significance of time as a factor in teaching and learning implications is a conclusion reached by teachers in the Sydney Catholic Primary Schools' BYODD pilot program (Appendix C). They listed "...time and opportunity to explore the device personally and to become familiar with apps" (CEO, 2013, p. 19), as the third most useful professional development strategy. Both Miriam and Monique note time as a hindrance to their ICT pedagogical practice. Time for them to develop their knowledge and understanding of the breadth of opportunities for the

iPad as a teaching and learning tool as well plan and design learning experiences, that are inclusive, differentiated and build on the strengths of the learner (Kalantzis & Cope, 2012b) so as to transform learning is a challenge for the teachers and a critical factor in ICT integration.

5.5 Leadership Practices

ICT transformative practice cannot occur without support and leadership (Becta, 2008). School leadership, in particular, "is central in enabling teachers to engage in innovative practice" (Scrimshaw, 2004, p. 5), therefore the role of the eLearning Coordinator as part of the leadership structure at the Valley school requires analysis to identify factors influencing transformative practice.

The first year of implementation of the BYODD program in Year 3 and Kindergarten is supported by the Principal's appointment of the eLearning Coordinator as a member of the school leadership team and Year 3 teacher. However, in 2015 Miriam was asked to coordinate Mathematics K-6 as well as eLearning. To undertake this role she is released one day a week from her class teacher position where she tries with inconsistent success, as she herself notes, to divide her time evenly between Mathematics and eLearning, "but obviously different things come up and some things take more time than others at certain times" (Interview 2, Miriam Valley School, July 2015). She acknowledges the necessity to have someone to support colleagues especially those reluctant ones or those uncomfortable with ICT, when she says:

> I think the person having time to come in. I mean I used to do a lot more classroom visits before Maths got added to my (laugh) agenda but you know in my day out I would go in and you know visit classrooms and I would have a sort of sheet where people could book me in and say 'I really need help with green screen' or whatever. And I'll go in for a session and help them out but obviously now with Maths that's kind of disappeared a little bit. (Interview 2, Miriam Valley School, July 2015)

The demands on one person for quality effectiveness in the role of eLearning and Mathematics Coordinator present challenges for Miriam at both a personal and professional level. She is aware of the needs of her colleagues and is also aware that she cannot always attend to them in her allocated Coordinator release time of one day per week as diligently as she previously did before Mathematics was introduced to her leadership role.

During her release, she engages in developing teacher confidence and knowledge about the possibilities for ICT integration in the curriculum. She recalls:

> At the moment a lot of it is about getting teachers comfortable and confident with using the technology that they have in the classroom. It's good to get those teachers that aren't BYODD looking at the way different apps can be used in the classroom. (Interview 2, Miriam Valley School, July 2015)

Crossley and Corbyn (2010) note that building confidence and momentum among teachers demonstrates characteristics of school cultural dynamics that are prerequisites for transformation. When asked about the support she gives to her colleagues Miriam answered:

> I guess a sounding board is firstly the type of support I give because people have issues with technology all the time and it's kind of like this isn't working. So I try to be understanding, I guess in terms of using ICT because it's a drama. (Interview 1, Miriam Valley School, March 2015)

Miriam is acknowledging the challenges that ICT pedagogical practice present for teachers. She concedes it's challenging and she explains, "I also did class support last year where teachers would nominate what they were doing and I would go in and help them with their ICT at the time they allocated" (Interview 1, Miriam Valley School, March 2015). Whilst this approach supports the positive conditions necessary for influencing pedagogical practice and a higher level of ICT integration (Tondeur et al., 2009), it is not sufficient in itself to embed and sustain practice that is transformative. It requires a degree a forward thinking and

planning at a whole school level around teacher support, resourcing, working through technical issues and pedagogical practice.

Miriam describes other leadership practices that she employs that are more strategically planned and implemented:

> We ran things like the Web 2.0 course after school for teachers that hadn't completed that. We also had App Tuesdays for teachers so we would introduce a new app each week and give a brief summary of how you could use it in the classroom and give the teachers who came, opportunities to use it and add it to our Google Plus page so that they could show their learning as it happened. (Interview Miriam Valley School March 2015)

Miriam, after having identified teacher needs, works collaboratively, as identified by 'we' to implement targeted professional development. These sessions are voluntary, running after school, and are not part of the ninety minutes weekly professional development requirement. Although it allows some teachers to opt out of voluntary Professional Development, it also provides them with the opportunity to take personal responsibility for their own professional learning and attend small group PD sessions responsive to their own professional needs (Schibeci et al., 2008).

Adding to a 'Google plus' page encourages pedagogical practice to be shared among school colleagues and provides a platform for individual innovative teachers to share the practice with like-minded professional collaborators anywhere and anytime. However, not all teachers engage in this practice. Miriam recounts, "I hope I am in some way influencing the way they do it but um also I'm hoping that if they come across something or if they make a, you know, discovery of some sort that they share it as well" (Interview 2, Miriam Valley School, July 2015).

Professional Development that is collaboratively planned and supported by members of the leadership team is delivered to teachers at their level of need:

> Lyn: What about Professional Development in school or out of school? I know you've already talked a little bit about it.
> Miriam: Yes we do obviously have a staff meeting once or twice a term depending on other factors. So we had a staff meeting this term on Teacher Dashboard. It was a bit of a refresher because we have 3 new staff members this year so we split teachers into groups so the people who were using it and quite confident became leaders and taught depending on the other levels of the teachers. Then we've done, I've done other staff meetings using the SAMR model with teachers on Twitter - how you can use Twitter in the classroom, on Digital Citizenship with kids like finding resources and sharing that with staff and making sure the kids are all on the same page with Digital Citizenship. Then we've got like I said before Cloudshare next term. Jim Tate will be coming in next term to work with the BYODD classes. (Interview 1, Miriam Valley School, March 2015).

This creates conditions and opportunities for colleagues to learn from and with each other. Teachers are grouped according to their knowledge and level of skill with implementing the Web2.0 tools that support personalised learning for students. Miriam also notes that this provides opportunities for more confident teachers to become leaders by supporting the skills development of their peers.

Monique refers to the leadership practice that is shared by the school's Assistant Principal, "I guess like our AP and in so far as, and we're still talking about technology she's very supportive of our learning but probably not because she's not an expert in technology either" (Interview 1, Monique Valley School, March 2015). The practice of the Assistant Principal undertaking class observations is embedded in whole school practice and does not seem to bother Monique when asked by the Assistant Principal, "Do you mind if I come in?"

(Observation 3, Monique Valley School, October 2015). These class observations provide opportunities for the Assistant Principal to demonstrate the type of supportive leadership that create opportunities for good practice with Web2.0 tools by affirming the teacher's selection of text that students are interacting with on their ipads. Monique's selection of appropriate resources is acknowledged, "Where did you get these texts? They're good" (Observation 3, Monique Valley School, October 2015).

Analysis of leadership team practices at the Valley school focus on the role of the eLearning Coordinator in leading ICT integration and the implementation of the BYODD program. As part of the leadership team she has shared responsibility with the Principal and Assistant Principal for guiding successful ICT integration and developing ICT pedagogical practices. Her interactions and leadership practices are observed to actively foster support and affirmation for the development of ICT pedagogy. She develops a collegial relationship with her colleague teacher that is acknowledged as supporting her learning journey. Miriam actively engages in developing knowledge and confidence and delivers professional learning for teachers at their level of need. She also designs opportunities for teachers to learn from each other. However, she finds her combined leadership role very challenging and does not have enough release time to successfully embed consistent ICT integration across the school. This chapter has analysed aspects of teaching and learning at the Valley school. It began with an analysis of teachers' attitudes and beliefs. It analysed features of their pedagogical practice including developing 21st century learning skills, knowledge of the student as a learner, knowledge of students' prior learning and discourse. It provided analysis of hindrances to ICT pedagogies and concluded with an analysis of leadership practices at the school.

The following chapter is a case study of the second school in the study, the River school.

CHAPTER 6 A CASE STUDY OF THE RIVER SCHOOL

6.1 Introduction

The highly multicultural River school is described on its website as being both unique and complex with a focus on learning and innovation. Their current school wide pedagogy acknowledges the implementation of learning principles that aim to develop lifelong learners in an innovative environment. They name these principles as 'futuristic, adaptable, connected, empowering and spiritual'. The River school maintains that these principles recognise students' diverse needs and their strengths, value the importance of relationships in learning and promote collaborative learning in a contemporary learning environment.

The whole school framework through which these pedagogical principles occurs is 'Design Thinking', which is a process engaging students in inquiry and reflective practice and developing creative thinking skills by becoming problem finders. It promotes mindsets to discover new ways of doing things as well as questioning why we do things the way we do (McIntosh, 2014). The whole school incorporates 'Design Thinking' into its daily practice by providing planned opportunities for students to become critical and creative thinkers as they are encouraged to feel, imagine, do and share (Appendix A).

Curriculum is planned to engage students in this process beginning with immersing in research and observation, synthesising to explore problems, creating prototypes to show understanding or solve a problem and finally displaying and celebrating their learning (McIntosh, 2014). The Year 3 teacher Colin explains the benefits of using ICT to develop the process:

> In the inquiry learning it gives the kids an opportunity to use imovie and create their own re-enactments of events we've been talking about. For instance we're doing a subject around the First Fleet and the arrival of the First Fleet so what they were doing with the iMovie was to create their own re-enactments. And so one group would be re-

> enacting as the aboriginals and how their reactions were when the first fleet came in. (Interview 1, Colin River School, March 2015)

Although the school promotes the framework of 'Design Thinking', Colin names the process he uses in his classroom as 'Inquiry Learning' rather than 'Design Thinking". The process of inquiry is broad and involves students accessing, selecting, organising and interpreting information and data to create new understandings while using ICT creatively and imaginatively (Curriculum Corporation, 2006). Colin sees merit in learning that allows students to experience and be reflective on life in the very early days in Australia's history and apply this new knowledge in the creation of their presentation using ICT. He is articulating a connection between inquiry learning and the unit of work recently undertaken rather than a connection between the specific school wide framework of 'Design Thinking' and the unit of work. This suggests a lack of ownership of the framework that could reflect the manner in which school planning occurs or commitment to whole school practice. Planning for the process of 'Design Thinking' is given priority and dedicated time at the end of each year by the school's leadership team that meets to cluster outcomes as they plan learning outcomes for each stage. Christine, as the eLearning and Mathematics Coordinator participates in this process. Teams of teachers then work together to design teaching and learning programs that are supported by the integration of ICT as a tool for learning. Christine leads this collaborative programming with Colin and Connie, the Stage 2 teachers.

Students in the study are situated across three classrooms divided by glass panels enabling clear observation of the three rooms. There are Year 3 and Year 4 students located in each room. The ICT resources are shared across the grade. There are twenty-seven devices shared across the three classes. The twelve chromebooks are housed in the middle classroom and there are five iPads in each class. The teacher has a device that is sometimes used by the students when necessary.

The approach to planning at River school that is designed to support an inquiry based learning process through a specific framework utilising ICT as a tool and the amount of technology that students can regularly access provide a rich source of data for exploring ICT transformative practices.

This case study analyses factors at the River school that influence ICT transformative learning. The teachers' attitudes and beliefs and their pedagogical practice are detailed. An analysis of hindrances to ICT pedagogies and leadership practices at the school is also presented.

6.2 Attitudes and Beliefs about ICT

Prestridge (2012) states "teachers form their own beliefs about the role of ICT as a teaching tool, the value of ICT for student learning outcomes and their own personal confidence and competency. These beliefs intersect with teachers' established pedagogical beliefs" (p. 449). At the River school Christine's approach to ICT pedagogy is formed by her attitudes and beliefs about the importance of ICT in the life of her students, "Well it's as I mentioned before it's a way of life. We use ICT in so many different areas of our life and I know the students use it and they relate to it. It's just what they know. It's a part of their everyday" (Interview 1, Christine River School, March 2015).

She names it as being essential in the 21st century because children are "saturated with ICT" and use it all the time in many aspects of daily life. Christine recognises that students use ICT out of school and knows that it's part of who they are and their daily experiences in the society in which they live. She acknowledges the relevance and importance of ICT in the daily life of her students and identifies their engagement with it as the reason for its integration across the key learning areas in the Stage 2 teaching program. "I think it is really important to use it in the classroom….so yea it does depend on the task as I said before, using 'ABC Reading Eggs' is exactly the same as reading a book but I knew that it would engage them more so yes it does depend on the task and their skills too and what they're able to do"

(Interview 1, Christine River School, March 2015). Students' reading skills are being developed through the online program 'ABC Reading Eggs' which they individually access at least once a week using chromebooks in their daily literacy lessons. Knowing that her students use technology and relate to it is reflected in this regular use of ICT to support and enhance the delivery of curriculum.

Colin shares Christine's position about the importance of ICT in students' lives. He acknowledges the necessity of ICT in today's world:

> Lyn: So I guess you believe then that it is important.
> Colin: Oh I think it's definitely important particularly when they get into high school. They get into um the world outside of learning, the world outside of the first 18 years of their life. It's all ICT. It's all you do. You do your banking online, you do everything so you can't really survive unless you've got a good grasp of information communication technology. So I think if they don't have it, it's um putting the kids on backward step because when they get, when they have to do it and they really need it to get ahead in life, they're going to be behind. So they really need to have that, that um yeah that skill because the world is going in a direction where everything is ICT. If your car breaks down and you don't know ICT you might have to download a program and if you don't have any clue how to do that it's definitely a challenge. (Interview 1, Colin River School, March 2015).

Colin is recognising the need for students to develop ICT skills and that if it's not introduced to children when they are young then it's putting them 'on a backward step' as they prepare for life after they turn 18. He recognises the importance of ICT skills in the future, rather than the present lives of students and views the teaching of these skills as having a functional

purpose supporting activities such as banking and car maintenance when they are older. This functional purpose is demonstrated when Colin uses ICT as a platform to send learning tasks in the middle of a maths lesson to his students that they then access through their Google Drive app on their chromebooks. "There's a 3D modelling task I want you to open up. Have you got Drive open? If others have got theirs open they can complete the activity…You should be getting it through now" (Observation 3, Colin River School, August 2015).

Colin and Christine's ICT practice is underpinned by their view on the widespread use and usefulness of technology in everyday life. Prestridge (2012) identifies this approach as demonstrating a focus of the functionality of ICT. This functional approach informs many of the tasks set for students in the daily Literacy lessons observed during the Term 1 and 2 visits. The ninety-nine students across the stage share twenty-seven devices and have literacy and numeracy lessons scheduled at the same time. During observation of a literacy lesson some groups work with the teachers developing reading comprehension skills, others work individually completing written tasks while nine students in each class are able to use chromebooks and iPads. The use of chromebooks to log on to the 'ABC Reading Eggs' to develop reading comprehension skills is a daily activity as well as the use of ipads with headphones for the interactive 'Rosetta Stone'. The Sydney CEO is funding the implementation of this language learning program that monitors students' progress online, allowing progression through the program via multiple levels. Students access this site individually to orally practice a language of their choice. Most of the students have a language background other than English (LBOTE) and choose to learn their home language such as Mandarin, Italian and Arabic. The use of technology is dependent on the number of shared devices available to the three teachers as Christine explains:

> At times depending how many children need the technology it can be difficult. If it's a group of about 5 to 6 we separate, like we give each classroom in Stage 2 say 4 macbooks and 5 Ipads so it works in that way. But if you wanted the whole class to do

> a particular ICT task it can be a little bit tricky with all those students. (Interview 1, Christine, River School, March 2015)

Integrating their limited number of devices in this way in daily literacy sessions serves to support the teacher's organisational pedagogical practices rather than transform learning. It provides opportunities for the teacher to conduct a guided reading session with a small group while continuing to oversee the other groups of students. At the same time the nature of the tasks students engage in does allow a level of differentiated learning with "learners working on different things at the same time" (Kalantzis & Cope, 2012, p. 73). Students are developing their reading skills at their level of need when they engage with the online reading program. Students who have not yet mastered their home language are able to access a website and learn at their own pace. While the teacher is focusing on the group at hand, others using ICT are expected to display a level of self-regulation. Four students using the Rosetta Stone apply themselves to their task, perhaps because they are wearing headphones and can be heard talking in their home language. This activity is building on the strengths of the learner (Kalantzis & Cope, 2012b). Five students working online with Reading Eggs have varying success. One student is delayed in starting his task firstly because his chromebook is not charged. The teacher notices him and directs him to find another device. He then experiences problems with his password. Rather than bother the teacher who is with the reading group he asks his peers for assistance. Having delayed his own learning time he then interrupts the learning of his peers. Other students display varying levels of perseverance and task completion, a characteristic of the moral dimension to support lifelong learning.

Connie also focuses on the functional purpose of ICT when she describes the use of the iPad in a HSIE lesson:

> "We might print out the QR code on a task card and write what they have to do and have some questions related to the clip that they're going to access. So we just did one on British Colonisation. So they had to use the QR code. So they got an iPad and

> scanned to the QR code then that took them to a site on British Colonisation. It was just a way of freeing up the teacher so they could go to another group and support them. They could get the information easily and they liked that because it's just an interactive way of doing it and in a different way." (Interview 1, Connie River School, March 2015)

This use of mobile devices to direct students immediately to a source for their research allows the teacher more freedom to move amongst groups to facilitate their learning. While the device has a functional purpose, serving as a tool for viewing, its use, as described by the teacher also creates opportunities for teachers to personalise the learning task to suit individual or group needs. Integrating iPads to support learning in this way is providing teachers with "opportunities to shift from teacher-centred to student-centred learning" (Moyle, 2006, p. 52). It is worth noting that rather than this form of student-centered learning giving the teacher more freedom it actually requires a high level of teacher input around expectations of student involvement beforehand and active participation by the teacher during the lesson to ensure its success.

The functional purpose of ICT extends also to the effect it has on the motivation of students (Crossley & Corbin, 2010). Christine's students are motivated to a point where 'their eyes light up' when she directs their continued focus in a Mathematics lesson by encouraging them to move onto working with an online digital resource. She describes that motivation and excitement:

> Lyn: Ok, let me see, so just looking at the work that you do with ICT, do you think it makes a difference to their learning?
> Christine: I definitely see that engagement is really high. That even before we were, with my group we were focusing on the drawing skills of 3D objects so a few of the girls finished and I said that if you're finished you can

> go on Scootle and they said 'Yes!' So they get really excited by using technology. Just that engagement is high. They love it. They love using it. They love having it integrated in their work. So I definitely think that it's a positive tool. (Interview 1, Christine River School, March 2015)

By directing her students to the use of the resource 'Scootle', Christine is viewing ICT as "...a tool within a task, not the focus of the lesson..." (Prestridge, 2012, p. 453). ICT is functioning in this instance as a reward for task completion as well as providing a resource for an extension task. Students being observed during a Maths lesson are motivated and engaged, able to sit in a group together but work individually on a 3D task, supporting and helping each other to understand the task. Their 'ontask' behaviour and ability to complete their assigned work is being rewarded and affirmed through the use of ICT. Christine's belief in the function of ICT to motivate and engage is informing her practice.

At River school, the use of ICT by the Stage 2 teachers in their daily English and Mathematics lessons is informed by their attitudes and beliefs in the importance, usefulness and relevance of technology to the lives of their students. They reveal an appreciation of the necessity of developing 'the kinds of persons' (Kalantzis & Cope, 2012b) who will be able to use ICT to navigate through their daily lives. However, a lack of resources for individual students hinders further development and ICT is regularly used for improving reading, maths and language skills. A limited number of chromebooks and iPads commits teachers to a functional approach to ICT use as it enhances and motivates student learning. Teachers are observed to use ICT to facilitate their organisational structures in the classroom, support curriculum delivery and facilitate their classroom practice.

With the focus on functionality, ICT is being used to engage students in their learning but not to take them to a level where they are using it as a tool for creating new knowledge (Kalantzis & Cope, 2012b). ICT serves to facilitate the current structures and teaching

practice in the classroom. With limited resources there is an absence of planned opportunities using ICT for dialogue, knowledge sharing and collaboration critical features of 21st century learning skills and characteristics of the discursive, intersubjective and proprietary dimensions (Kalantzis & Cope, 2012b) of learning that has the capacity to transform.

6.3 Pedagogical Practice

Student and Teacher as Learners

Kalantzis and Cope (2012b) state that a prerequisite for student engagement in transformational learning requires identification of students' motivation and knowledge of their needs and identities. At the River school the teachers' approaches to ICT pedagogical practice are underpinned by their connection and relationship as learners with their students. Colin reveals that his practice is motivated by the enjoyment he observes as his students engage in learning using ICT:

> Lyn: Just two more questions. On the other hand what encourages or enhances your practice of ICT
>
> Colin: The kids enjoying it. That definitely enhances it. But also seeing the actual, some of the things the kids come up with iMovie, it just blows your mind sometimes because you're getting the perspective from them and they're taking the initiative they need to do it. They're showing a side to you that you haven't seen before particularly some of the new students I haven't had before. When they present their work on ICT you see I didn't look at it from that perspective so kids they've got very creative minds and they take it from a different... they might take it somewhere where you didn't think they could. And I think with that as well they can go outside, they can be on their own. They're not embarrassed because they're doing it in front of the kids. They can do it one on one with a kid that they're comfortable with and you're seeing them

> from a different perspective. They're not standing in front of a class which can be very nerve wracking for them. They're doing it in front of a peer or two other peers however the group is situated and so you're getting better work from them I think because you're seeing they're presenting work more comfortably than if they're standing in front of the class like we did when we were at school kind of thing. You go in front of the class and you'll talk and there'll be a teacher at the back marking it. Whereas if you've got it on a thing basically all they're looking at is an iPad or they're looking at a computer screen. It's so much better. They're so much more relaxed and they say things a lot more honest as well. (Interview 1, Colin River School, March 2015)

ICT is providing a lens through which Colin sees his students in a different light. He is gaining insight into their identities as they present work using technology, potentially enabling a better understanding of their needs. The students present for him another perspective, broadening his own understanding, teaching him something he didn't know. He acknowledges that ICT give his students freedom to create. However, this personal viewpoint is not observed to be enacted in practice in all key learning areas, with students not always observed to be "agents of their own knowledge" (Kalantzis & Cope, 2012a, p. 62).

Colin is also cognisant of the fact that ICT has the potential to open up the learning space and with his colleagues applies this in practice during the HSIE and Science unit of work in Term 3, 'The Damage is Done" (Appendix A). The unit engages students with the real world problem of pollution of their local river and includes and excursion to the river. Their lessons are planned and scheduled to coincide with a time in the school week when students are able to access more devices. During these sessions groups of students are sent to work under the supervision of the Librarian who has access to the teaching program. With many students working in the library, the class teachers facilitate the process of 'Design Thinking' by

opening up the classrooms and adjacent spaces to allow for ease of movement and encourage student interaction and collaboration across the stage as students work in pairs, triads or small groups each with their own device. Students are free to move around within their own classroom to access resources, negotiate with peers and seek assistance from the teacher. This modification is able to happen because students have been removed from their classroom to access digital devices elsewhere thereby creating space in their classrooms and better equity of digital resources. Teachers are aware that their students require better access to ICT and can work more creatively in a learning space designed in a flexible and varied way (Kalantzis & Cope, 2012b).

In her daily teaching, Christine's demonstrates an approach to ICT pedagogical practice that values learners' contributions and challenges the more traditional relationship between teacher and students (Voogt et al., 2013). Working with a small group in the Library, she is introducing the Green Screen app and as students are doing a test run, "After you preview then save to your camera roll if you want to keep it. I'm learning this app with you and we'll learn together" (Observation 2, Christine River School, June 2015). This is affirming the students' role as first time users of this app and is providing a supportive learning environment promoting risk taking. The teacher acknowledges to her students that she does not have all the answers and is also learning. She is giving learners a significant role alongside her, in constructing their own knowledge of the technical requirements for using the app, thereby sharing in the process of learning. Her role as a pedagogue is changing (Kalantzis & Cope, 2012b) as she becomes a co-learner with them, developing a different dimension in the teacher-learner relationship. The learning process she has designed engages students in activities that are contemporary and meaningful to them such as making slide shows and uploading videos to YouTube. These are incorporated as part of the celebration and presentation of their HSIE unit of work, moving the focus of learning "...from

reproducing information and content to content creation and sharing in virtual environments" (Voogt et al., 2013, p 405).

Christine describes her approach as an ICT practitioner when she explains how she incorporates the SAMR Model into her teaching:

> I guess you know I do try as much as possible to get into that transformation stage, for modification and redefinition I think it's important not just to use it as a tool to learn like but a tool of learning so that they're not just learning from it but they're learning through it um so I try as much as I can to have tasks where they need to create something, not just using it as oh read this because that's just the same I guess sometimes it's just as getting a book but having a task that they actually have to create and then demonstrate what they've learned. (Interview 1, Christine River School, March 2015).

She makes reference here to a model of technology integration, developed by Ruben Puentedura, that she uses to help her reflect on her use of ICT as "a tool of learning", attempting to move to the level of transforming student learning by "having a task that they actually have to create". She is aware that students need to be knowledge creators and demonstrate their learning.

This approach to practice is observed when all students across the stage participate in an 'Expo' presenting prototypes for ways of informing their school community about the water quality of the local river. Groups of students, having worked collaboratively in previous lessons use ICT as "a tool of learning" as they present to a real audience of peers, teachers and members of the school's leadership team. Knowledge sharing and collaboration binding collective intelligence (Kalantzis & Cope, 2012b) are central to this learning experience. To enable students and visitors to fully commit to the presentations, classroom furniture is moved and spaces outside the classroom are used for students to set up for their presentations. The visitors move informally around the different groups to listen to students delivering their

message of concern about pollution through different digital tools and modes of communication such as websites, imovies, blogs, slide presentations, raps and prayer services that they have created. One student explains, "We researched information from sites and used photos from our excursion using Google slides. We want to convince people to stop littering" (Student, Observation 2, Christine, River School, June 2015). When asked about the photo she answers "Miss took them on the iPad and shared them with us so we wouldn't drop them", revealing there are features of these student-centred experiences that still remain teacher directed, in this case, for the sake of safety of equipment. Although Christine acknowledges that there is equality in so much as she is learning at the same time with the students, the balance of agency is still with the teacher who has not yet handed over control the knowledge making process. Students who are not being entrusted with taking charge of one of the integral components of a learning task are not creators of their own knowledge. This practice demonstrates teachers are engaging students in researching and solving problems in real world issues. These are characteristics of the moral dimension of transformative learning (Kalantzis & Cope, 2012b). However, while they are engaging in student-centred authentic learning there is still a level of teacher control demonstrated when interacting outside the classroom, by not allowing students to take their own photos with the iPad. Students are not allowed to be fully engaged in co-designing their learning, a characteristic of the pedagogical dimension of transformative learning (Kalantzis & Cope, 2012b). Lack of deep engagement by students in the learning process is not supporting transformative learning.

Teacher Confidence

The three Stage 2 teachers Christine, Colin and Connie describe themselves as having a high level of confidence using ICT. Colin has the view that, "It's something that comes along with teaching in this age so I feel quite confident in that" (Interview 1, Colin River School, March 2015). Christine claims, "But overall I do feel pretty confident in being able to incorporate it"

(Interview 1, Christine River School, March 2015). Connie also maintains she has a high level of confidence in using ICT in the classroom, despite her periods of absence from teaching over the last few years. However this is at odds with a later comment describing her confidence, "I do notice when I graduated I was a lot more confident than that, but that is because I was up to date with the technology but it moves so quickly that you have to keep up with it" (Interview1, Connie River School, March 2015).

A level of confidence that is high is significant since teacher confidence has been linked to the use of ICT to transform curriculum in Australia (Jamieson-Proctor & Finger, 2008) and linked by Condie and Munro (2007), to teachers in schools in the United Kingdom actively trying new approaches and activities with ICT. Teachers at River school confidently use ICT in the classroom, supporting student learning across a variety of key learning areas. Lack of devices requires a high level of pre-planning and organisation and possibly supports this level of confidence. It commits the teachers to safely using ICT to support curriculum. Insufficient hardware is fostering safe practices with technology denying opportunities for seamless ICT integration and a wide range of digital pedagogies.

6.4 Hindrance to ICT Pedagogical Practice

Whilst time is named as impacting on ICT pedagogical practice, all three teachers name lack of resources as a major hindrance to the integration of ICT. Christine states "I find that um, when there's more ICT available it's easier to um, complete a task with the whole class if there was a particular ICT lesson that I was wanting to do or the task as a whole class it's easier that way" (Interview 1, Christine River School, March 2015). She notes here that an increase in devices available to students would assist task completion. This is using ICT to maintain current practice rather than transform. It supports "use of ICT as a tool to achieve established curriculum outcomes with teacher-directed practices" (Prestridge, 2012, p. 455) rather than move towards transformational learning and creating their own knowledge.

Connie agrees that resourcing is a hindrance to practice:

> Lack of technology across a big cohort. And maybe, just not having… I might know of an app and not having, just having access to an app straight away would be good without having to log that and pay for it there and then I won't get it until I don't know when. (Interview 1, Connie River School, March 2015)

She also names the lack of freedom to implement new applications as inhibiting her practice. She feels that the school process of having to record apps that she would like to introduce and then have to wait until the CEO appointed ICT Support Officer (ISO) is able to load them onto the school devices, takes too long. Since the ISO attends the school only three days each fortnight, she would appreciate a more timely response to her request. This lack of understanding about the system and school based processes serves to dampen her enthusiasm for ICT implementation.

Colin names class sizes as hindering practice:

> I think the sheer number of students. It's a big one up there I think having the availability for students to use ICT I think that's up there but also how the students use ICT whether they understand what, like they are using the ICT but do they really why they are using it? What they're benefitting from it. So if they're just using it to write a couple of things down then essentially they could have one of those plastic whiteboards and they're doing the same thing so unless it's been used to the best way, to the highest capacity that the students can do then it could fall short kind of thing. The main interest is the numbers of technology that they have and the students actually use it, so using it to enhance their learning. (Interview 1, Colin River School, March 2015)

The number of students able to access so few devices, is seen by Colin as a hindrance to practice. He therefore, questions arrangements at the moment and the impact it has on enhancing learning. If lack of devices for a large number of students is resulting in the continued use of ICT as a substitute writing tool, he questions its effectiveness. He is

admitting that a lack of devices at the River School is maintaining the level of ICT pedagogical practice rather than improving or transforming it.

6.5 Leadership Practices

In an analysis of the impact of ICT in schools in the United Kingdom, researchers found that "of key importance were the roles of the head teachers and senior staff in taking forward developments, with a clear focus on learning and teaching as well as positive attitudes to the potential of elearning in improving attainment" (Condie & Munro, 2007, p. 71). Technology leaders need to have active involvement with technology (Anderson & Dexter, 2005) and at the River school the eLearning Coordinator, as a key ICT practitioner, is integral to the development of ICT pedagogical practice. This role requires analysis to provide insight into factors that influence ICT transformative practice.

Christine describes her leadership practice as having an influence on the pedagogical practice of her colleagues:

> Lyn: My next question then in what way do you think that you influence the ICT practice of your colleague teachers?
> Christine: Well I feel that I'm someone who's quite welcoming and open so if there's anyone who does come up to me with a question or something I would like to know, I can spend the time helping them out and taking the time to go through things with them, making sure they understand the, even with emails, making sure I answer back. Just making sure I guess that I am assisting them when they need that help and also being able to provide them with different ways of using eLearning tools in the classroom. Um sometimes some staff might come up to me and say 'Christine, I'm thinking of doing this. What do you think I could use to put into my program?' If I don't know then and there I'll have a think about it and get

> back to them. I feel as though I'm quite open like that yeah. (Interview 2, Christine River School, August 2015).

Christine's open approach supports effective communication and invites collaboration with peers that are elements necessary for engaging teachers in transforming their pedagogical practice (Crossley & Corbyn, 2010). Teachers are working within a group of professionals where, not knowing and actively seeking support to become more informed as a consequence of this, is supported by the school's leadership team. They plan and budget for teacher release to work with the eLearning Coordinator, "Last year there were a few days when the Principal and Assistant Principal had allowed teachers to come out with me and I would show them how to use Teacher Dashboard" (Interview 1, Christine River School, March 2015). The Coordinator's personal knowledge becomes common knowledge assisting the development of a knowledge-producing community (Kalantzis & Cope, 2012b). At the same time this promotes a culture of learning among teachers building their knowledge and capacity to transform learning.

The dual role of class teacher and Coordinator places a range of demands on Christine including developing organisational and interpersonal skills:

> So really just in between juggling the classroom side of it and the coordinator side, just trying to find time. But it's funny like this is my sixth year teaching and I feel like I'm kind of back to my….I'm not like in terms of my classroom I don't feel like I'm a first year out but in my Coordinator role I feels like a first year out again. And it's been great… like I've learned so much but I know that there's also a lot more for me to learn and the way that I do things too. And I guess that because I did start here as a beginning teacher, stepping up into coordinator role in that same school is sometimes a little bit hard because there are a lot of staff here who saw me as first year out and now I'm leading. (Interview 2 Christine River School, August 2015)

Christine names time as a challenge as she juggles her leadership role with that of a classroom teacher. Lack of time to plan and develop resources (CEO, 2013) affects her ICT practice in the classroom. She too needs time for personal learning "to look and see what's out there and what the resources are online for a particular app" (Interview 1, Christine River School, March 2015). She feels constrained by time as she tries to make time to improve her own knowledge and understanding of ICT while also trying to maintain confidence.

There is also the issue of having credibility in the eyes of her peers. She acknowledges that the learning culture of the school assists her in her role and "everyone's been really supportive", however, she is still wary that some may still see her as a beginning teacher even though she is now in a position of leadership. She maintains a learning-centred model of leadership herself, displaying the knowledge, skills and attitudes to lead and support her colleagues in adopting new ICT practice. "You need to be confident with it in order to use it, but I think that at the same time you don't need to know it all. Like I think sometimes you just need to do it" (Interview 1, Christine River School, March 2015). Her confidence supports her practice as a learner of ICT. She notes that you don't need to have all the knowledge which is, at times, at odds with the 'safe practice' of ICT pedagogy as observed in daily English and Mathematics lessons and 'teacher only' use of the iPad to take photos on the excursion. Lack of resources on these occasions is enabling safe practice to continue rather than pedagogical beliefs driving ICT student centred environments towards transformational learning.

Christine's divides her leadership role between eLearning and Mathematics as she is responsible for coordinating both at River school:

> I'm juggling both roles. Um I spend my time focusing on one area or the other but sometimes they overlap which is good. So what I do is I help the staff become familiar with all the eLearning tools. I expose it to them. If they would like me to, I am happy to go into the classroom and model it so different apps, different programs that they

> use. So I make sure that they are aware of those different tools. (Interview 2, Christine River School, August 2015)

This approach is supported by her Principal who gives her "so much freedom to do what I think is necessary and that is so good" (Interview 2, Christine River, August 2015) as she provides "situated professional development" (Kopcha, 2012, p. 1110) for her colleagues at their point of need helping to work to overcome the barrier of time constraints (Ertmer et al., 2012; Hew & Brush, 2007) that negatively affect higher-level technology use. Knowing the professional learning needs of the staff and offering support to address those needs is a principle of effective professional development (Kopcha, 2012).

While freedom to develop her instructional leadership is appreciated by Christine, she does acknowledge that, "Sometimes I struggle with that. Sometimes I need a bit of direction" (Interview 2, Christine River School, August 2015). In her role as eLearning Coordinator she does attend professional learning opportunities provided by CEO as well as eLearning Network Meetings and has the opportunity to communicate online with other eLearning Coordinators through the network of 'Google Guides". However, time to attend these opportunities and engage in online conversations occur at the expense of her one day release a week or her time away from work as she explains, "Well having my day out allows me to you know use different eLearning tools or get my head around different tools. I do a lot of work from home too but balance is important, so I try to be. You can be consumed by it" (Interview 2, Christine River School, August 2015).

6.6 Professional Development

As a leader of eLearning Christine' role is to support ICT integration through professional development. ICT professional development at River School is a combination of school based and self directed. Connie is seeing herself as a learner when she states, "You really have to teach yourself a bit because you really have to keep up to date with it" (Interview 1, Connie River School, March 2015).

The eLearning Coordinator plans in advance the school based sessions delivered at a variety of times or following training sessions that she, herself has attended:

> I sometimes just have a look at what the needs are of the staff or if I think there is anything new that I've heard about through emails or eLearning Network Meetings. I collaborate with the Principal and Assistant Principal. Talk to them about it. Have a conversation and then go from there. (Interview 2, Christine River School, August 2015)

Christine notes that her role is "upskilling the staff for themselves and in order to use it (ICT) in the classroom" (Interview 1, Christine River School, August 2015). She explains 'Teacher Professional Development 101' that is held before school, "We put up what we would like to share with the staff, so anyone who is interested can come along. They don't have to. It's voluntary. So I've spent some time doing a few of those sessions (Interview 2, Christine River School, August 2015). Her approach to Professional Development supports the needs of staff with like-minded attitudes and beliefs who want to take responsibility for their own professional learning and development. She admits that not all staff attended these voluntary opportunities so she planned a Staff Meeting to meet others on staff yet demonstrating personal responsibility. "What I did on Monday at our Staff Meeting was that I ran Reading Eggs, Mathletics and Rosetta Stone in the one Staff Meeting. And the staff that would really benefit from it were there" (Interview 2, Christine River School, August 2015).

While voluntary professional development in the use of websites for reading, maths and language skills development, was not taken on board by all, Christine reflects that voluntary sessions in how to apply Google Apps was well received. She notes, "A lot of staff did come to that but I think because it was new and they had to know about it so there were quite a lot of staff that came to that" (Interview 2, Christine River School, August 2015). More teachers attended voluntary professional development sessions covering the application of a range of Google apps rather than attend the voluntary sessions covering training in the

use of various sites to develop student's literacy and numeracy skills. While these all these applications had potential to enhance student learning and ultimately enhance their classroom practice, the use of Google apps in the classroom was a system requirement to support the new Cloudshare learning platform across all Sydney Catholic schools. Staff was aware of this and chose to attend the professional development as they would later be asked to implement it in their teaching program.

Christine's content selection for these sessions aligns with Prestridge's conclusion that the "relationship between competency and confidence will impact the required balance between training and pedagogically focused approaches in ICT professional development" (2012, p. 457). This "balance" requires a more strategic approach to professional development adopted by leadership rather than "just have a look at what I think are the needs of the staff" to ensure there is not an over-emphasis on training at the expense of pedagogy and that teachers engage in a cycle of professional learning that involves "...collaboration, enhancement, enactment and reflection" (Schibeci, 2008, p. 313) to support the transformation of ICT pedagogical practice.

A strategic approach by leadership to professional development requires a tailored program and variety of opportunities (Moyle, 2006) both planned and at point of need to ensure transformational learning. These "should involve both knowing how to use ICT (the technical dimension) together with understanding how to use the technologies to bring about the higher-order thinking (the pedagogical dimension) that is the basis of developing and assessing creative and critical thinking" (Condie & Munro, 2007, p. 28).

This chapter has analysed aspects of teaching and learning at the River school. It began with an analysis of teachers' attitudes and beliefs. It analysed features of their pedagogical practice including students and teachers as learners and teacher confidence. It provided analysis of hindrances to ICT pedagogies and concluded with an analysis of leadership practices at the school.

The following discussion chapter gives an overview of the study and its significance. It discusses the main findings about teachers' personal constructs, time, teacher knowledge and skills and resources as factors that influence digital pedagogies transforming learning.

CHAPTER 7 DISCUSSION

7.1 Introduction

This chapter sets out to discuss the insights and knowledge that has been gained during the study. It provides a summary overview of the study and the significance of the topic. It makes meaning from the themes, the relationships between the variables and the contrasts and comparisons presented. It elaborates the findings about key themes of personal constructs, time, resources and knowledge and skills of pedagogical practice.

7.2 Overview

There is wide inconsistency between expectations for ICT transforming teaching and learning and the delivery of practice of teachers in the classroom. In spite of government funding and visions for 21st learning for students, the integration of ICT into classrooms to deliver 21st learning has been slow (Law et al., 2008). "The demand for the transformation of pedagogy has precipitated a worldwide concern for teacher professional development in ICT" (Prestridge, 2007, p. 3).

Smeets (2005) maintains that ICT has the potential to provide access to and view vast information from a variety of sources, make complex processes easier, facilitate higher order thinking and foster collaborative and differentiated learning. However, the potential for ICT to change teaching and learning has not been reached (Schiller, 2003). Research has found that moving from traditional teaching practices to teaching in a technology rich environment is very challenging for teachers (Chandra & Mills, 2014).

Teachers are daunted and hesitant by the rapid pace of change of ICT (Phelps & Graham, 2008) and there is evidence these powerful technologies are sustaining practice rather than transforming it (Levin & Wadmany, 2008). It is a changing process for teachers to move from learning to use technology to using technology to learn (MCEETYA, 2005). Change has been documented as a complex process. Fullan (1998) cites moral purpose, vision, time and relationships as essential elements in the change process. Complicating this

process are factors such as teachers having to learn to work with rapidly changing ICT resource innovations (Orlando, 2009). Zammit et al. (2007) list time for teachers to access and familiarise themselves with new sources of information and the understanding and practice of new pedagogies as challenges for teachers. These requirements for successful integration of ICT make the complex process of change even more complex.

The teacher's role is transforming to becoming a facilitator of learning (Angers & Machtmes, 2005; Smeets, 2005). No longer are they a pedagogue, standing and delivering but now have expectations as "designers of knowledge-making environments, builders of learning scaffolds, managers of student learning and researchers of learner performance" (Kalantzis & Cope, 2012b, p. 78). These expectations of the changing requirements of the teacher's role to deliver successful ICT integration are taking a long time to become reality. Factors influencing this process have been well documented (Ertmer, 1999; Ertmer & Ottenbreit-Leftwich, 2013; Hew & Brush, 2007; Levin & Wadmany, 2005).

7.3 Significance of Topic

Ertmer (1999) identified first and second order barriers. She contends that first order barriers adjust practice and second order barriers confront teachers' beliefs and change their roles. First order barriers were equipment, training and support while second order barriers were identified as attitudes and beliefs and teaching and assessment practices. Teacher beliefs and attitudes were later identified as the strongest barriers to ICT integration. Addressing these barriers therefore challenge teachers both personally and professionally as it requires engaging with their pedagogical beliefs that have developed over a long period of time that includes their own educational experiences as a student and as a teacher.

A focus on the pedagogy required for ICT integration to deliver powerful learning environments (Smeets, 2005) engages with the principles of transformational learning. Teachers are required to develop knowledge about contemporary learning in a global society, designing new learning experiences and assessment practices and understanding the student

as a learner. To do this they need system and school support to deliver successful contemporary practice in ICT rich environments. However, conditions to support adoption of transformative practice have been found to be missing in most schools (ITL Research, 2011). This study is significant to find out the influencing factors on ICT transformative practices to support a way forward for schools and school principals in developing successful 21st century learners.

7.4 Findings

Through an exploration of the integration of ICT by Stage 2 teachers in two Sydney Catholic primary schools, the study findings reveal insights into the factors influencing ICT transformative practices. It finds that teachers' personal constructs, time, ICT resources and knowledge and skills of pedagogical practice are four critical factors influencing transformative learning in varying ways.

Personal Constructs

This study confirms earlier research that attitudes and beliefs determine adoption and use of ICT (Angers & Machtmes, 2005). It finds that for all teachers their personal constructs, formed by their prior knowledge, experiences and beliefs, influence their ICT transformative practices.

Within the ICT rich environment at the Valley school, the teachers' positive approach sustained them as they navigated through the initial period of implementation of a BYODD program in their Year 3 classrooms. Students' learning to work with their iPads as a learning tool at the same time as the teacher is learning, creates challenges. Instances when passwords prove elusive, problems with 'logging on', or when students have difficulty accessing necessary apps were common occurrences. Teachers' positive approach to challenges was very realistic. "We are taking baby steps too" (Monique, Valley School, March 2015). They acknowledged the development of collaboration skills was evolving due to students' lack of technical skills with personal devices. A pragmatic attitude turned the problems into

interruptions that they managed. They approached them with the attitude that the more practice students and teachers had with their device then problems would decrease. Teachers turned one person's problem-making experiences into a group problem solving that united the students trying to find answers to a problem. All teachers believed that technology was an essential 21st century learning tool and necessary to develop skills of critical thinking and problem solving. Their beliefs underpinned their approach to challenges and led them to demonstrate perseverance and patience, presenting as good models of problem solving for their students. Perseverance in navigating problems is necessary for 21st century learning and characteristic of the moral dimension (Kalantzis & Cope, 2012b) supporting the development of successful learners.

Teachers at both schools with positive 'can do' attitudes to the integration of ICT presented as learners alongside their students. At Valley School the introduction of iPads to Year 3 was a learning journey for students and teachers. Students were getting used to their own devices as tools to support learning, navigating their way through new apps, organising work electronically into Google Drive folders and learning to work collaboratively with peers. Teachers were getting used to devices that were different to a Mac or chromebook used previously for teaching. One teacher in particular found iPads were somewhat limiting for her.

At River School, teachers also acknowledged that they were learners. Inexperience with the 'Green Screen' app did not deter them. They approached the experience with positivity and enthusiasm for learning. Acknowledging themselves as learners engages with their changing role as a teacher no longer delivering a learning environment but facilitating the learning. Their attitudes allowed them to see students in a different light and use ICT to engage in inquiry learning and problem solving which are characteristics of the pedagogical dimension (Kalantzis & Cope, 2012b) of transformative learning.

Working in an environment with limited ICT devices to develop eLearning for students was encouraged by teachers' beliefs at River School. They found it very challenging to work with insufficient resources for learning. ICT pedagogical practice was underpinned by their belief in the importance of ICT as a necessity of modern life and essential for 21st century learning. Teachers believed it promoted student engagement and motivation. This drove commitment to designing the learning environment around access to ICT by pre-planning and sharing with other teachers to ensure use of devices for students and reflects characteristics of the proprietary dimension (Kalantzis & Cope, 2012b). All teachers found there were simply not enough chromebooks and iPads to go around and admitted frustration with the circumstances but continued to design activities integrating ICT where possible. One teacher indicated if extra devices were available they would be used to assist task completion. This would support curriculum outcomes rather than moving towards transformational learning which is at odds with her belief of the importance of ICT to enhance and motivate learning but in line with her understanding of the usefulness and relevance of ICT in children's lives.

This study finds teachers' attitudes and beliefs about the benefits and necessity for technology in the lives of students is a positive influence on their approach to learning and teaching with ICT. ICT served to develop teachers' understanding of themselves as learners and provided opportunities to demonstrate problem-solving approaches with and for their students. Teachers also saw ICT as essential for 21st century learners and believed it promoted engagement and motivation to learn. Teacher's beliefs assisted in overcoming challenges to teaching practice such as lack of resources and at these times rather than not use ICT at all they adopted a functional approach to ICT integration that affected alignment of beliefs with practice.

Finally, teachers' personal constructs, their beliefs and attitudes about the importance of ICT are found to have a positive influence on learning using ICT transformative practice.

They demonstrated pedagogical practice involving higher order thinking, problem solving, creative and critical thinking and collaboration that was dependent on students' technical skills development and availability of resources. Their practice demonstrates characteristics of the new learning theory by Kalantzis & Cope (2012b) and supports development of teaching and learning that transforms.

Time

"Time is a scarce commodity in schools" (Moyle, 2010). All teachers in the study found time to be a huge impediment to successful ICT practice. Teachers identified the need to maximise learning time when undertaking implementation of an ICT-rich program by enabling students to be active learners particularly in the initial stages. They reported this was compromised by lack of time for personal learning, away from the classroom, to create, think and plan a teaching program that efficiently and effectively supported successful learning. Time to explore new apps and sites for students was generally done at times after school or weekend. Teacher time to learn and navigate new digital tools was observed to influence student learning in one class. Her unfamiliarity with iPad affected time taken to trouble shoot technical problems. Lack of technical skill was observed to delay the learning process and teachers noted themselves that poor preparation of ICT tasks contributed to non-completion of work. At these times 'off task' behaviours that distracted peers affected student learning outcomes. Teacher's ability to maximise learning in an ICT rich environment was challenged by lack of time needed for personal learning and professional development.

Teachers noted that students too, need time to adjust to the iPad as a learning tool and many needed reminding at the Valley School that the work still needed to be completed. Lack of technical knowledge of teachers and students contributed to off-task behaviour in the classroom. At River School students' technical skills, developed over a long period of time, were noted by one teacher to effect task design and completion. Students with well-developed

technical skills were able to access more effectively and efficiently higher order tasks characterising transformative learning.

Creativity and innovation, characteristics of the moral dimension for transformative learning, challenge teacher practices requiring time to prepare and develop pedagogical practice. The two elearning and Mathematics Coordinators have one day a week release time. Strategically planning professional learning development opportunities, supervision of teaching programs electronically accessed, networking with colleagues at other schools and designing learning experiences for students occurred mostly at release time. Coordinators gave of their time to answer staff questions, generally during lunch or after work. Coordinators cited lack of time as affecting successful performance in their leadership role. Planned professional development opportunities occurred outside mandated professional learning hours at both schools and were not supported by all teachers.

ICT transformative practices at both schools were challenged by time. A lack of time for professional development, teacher preparation, planning, creating and personal learning with new tools, critical to changing teacher practice, hindered ICT transformative practice. Teacher knowledge and understanding of time for development of student technical skills was essential to maximise effectiveness of a BYODD program.

Resources

This study revealed that the level of resourcing at both schools, a characteristic of the architectonic dimension of transformative education (Kalantzis & Cope, 2012b) influenced ICT pedagogical practice. At the River School, lack of resources supported and enhanced curriculum delivery but significantly limited ability to successfully integrate ICT that would transform practice. Sharing devices required prior planning and lessons scheduled to coincide with each other limited the ability of ICT to be seamlessly integrated. Literacy and numeracy learning experiences integrated ICT use at a functional level for reading, maths and language practice to support learning needs. Choice of apps supported differentiated learning but

individual students could only access these once a week. These practices require knowledge of the needs of the learner and reflect characteristics of the socio-cultural dimension of a transformative approach to education (Kalantzis & Cope, 2012b) but were limited due to a lack of devices. At the same time organisational practices were supported by functional use of technology that allowed students to engage in tasks independently while teachers worked with others in small groups. However, when use of extra devices for a Science unit was scheduled, the design of the learning task changed to become transformational. Students were able to engage in inquiry learning, research, communicate with a worldwide audience, collaborate with peers through their Google Drive app and engage with wider audiences for feedback. This arrangement was limited to only three hours throughout the week compromising the development of digital pedagogies transforming learning.

In the BYODD program, ICT is seamlessly integrated with student use of their personal device in Religious Education, English, Mathematics, History and Science. Students were not using their device all the time but engaged in variety of ICT tasks throughout the day. ICT was integrated at a variety of levels depending on the task purpose or student needs, reflecting characteristics of the epistemological dimension of transformative education (Kalantzis & Cope, 2012b). At times it was used at a functional level to support organisational practices and enhance curriculum outcomes. Web 2.0 tools also provided access to differentiated tasks supporting teacher directed approaches to personalising learning. At other times students engaged in problem solving, critical and creative thinking in student-centred open-ended and higher order tasks accessed on personal devices.

This study finds that lack of devices at one school supports and maintains teacher pedagogical practice that integrates ICT at a functional level and interferes with the development of transforming learning. It also finds that an increased number of devices and a one-to-one device program support open-ended and higher order tasks. At these times

teachers are facilitators of student learning developing 21st century learning skills and engaging in pedagogical practice that supports ICT transformative learning.

Knowledge and Skills of Pedagogical Practice

Teachers at both schools demonstrated a positive attitude and confidence using ICT for teaching and learning. This supported their pedagogical practice. Their positive relationship, connection and knowledge of their students enhanced their pedagogical practice. They were learners alongside students demonstrating knowledge of problem solving, collaboration and perseverance as attributes of learners, which are characteristics of the moral dimension of transformative education (Kalantzis & Cope, 2012b).

A student-centered approach to teaching and learning that develops 21st century learning skills was not embedded but emerging. ICT pedagogical practices were varied and depended on availability of resources, learning intentions, student skill levels and teacher knowledge and understanding. Assessment practices using ICT included self reflection and peer feedback across some key learning areas. Teachers used ICT at a functional level to enhance and personalise teaching and learning and motivate students.

At times across both schools, students used technology to actively engage in thinking and new knowledge construction involving student voice and choice and real life issues while teachers engaged as facilitators of learning in the classroom discourse. These are characteristics of the intersubjective and discursive dimensions of new learning (Kalantzis & Cope, 2012b).

Teacher knowledge and understanding of digital pedagogical practice impacted successful learning outcomes. Lack of ICT related management skills and knowledge interfered with student learning causing delay in task completion, passive participation by some students and ‘off task’ behaviours.

This study finds that at both schools pedagogical practice supported the development of student centred learning. However, the ability to engage in transformative approaches to ICT pedagogical practice was hindered by lack of teacher knowledge and skills.

Conclusions drawn from these four findings are discussed in the following chapter. It begins with a brief overview of the research and the significance of the study to school Principals and teachers. It lists the four major findings and recommendations for Principals and teachers.

CHAPTER 8 CONCLUSION

8.1 Introduction

This final chapter of the thesis sets out to join together the findings made to draw conclusions for influencing factors for digital pedagogical practices in primary school. It makes recommendations for teaching and learning that will support the development of learning that transforms.

8.2 Conclusions

The thesis has study has four main conclusions. It concludes that, teachers' personal constructs, attitudes and beliefs about ICT that are not challenged by a lack of resources, positively influence learning using ICT transformative practice.

Secondly, time is critical for changing teacher practice. Lack of time for professional development, teacher preparation, planning and creating as well as time for personal learning with digital devices hinders ICT transformative practice. Time is also an influencing factor for development of student ICT skills.

Thirdly, resourcing is an influencing factor in ICT transformative learning. Lack of devices is found to maintain teacher pedagogical practice at a functional level that supports teacher directed practices and decreases opportunities for the development of digital pedagogies. However, an increase in the number of devices and a one-to-one device program support opportunities for open-ended and higher order tasks, allowing teachers to more effectively engage in facilitating the development of 21st century learning skills to support transformative learning.

Finally, in an environment where pedagogical practice is found to support student-centred learning, transforming student learning is hindered by lack of explicit knowledge and skills of ICT pedagogical practice.

8.2 Recommendations

This study has explored factors that influence learning using transformative ICT practices. Findings from the two sites in the study have particular value for primary schools principals and teachers**.** To support the development of transformational learning requiring learner-centered pedagogical approaches (Pelgrum & Law, 2003) that allow teachers to make a contribution to changing society (Cope & Kalantzis, 2005), this study makes two major recommendations for primary schools.

The first recommendation of this thesis is for systems and schools to strategically plan time for teachers' personal learning about and with ICT that takes place in the school setting. Supporting this it is recommended that planned professional development engages and fosters positive attitudes towards the integration of technology while also providing opportunities for teachers to engage with and put into practice personal beliefs about ICT as a 21st century learning tool.

The second recommendation addresses the development of teachers' knowledge and skills of digital pedagogies that actively engage students in creating knowledge. This thesis recommends an increase in resourcing of ICT, providing access for teachers and Stage 2 students to individual mobile devices to support opportunities for teacher professional learning and importantly support the implementation of transformative learning experiences for students.

APPENDIX

A. River School Teaching Program documents

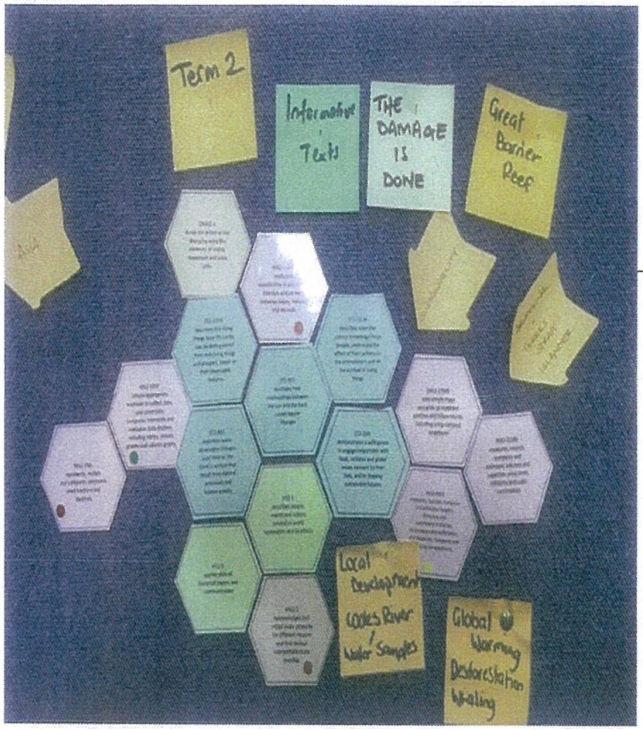
APPENDIX

1. River School Teaching Program documents

GENERATIVE TOPIC: a real life issue
The Damage is Done?

LC

collaborative planning



SP

Week	Outcomes	**Immersion** • Across all KLAs • Stimulus to create curiosity	Resources https://www.dropbox.com/s/e03v50n1fbqx78/NoTosh%20Design%20Thinking%20-%20Immersion%20Overview.pdf
2-5	ST2-8ES ST2-2VA ST2-11LW	Hook:Hook -Water samples from different parts of the Cooks River (ddddfrom Yagoona, dddd from Campsie and ddd from Mascot) -Ask the students where they think these samples may have come from. Have a discussion about this. -Show students a range of images of the Cooks River at present (at this point chn still have not been told where the water samples have come from or where these pictures are from) Images of Cooks River - A timeline of pictures e.g. Present to the past. Discuss these pictures and what they observe. What are some differences over the years? Immersion 1 (Links to TLW Program) ***FSL Oral Assessment Task*** Jigsaw Information Report Activity Students are put into groups of 4-5 students. As a class brainstorm the subheadings for an information report on the Cooks River. Groups are to research and construct an oral information report on the Cooks River. Each student in the group is to research a different part of the information report an write this into their Design Thinking books. Once each group has completed this the groups then present their information report to the class and record on iPad. Immersion 2 Cooks River Alliance Incursion -Catchment model -Effect of our actions on the environment	http://www.wollicreek.org.au/tvt_schools/index.htm http://www.wollicreek.org.au/pdf/tvt_flyer_with_map.pdf http://www.sydneywater.com.au/sw/water-the-environment/what-we-re-doing/current-projects/stormwater-management/stormwater-naturalisation/index.htm http://www.sydneywatertalk.com.au/crbnp/ https://www.youtube.com/watch?v=bgRSi0burzQ - Cooks River Naturalisation Project Jasmine from Cook's River Alliance

teacher directed

needs

P

R

LC

	ST2-10LW	Immersion 3 History of the Cooks River Timeline on the history of the Cooks River Immersion 4 Excursion to Cooks River organised by Jasmine from Cook's River Alliance Group Program Session Outline Immersion 5 Water Quality and Pollution Experiment - Visual experiment shown to Ss about the effects of pollution on our water quality. - Class discussion at each point of the experiment eg. What effects is this rubbish having on our waterways? Do you think we can remove all this pollution from the water? Yes/No? Why? - Discussed the effects this has on our water and how it will affect us and the wildlife that live here. Shared Reading- Erosion Rocks and Soil by Cranbrook Institute of Science 'How Weather and Other forces Change the Earth' Using Water by Cranbrook Institute of Science 'How You Use and Change Water' - During each reading of the Big Books Ss would become involved in discussions about the effects of erosion through natural causes and also how we affect the environment through our daily lives.	https://drive.google.com/drive/folders/0B0VaLkvgNWvPflNIRU5fR01DWXhQbnFsR2EwVUNXc3g3VGg3UkdrbUdSaFVQWHplaEw4Qlk http://gironlife.blogspot.com.au/2010/04/experiment-can-you-undo-water-pollution.html?_sm_au_=iDVnHtg0MVD0qSNj Scholastic Big Book of Exploration Series

Week	Outcomes	**SYNTHESIS** How might we...(place, people, program) • *Is it a problem worth solving?* • *Does it pass the "So what?" test?*	Resources
6-7		*Hexagonal Thinking* *How might we...?*	Hexagons

Week	Outcomes	**IDEATION & PROTOTYPE** • *100 ideas in 10 minutes* • What does a solution look like?	Resources
8-10		*100 ideas in 10 minutes* - Ss work in groups and brainstorm ideas for their prototype. - These ideas sorted into 3 groups - Darling, Safe Bet and Long Shot Groups then decide on their prototype and begin working on this.	

Week	Outcomes	**FEEDFORWARD** • Austin's Butterfly http://vimeo.com/38247060 • Even better if...	Resources
8-10		*Throughout prototyping- small group critique*	

Additional Resources

B. Valley School Teaching Program documents

2. Valley School Teaching Program documents

QUESTION 1: Why did the great journeys of exploration occur? (3 Weeks)

Whole Class Building the field

Lesson 1-2

As a class, briefly discuss what, how and why people explore. With a partner, students complete write the meaning of exploration and create a list of reasons for what, how and why people explore.

Use Resource Sheet 1 and discuss the words and meaning related to explorers' voyages. With a partner, students are to locate the meaning in the dictionary and match the words to its correct meaning.

Teacher reads passages on European explorers (Resource Sheet 2). As a class, students identify the countries they came from. Use a world map or globe to locate the countries.

Watch Captain Cook's journey Captain Cook R

Use http://fwpsstage2.wikispaces.com/file/view/British+colonisation+unit.pdf to read Terra Nulius and complete following questions.

Use Mapping Australia for more information R

Lesson 3-6 Research an explorer

Students allowed choice of task and their method of presentation. These include google drive, imovie, PPP, glogster, bubblus, word LC

Student choice/flexibu

Students have the option to pose and explore their own questions instead of the questions below LC

MODIFIED-CORE	*UPPER CORE-EXTENDED*
• In groups, students are to research early European explorers before the British colonisation and create a mind map showing information on:	• Research an explorer such as : - Willem Jansz - Nicholas Marion du Fresne - William Dampier

needs

- Who they were? - Where they came from? - Why did they come? - Where did they go? - What did they do? - What was the Aboriginal response to their visit? European explorers include: - Willem Jansz - Nicholas Marion du Fresne - William Dampier - The Maccassans - Abel Janszoon Tasman - Jan Carstenz - Luis Vaez de Torres - Dirk Hartog	- The Maccassans - Abel Janszoon Tasman - Jan Carstenz - Luis Vaez de Torres - Dirk Hartog Write a journal of this explorer's journey including comments on your hopes and fears. (BLOOM'S Analysis) The following may help you with writing a journal entry: http://www.wikihow.com/Write-a-Journal-Entry • Choose 2 European explorers. Identify differences similarities of their journeys , why they were exploring and anything interesting. (BLOOM'S Analysis) • How has exploration changed in the twenty first century? Consider why people explore, what they explore and how they explore. (ADJUSTMENT TO DEVELOPMENT Williams Model) needs.

QUESTION 2: What was life like for Aboriginal and/or Torres Strait Islander peoples before the arrival of the Europeans? (2 weeks)

Whole Class Building the field

Lesson 1-2

P

Watch http://www.youtube.com/watch?v=VcslF8yQ1Tg 'The First Australians Part 1'

teacher directed

Explain to students that the Australian continent has always been multicultural. Before 1788, there were approximately 500 different language groups or nations. Current scientific understandings show that Aboriginal occupation date back between 50 000 and possibly 100 000 years before present (BP). Many Aboriginal people believe that they have always been here.

As a class, use an Aboriginal languages map (see http://fwpsstage2.wikispaces.com/file/view/British+colonisation+unit.pdf), point out the diversity of Aboriginal cultures in Australia. Jointly locate the Aboriginal language group for

the Ryde area (Wallamattagal?). Find the names of the Aboriginal peoples who came from the area now known as Sydney (use Resource Sheet 3)

Use http://fwpsstage2.wikispaces.com/file/view/British+colonisation+unit.pdf — R

Divide students into 5 groups with information on:

D

Timeline of Aboriginal History (2 groups because of large amount of text)

Aboriginal Foods

The Euro People of Sydney and their Food

The Dreaming

teacher directed

Each group reports their information while other groups fill in a grid

Explain to students that over thousands of years of careful observation, Aboriginal people acquired an intimate knowledge of physical features of the land, animals, plants and people, and their interconnectedness. They managed the environment according to ancient laws and customs that are recorded in Dreaming stories. These stories describe ways of caring for the land as well as changes to the continent that have occurred over thousands of years, such as climatic and sea-level changes and volcanic eruptions.Read a couple of Dreaming stories and discuss the meaning of each. Display a range of Dreaming stories.

Lesson 3-6 Explore Aboriginal life

student choice

LC — *Students allowed choice of task and their method of presentation. These include google drive, imovie, PPP, glogster, bubblus, wordle*

LC — *Students have the option to pose and explore their own questions instead of the questions below*

needs

MODIFIED-CORE	UPPER CORE-EXTENDED
• Write down as many facts about the Eora people as possible. • Recount and illustrate/add images an Aboriginal dreamtime story. • Make a diorama showing the important features of the lives of the Eora people. • Draw a story map to illustrate how the Eora people lived.	• Compare the lives of the Eora people to how we live today.(BLOOM'S Analysis) (ADJUSTMENT to DEVELOPMENT William's Model) • Design a book suitable for an infants class to learn about the Eora People. (BLOOM'S Evaluation) — CK • Write your own dreamtime story. (BLOOM'S Evaluation) (CREATIVE READING SKILLS William's Model) • Aborigines were the first inhabitants but were also immigrants to Australia. Do you agree? (Tolerance For AMBIGUITY William's Model)

R — http://aso.gov.au/titles/documentaries/first-australians-episode-1/

real life issue personalise

C. Catholic Education Office Sydney, BYOD Interim Report (2013)

Catholic Education Office Sydney
www.ceosyd.catholic.edu.au

PRIMARY SCHOOLS BYODD PILOT PROGRAM

INTERIM REPORT – AUGUST 2013

TABLE OF CONTENTS

Stage 3 Students, St Michael's Lane Cove

BRING YOUR OWN DESIGNATED DEVICE PILOT PROGRAM

BACKGROUND

The Bring Your Own Designated Device (BYODD) project is being conducted at four Sydney Catholic systemic primary schools during 2013. In an effort to determine the impact and effectiveness of the project, the participating schools, St Michael's Primary Lane Cove, Villa Maria Primary Hunters Hill, Holy Spirit Primary North Ryde and St Kevin's Primary Eastwood, are participating in a research project.

The findings of this project will be used to inform Sydney Catholic schools contemplating the implementation of a BYODD program. The initial benchmark data were gathered during the first week of the project involving 399 student participants. Stage two data capture occurred in July, with the final data capture to take place in November 2013. The survey data will be supplemented with regular observational visits and structured parental feedback.

The interim report will be made available to schools during August, with a final report published in December.

PILOT PROGRAM CONTEXT

The schools participating in the Research Project expressed an interest in a BYODD program during Term 3 2012.

Initial discussions were held with Dr Doug Ashleigh, Director of Knowledge Management and ICT. Catholic Education Office (CEO) Sydney approval for the pilot program was given with an understanding that the schools would conduct the program as a research based pilot.

In 2012 the Apple iPad was the only tablet device approved and supported by the CEO Sydney ICT team. All schools chose the Apple iPad as the designated device for the program. Parents were contacted and given opportunities to be informed and to provide feedback on the proposal. With majority parent support the program was introduced into the selected grade or stage in each of the four schools in Term 1 2013.

The schools involved in the BYODD pilot program are located in the Inner Western Region (three schools) and the Eastern Region (one school) of the Archdiocese of Sydney. The schools are in a similar geographic region, the northern suburbs of Sydney. All four schools have an ICSEA Value of greater than 1100. In the School Distribution data from ACARA the combined percentage in the lowest two bands range across the schools from 1% to 18%. While there is a considerable difference between the four schools, they all have a high percentage in the top quarter of the Student Distribution table on the MySchool website.

RESEARCH DATA

This Interim Report is based on the following data:

- observational visits to each of the schools
- interviews with each school Principal
- interviews with the staff member who has primary responsibility for the program
- discussion with the leaders of the program and the participating teachers in a two-day workshop
- an online survey of a representative group of the parents (23 responses)
- an online survey of the teachers (18 responses)
- an online survey of the students (331 responses)
- interviews with the two Regional Technology Advisers
- interviews with ICT staff and management.

INTRODUCTION OF BYODD

PHASE 1: STRATEGIC PLANNING

TIMEFRAME

All schools began consultation and discussion six months or more before the planned implementation date of January 2013.

AIMS OF THE PROGRAM

The aims were individual to each school but shared these common characteristics;

- to support the pedagogical development of the classroom towards 21st century learning
- to further engage students through personalised learning
- to increase access to technology for students in a sustainable manner
- to increase student skills in ICT.

PARENT AND COMMUNITY CONSULTATION

The support of parents for the program was identified as a key factor for success by all schools.

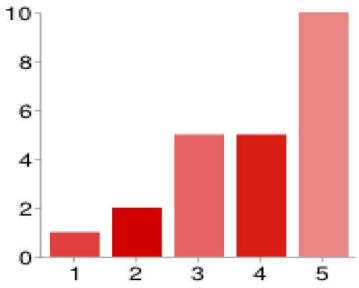
Initial consultation with parents occurred in Terms 3 and 4 2012. Contact was through letters home, parent surveys and parent meetings.

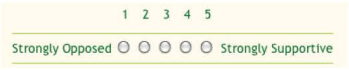
INITIAL PARENT RESPONSE

When first contacted by survey or letter, the level of parental support varied from approximately 60% to 80%.

Responses from parents were sought in the Interim Report: Parent Survey Q 3

When the BYODD program was initially discussed at your school how would you rate your response to the proposal?





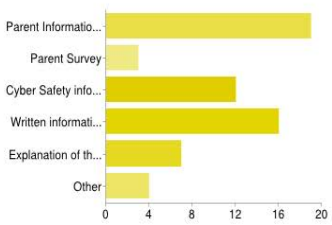
ADDRESSING PARENT CONCERNS

Each school held a meeting for parents to explain the program. The meetings addressed parental concerns using the following strategies;

- explaining the learning outcomes which BYODD could help to achieve. This was done in the context of continuing the development of school pedagogy
- providing parents with the school strategies for managing the iPads at school
- having responsible use policies and agreements prepared
- offering a range of options for purchase, lease or rent of the iPads
- addressing issues such as insurance
- reassuring parents that no student would be disadvantaged if they did not have their own iPad
- allowing iPads to be stored overnight at school if parents so wished.

On the parent survey, parents listed the following as being helpful in explaining the BYODD program:

Which forms of communication and preparation did you find helpful as a parent?



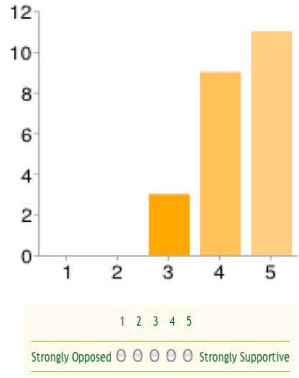
Parent Information Evening	19	31%
Parent Survey	3	5%
Cyber Safety information or session	12	20%
Written information from the school	16	26%
Explanation of the student learning goals for the program	7	11%
Other	4	7%

CURRENT PARENT FEEDBACK

All four schools reported that parents had become increasingly supportive of the program. Some schools had open classroom sessions where parents could see children working with iPads. Other schools had websites which provided parents with information, work samples and progress reports.

The perception of increasing levels of parent support was in line with responses in the parent survey. Parent Survey Q 16

To what extent are you supportive of the BYODD program after the first five months?



CHOICE OF STAFF

Staff in each of the schools were selected for the program through an expression of interest or by invitation of the Principal. The staffing was planned in Term 3 and Term 4 in 2012.

School Principals listed the following characteristics as important in choosing the best staff for a BYODD classroom:

- a strong pedagogical base including student-centred and personalised learning approaches
- ability to work effectively in a team of teachers
- a positive and innovative approach to the use digital tools.

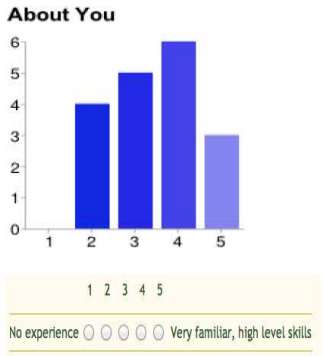
At least some staff in the program in each school are very confident and capable with technology.

In three schools the Assistant Principal is teaching a class in the BYODD program. Staff were notified as early as possible to allow maximum preparation time for 2013.

(There were unavoidable changes to staff in the program in one school, resulting in a less ICT experienced casual teacher being included in the program at short notice).

In the teacher survey, Q 1, teachers rated their own familiarity with the iPad prior to the program as quite high.

About You *
How would you rate your familiarity and skills with an iPad before the BYODD program?



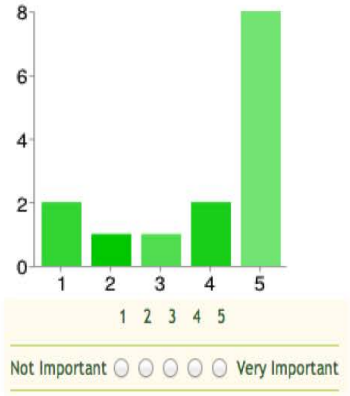
TEACHER PREPARATION

Although chosen for their contemporary pedagogy and ability in a BYODD classroom, 78% of teachers reported preparing for the program for between three months and six months before the iPads were used in the classroom.

STAFF RESOURCE

Three schools provided the teachers in the program with an iPad. The importance of this is seen in the response to survey question 5.

If you were provided with an iPad by the school, please rate how important this was in your preparation



TEACHER PROFESSIONAL DEVELOPMENT

Teacher Professional Development (PD) was identified in surveys and interviews as being very important to the success of the program.

Principal's Comments

"You can't do this without a commitment to PD to support the staff." Steve Conlon

"It is very important to provide staff with the right technology in their hands, combined with relevant, explicit PD." Kevin Turner

The types of Professional Development varied. They include:

- release time for team members to plan and develop resources
- visits to other schools, conferences
- team and Buddy programs
- explicit PD sessions run in school or with CEO personnel

Teachers also spent time on personal device and app exploration, completing modules of the CEO iLearn with Mobile Devices course, or other forms of PD such as postgraduate study.

The most useful forms of PD were identified in the Teacher survey Q 6.

The most useful Professional Development strategies based on their frequency of mention by the teachers are:

- opportunities to work with school colleagues and members of the grade or stage team to prepare for BYODD
- external PD including school visits, workshop days, conferences and postgraduate study
- time and opportunity to explore the device personally and to become familiar with apps
- the CEO online course, iLearn with Mobile Devices: iPad
- learning how to use Teacher Dashboard.

CHOICE OF STAGE OR GRADE FOR THE PROGRAM

Three schools chose Stage 3 for the BYODD program. Some reasons for this choice include:

- an opportunity to further develop pedagogy or projects begun in the previous year
- a desire to help students in their transition to Year 7

- a natural fit with the teachers already in Stage 3
- Stage 3 staff wanting to build further on a collegial culture accustomed to multiage sharing
- a desire to increase the engagement of students, particularly boys, through the BYODD program.

Year 4 was chosen for the BYODD program at Holy Spirit School North Ryde. Some of the reasons provided were:

- a desire to further develop personalised learning program in Year 4
- an opportunity for the students to use the devices for a full three years of learning
- the ability to measure outcomes of the program by examining NAPLAN results in Grade 5 compared to Grade 3.

CHOOSING APPS

The teaching teams at each school chose the apps they wished the parents to purchase for the iPad. The cost varied between schools, from $20.00 to $60.00. During this research the students were observed using a range of apps on the iPads to complete tasks such as mind mapping, creating video or image presentations, writing reports and creating their own iBooks.

Here are the paid apps listed for students at St Michael's. There were also 27 free apps listed for students to download to their iPads for 2013.

Name of App	**Purpose**	**Cost**
Keynote	Presentation and Powerpoint	$10.49
Numbers	Spreadsheet	$10.49
iMovie	Editing film clips	$10.49
Garageband	Podcasting	$10.49
Comic Life	Comic fun	$5.49
Book Creator for iPad	Creating your own online book	$5.49

Explain Everything	Create your own voice recording while writing on virtual whiteboard	$2.99

The list of required apps will be reviewed by all schools at the end of the year. Several teachers believe students are developing good skills in locating, evaluating and using the best apps for their own learning tasks and that fewer apps will be mandated in the future. One of the parents commented in the survey that the apps purchased are not being used to their full capacity.

SOFTWARE

CLOUDSHARE

All four schools are using the Sydney CEO Cloudshare suite of tools. This has been of particular benefit in allowing students to collaborate on shared projects and assignments. Cloudshare has also assisted in the management of files and workflows, allowing students to store files, email and retrieve work and transmit work between teachers and students.

TEACHER DASHBOARD

St Michael's Lane Cove piloted the Teacher Dashboard Software. This program provides a management tool and teacher interface for the Cloudshare environment. The staff at St Michael's believe it has greatly assisted supervision and management of student workflows.

IDOCEO

St Kevin's Eastwood have managed student workflow and document management using the software program Idoceo. The teachers have found the program of benefit in the BYODD classrooms.

FINANCIAL ARRANGEMENTS

Schools offered a number of financial arrangements including:

- use of existing iPads no matter what model
- leasing of iPads through Apple reseller (this was not adopted by any families in the pilot schools)
- an ability for parents to hire iPads for Year 6 students
- insurance through the Apple Reseller.

EQUITY CONCERNS

An important consideration for each of the pilot schools was to ensure that no child was disadvantaged and that parents had a range of options to assist them to purchase an iPad if one was

not already available. In the initial baseline data 72% of families had an iPad before the school introduced the program. All schools allowed students to bring any model of iPad.

Steps to overcome equity issues are similar in all the schools:

- where parents are financially unable to provide an iPad the schools have provided them to the parents. The maximum rate of school provision is 7% of the number of students in the class
- where parents do not wish students to have an iPad at home the schools are providing them to students for use in class only.

An equity issue mentioned by teachers is the difference in ICT skills of students.

> *"A few children do not have their own device. They have to use a school device which is not allowed to be taken home. Children seem to be coping, as much of their work is on Cloudshare; however it is still a disadvantage. Some children also are not as computer literate as others, although the gap is closing with collaboration happening."* Teacher comment in the equity section of the BYODD survey.
>
> *"I believe that it should be compulsory for all children to take their iPads home each night because some teachers put homework on the iPad and nights when you can't take it home is a disadvantage for every student that can't take their iPads home every night like me. This means I have to wait to do a task for another day because my iPad is at school so I have less time to complete this task."* Student comment.

The equity measures taken by schools have been successful according to Principals and teachers. However there is concern about students who cannot take the iPads home; this restricts the homework use of the iPad and may disadvantage students.

IMPLEMENTATION OF BYODD

STUDENT PREPARATION

Schools undertook a number of steps to prepare students for the program:

- early notice to parents to give students the maximum amount of time to familiarise themselves with the iPad (eg over the Christmas holidays)
- the development and delivery of Cybersafety programs for parents and students in the program
- a student iPad bootcamp day/s in the first week of school.

Management of iPads

Each school provides storage for the iPads before school and during recess and lunch. Where there is after school care on site, storage of the iPads has also been arranged. Students do not have access to their iPads outside of class time.

Student Agreements

Each school prepared student agreements as a part of the BYODD program. These explain appropriate use and the consequences of inappropriate use. Every school has emphasised the need for this agreement to be clear and to be made available to parents as early in the BYODD planning as possible.

Student Learning Outcomes

School Principals and Executive Feedback

School Principals and staff have identified the following outcomes in the first semester of the program:

- student problem-solving skills have developed
- students are critiquing their own work, raising their own standard of work
- some children have really blossomed and some have improved their behaviour
- some students are now able to use a gifted trait for technology and supporting others in its use
- underachieving students have blossomed
- student engagement has improved and increased
- there is increased opportunity for student voice and choices in learning
- there are more opportunities for co-operative learning and peer feedback.

Student Response to Learning with the iPads

The students responded very strongly that they learned more because they had an iPad. Student Survey Q 3

PARENT CONCERNS ABOUT STUDENT LEARNING

Some parents voiced concerns about student learning in comments such as:

- "I can see some of the benefits of the iPads; however I feel that the children use them too much"
- "I am yet to be convinced that her learning outcomes are enhanced by having the iPad"
- "the iPad should not replace basic writing skills. Too much time spend on the iPad playing games".

TEACHER'S RESPONSE: STUDENT LEARNING

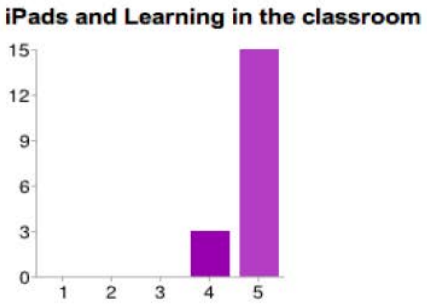
The classroom teachers believe that the learning outcomes from the BYODD program are being achieved (78%) or that it is too early to judge whether they are being achieved (22%). No teachers responded that the learning outcomes were not being achieved.

Teachers identified the following as outcomes which apply to their students' learning:

- the students are more focused
- the students find the learning more personalised
- students collaborate more

In response to Teachers Q14:

iPads and Learning in the classroom *
To what extent was student learning assisted by each student having their own iPad?



1 2 3 4 5

Not at all ○ ○ ○ ○ ○ Greatly Assisted

Specific Learning Outcomes

The students, teachers and parents were asked about the impact on student learning in specific skills or curriculum areas. The student responses identified **research skills**, **enjoyment of Maths** and **opportunities for creativity** as the most positive outcomes.

Parents identified **new learning opportunities**, **creativity** and **numeracy** as having the greatest impact.

Teachers identified **research and information skills**, **creativity** and **literacy** as the strongest areas of development of student learning in the BYODD program.

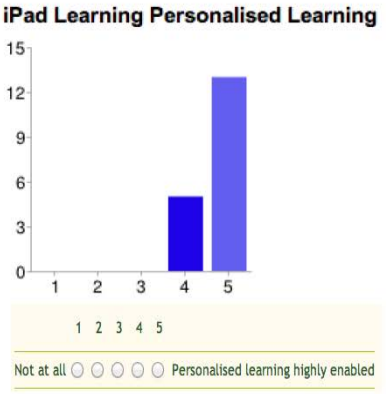
Personalised Learning

Students' Response

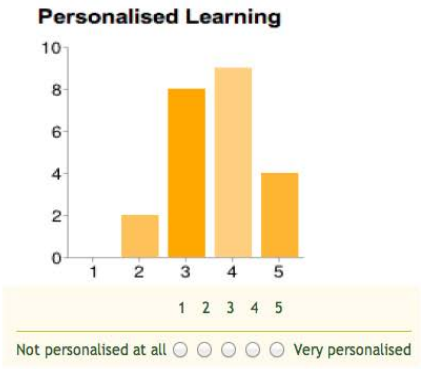
When asked whether they learned more on a personal iPad or a shared one, 94% of students responded that they learned more on their own iPad. In interviews the students stated that they could set up the iPad for themselves and use it to suit their own style of learning.

Teachers' Response

Teachers responded that the BYODD program enabled personal learning for students.



PARENTS' RESPONSE

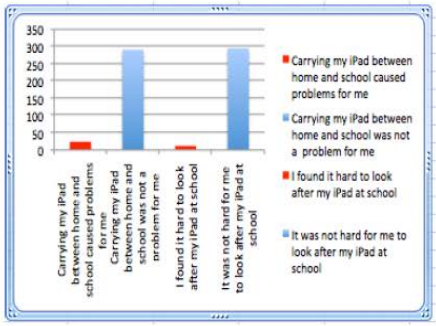


RESPONSIBLE USE AND CARE OF THE IPADS

There has been very little damage or loss of iPads within the first five months of the BYODD program.

No iPads have been stolen or lost in transit between home and school.

Students report that they do not have an issue with managing their iPads.



Grade 4 Students, Holy Spirit North Ryde

Internet and Wireless Connectivity

The BYODD is functioning successfully in all the pilot schools. However, ICT issues including Internet and wireless connectivity were identified as concerns for both the original implementation of the program and its further expansion. In interviews with school Principals and teachers leading the program in each school the following issues were identified:

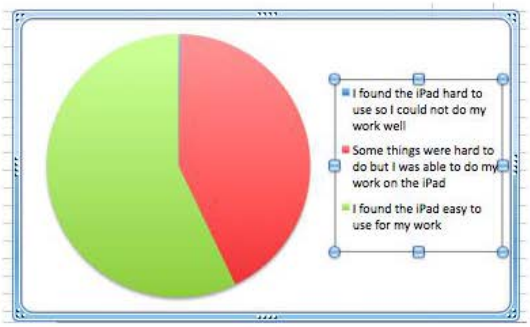
The need for additional access points for the wireless connection to the Internet. The recommended level is 15-20 devices per access point (devices include any phones or wireless computers in the vicinity). St Kevin's have adopted a policy to maximise the availability of the access points for the iPads. They require all student mobile phones to be switched off and stored at the school office during the day. This prevents the mobile phones from taking an access point, even when they are not being actively used.

There will be an upgrade of the wireless systems and the number of access points available in 38 primary schools in 2013-2014. The current BYODD pilot schools will be included in this number. This upgrade will be resourced from the secondary schools wireless upgrade project.

The congestion of devices on each access point is worsened by having large numbers of devices clustered in a small area, and also by the iPads' frequent failure to transfer smoothly between access points. 26% of classroom teachers report that the iPads drop off the Internet at times of high usage.

Some schools report difficulties in accessing the Internet using the approved web authentication method. This was reported as a particular issue early in Term 1, before the release of iOS 6.1.3. Some teachers are still reporting issues with web authentication in terms of initial access and subsequent downloading of search returns and images.

Students however report that they do not find using the iPads difficult. This may be a result of a positive approach to problem solving adopted by the teachers as a culture in the classroom, or a reflection of the level of technical expertise and support provided to students.



RECOMMENDATIONS FOR ICT REQUIREMENTS

Peter Sidgreaves, the CEO Sydney's ICT Services Manager, makes the following recommendations.

Before moving to a BYODD model:

- schools need to have a minimum of 20 MB bandwidth for Internet access
- Principals should arrange an ICT audit as a part of strategic planning. This will include a check on the number and position of access points available to the BYODD classrooms. This audit can be requested through the RSSO. Schools can increase the number of access points if needed
- schools should work with their ISO to clarify and streamline web authentication protocols and other assistance needed to get the iPads working successfully.

EVALUATION AND REVIEW OF BYODD

Each school is undertaking ongoing evaluation of the program. Examples include school-based teacher surveys, discussion with parents at information sessions, staff meetings and discussions, and participation in the data gathering for this report.

The parents and staff were asked for an overall evaluation of the program to date including best and worst features.

TEACHERS' COMMENTS

Best thing about BYODD:

"The amazing results the kids are displaying and the fact that I personally feel invigorated by the process."

"Enhanced creativity in the classroom. Students have taken ownership of their work."

"The best thing is the engagement level of students."

Worst thing about BYODD:

"The Internet dropping out has been a frustration for the teacher and the kids... It's also bad PR. for the parents. "

"The worst thing is the increase in the workload on the teacher initially. "

"Not enough support once the BYODD program had started in the classroom."

Parents' Comments

"It has enhanced his learning and his confidence. He certainly seems to be a lot more sure of his own ability to find the answers to questions and to take concepts to a new level."

"I believe the BYODD is an essential part of Year 6. I would strongly encourage other schools to look into the program."

"He spends more time on a screen for entertainment and browsing, which is a negative for us."

"It would have been nice to have more notice about the BYODD than one term. Also more parent information nights on what and how they are using the iPads.

Students' Comments

"Using my own iPad has helped me to research further into topics and subjects and is an easy way to access information and extend myself. It has also helped me to present my work neatly and creatively using apps and the Internet."

Phase 3 Sustainability and Expansion

School Principals and Executive Response

The Principals of all four schools intend to continue the BYODD program in their schools for at least another 12 months; it will then be reviewed. At this stage the program is seen as beneficial by students, teachers, parents and school executive members.

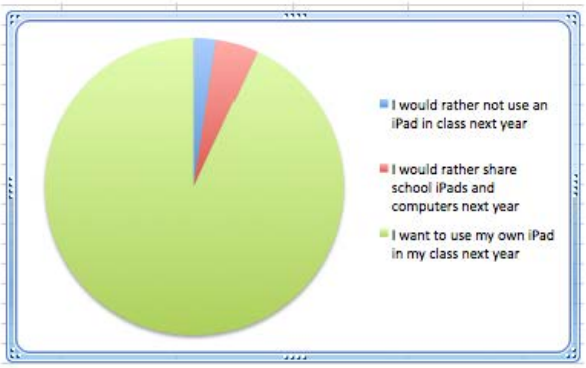
The program relies heavily on the drive and enthusiasm of key staff members in each school. The schools are building teams to ensure the program is sustainable even without the key person, however the importance of a BYODD leader is observable in every school.

Two factors identified as possible issues for sustainment and expansion of the program:

- the requirements of ICT infrastructure, including wireless access points and sufficient bandwidth, may limit the further expansion of the program
- the need to have increasing numbers of school staff who wish to have BYODD in their classroom may be difficult to meet. While the program is successful with the teachers currently involved, there will be a need for increasing amounts of Professional Development for other teachers in the school.

STUDENTS' RESPONSE

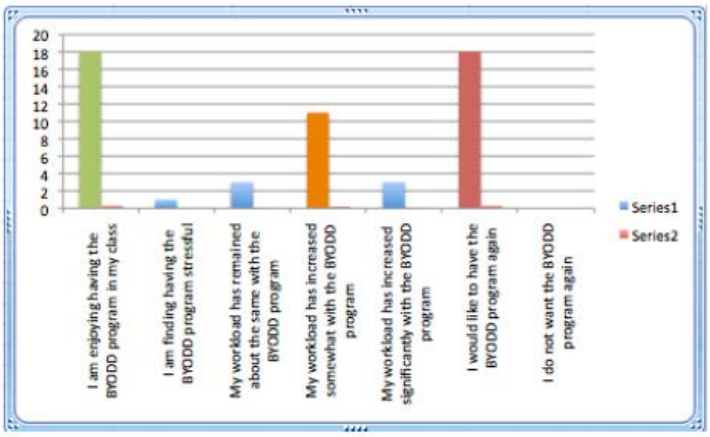
Students responded strongly (93%) that they wish to use their iPad in class next year.



TEACHERS' RESPONSE

All teachers responded that they are enjoying having the BYODD program and that they wish to have it in their classroom next year.

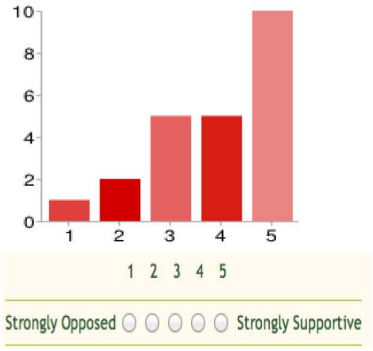
In several of the schools the BYODD program is a catalyst for change in the design of learning spaces and the configuration of classes and teaching teams.



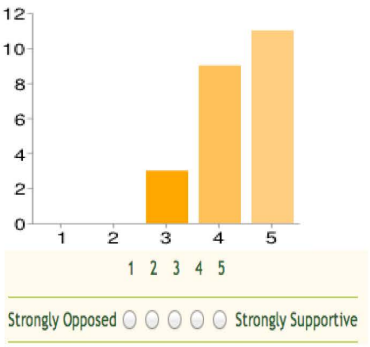
PARENTS' RESPONSE

There has been an increase in support for the program from the parents.

PARENTS' INITIAL SUPPORT 2012



PARENTS SUPPORT IN JULY 2013



Parents visit the classroom at St Michael's Lane Cove

INTERIM REPORT CONCLUSIONS

As of July 2013 The BYODD program is achieving the outcomes desired by the schools in the pilot program.

There was initial parent concern about the program, particularly about cybersafety, a possible imbalance of learning activities and the learning outcomes which would be achieved. The level of support from parents has increased, but parents continue to voice some concerns.

The strategic planning phase is crucial to the success of the program. This phase began in all four schools at least six months before the program was implemented.

The most important factor in achieving the learning outcomes is the pedagogical approach used by the teachers. The program has the greatest success when it is a part of a personalised, contemporary learning approach which is already established in the learning culture of the school.

There is agreement that specific learning outcomes which are being achieved include:

- student engagement in learning is greater
- there is increased personalisation of student learning
- a growth in students' research and information skills
- increased levels of student creativity.

The professional development of teachers has been identified by as a key factor for success.

ISSUES

Some staff have reported a greatly increased workload caused by the BYODD program. Other staff and school executive have expressed a desire for greater levels of support both within the school and from the CEO.

There were initial problems with wireless connectivity and Internet access. The number of access points in the schools has not been sufficient in all cases. Authentication to the wireless network and out onto the Internet has been problematic. This has been overcome in some schools but not all.

FUTURE

All schools wish to continue the program and some are planning to expand it further. This will depend upon improved network infrastructure, staff professional development, and the ongoing pedagogical development of the school.

RECOMMENDATIONS FOR OTHER SCHOOLS

These recommendations are made by the Principals and School Executives.

- The BYODD program is viewed as an enabling tool for a contemporary learning pedagogy. It is best introduced as a part of the ongoing development of school pedagogy.
- Measures to ensure equity of learning opportunity for all students are required.
- All Principals recommend that schools begin consultation and discussion six months or more before the planned implementation date.
- Communication with parents is a key component. This should begin as early as possible. Expressly addressing the learning goals and parent concerns at a meeting is helpful.
- Teachers for the program should have an innovative, contemporary pedagogy. They do not need to be the ICT gurus of the staff, but they should have experience and skill at using ICT in the classroom.
- Where possible a member of the school executive should lead the program, and teach in a BYODD program.
- Preparation needs to include an audit of the ICT infrastructure, especially the school wireless configuration and capability.
- Teachers require professional development for the program. This may be in the form of team planning and learning sessions, courses or sessions at school or external Professional Development opportunities. The majority of teachers in the program report an increased workload in preparation and in the program so far.
- Ongoing communication to parents is needed. Newsletters, meetings or a website can be used. In addition, provide parents with opportunities to visit the classroom, see a showcase of student work or be involved in other ways in the BYODD experience.
- All school Principals, executives and teachers recommend the program to other schools for consideration.
- A recommendation from the CEO eLearning Team is that schools use the CEO Moving To BYODD website. This has advice and resources for schools to use in planning implementing and evaluating a BYODD program.
- A program of preparation for the BYODD is being developed for schools by the eLearning team at the CEO. This is planned to be a three-day program to support schools in preparing, implementing and evaluating the BYODD program. For further information about this program please contact Greg Swanson, eLearning Education Officer.

REPORT RESOURCES

BYODD Pilot Stage 1 Benchmarking Data

Student Survey Form

Student Survey Responses

Teacher Survey

Teacher Survey Responses

Parent Survey Form

Parent Survey Responses

CEO SYDNEY RESOURCES

CEO Moving to BYODD Model Website

CEO Mobile Devices Course

CEO iPad Student Workflows

The Use of iPads in Year 7 Classrooms CEO Report 2012

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Leichhardt, NSW 2040
Phone (02) 9569 6111 Fax (02) 9550 0052
www.ceosyd.catholic.edu.au

D. FIELDWORK SCHEDULE

	RIVER SCHOOL			VALLEY SCHOOL	
	Christine	Colin	Connie	Miriam	Monique
Interview 1	27.03.15	27.03.15	27.03.15	3.03.15	3.03.15
Interview 2	19.08.15	n/a	n/a	28.07.15	n/a
Observation 1	7.05.15	7.05.15	Maternity leave	25.03.15	25.03.15
Observation 2	18.06.15	18.06.15	Maternity leave	1.06.15	28.07.15
Observation 3	25.06.15	19.08.15	Maternity leave	27.10.15	27.10.15

E. INTERVIEW QUESTIONS

Questions:

1. What do you believe about ICT as a learning tool?

2. What is your level of teacher confidence using ICT?

3. What is your access to ICT in classroom

- in terms of devices?
- in terms of connectivity?
- in terms of maintenance?
- in terms of technical support?

4. What have been your experiences using ICT in classroom, what were results, what did it mean for you?

5. What choices of learning experiences/strategies do you choose and why?

6. What in class/school support do you receive?

7. What ICT PD have you undertaken?

8. What is the biggest hindrance to your ICT practice?

9. What enhances your ICT practice?

10. What level are you operating on the SAMR model?

11. Are there any questions you'd like to ask?

F. COORDINATOR INTERVIEW QUESTIONS

QUESTIONS

1. Describe for me your role as eLearning Coordinator and how it works here at your school.

2. In what way do you think that you influence the ICT practice of your colleague teachers?
3. Can you describe how you create your teaching programs? With whom? How do they develop?
4. How do you use the syllabus documents? Do the ICT capabilities influence what you do?
5. How do you determine what ICT tasks and tools you are going to use in your teaching program?
6. Does it make a difference to the students' learning?
7. Would teachers' ICT practice continue to improve if there were no eLearning Coordinators?
8. How do they make a difference?

G. CLASSROOM OBSERVATION

Colin Classroom B 19 August 2015

Maths lessons

Students were seated at desks working in pairs, groups & individually on a Maths task, sharing chromebooks & macs. APlus Maths http://www.aplusmath.com/ was on the Smartboard answering 1x1 digit Maths algorithms. When finished

Colin: 'There's a 3D modelling task I want you to open up. Have you got Drive open Jeremiah?'. T'er explained the activity to students, drawing 3D shapes & noting edges, faces, & apex etc & directed 2 other students to get a device from the trolley. 'If others have got theirs open they can complete the activity'. Students then went into Google drive/ Maths folder. Other student around the room were engaging in their tasks.

T'er: 'Charbel get a laptop.'

Teacher shows on Smartboard those that the task had not been shared with.

T'er: 'If I have shared it with you you should be almost finished drawing your model so you can get some isometric paper to draw you model on once you have drawn it in 3D. Once you hear your name go & get a piece of technology. 'Susan get a macbook'

(The senior group in the grade received the doc first then after more instructions the other groups were sent the doc individually.)

A third group was also using Geoboards with a task on Scootle- a 3D design made on the laptop then ISO paper.

The document was taking a while to load.

T'er: 'You should be getting it through now'.

Some students were using the site Illuminations https://illuminations.nctm.org/ resource for teaching Maths. Some students were helping each other to understand task.

T'er: "Guys it's not in your Maths folder it's in your General folder. Make sure you read the instructions on the Google doc I sent you". Groups on this task continued to help each other.

Student to student next to her: ‘Do you want to add this?’

Reply: “Yes it has to be a 3D shape.’

One group getting elastic bands from teacher next door. New student observed by teacher to enter

T’er: ‘Can you share with Naomi as we don’t have any macbooks left?’

Student then also directed to get geoboards. Children sharing in pairs some on task some not.

T’er: ‘Guys you don’t need to get the geoboards. You’ve got an interactive geoboard.

T’er assisting a student who was having difficulties: ‘Click on the rubber, click on the lines. It’s very sensitive. Make 5 models on the website, draw 5 models onto isometric paper & then label on paper- edges, faces, apex.’ To another student who just arrived. “I need you to join up with someone with a laptop.”

And T’er: Just to remind you those people creating your 3D models & you’ve got to label. I’m putting it up on the Smartboard so you can see the labels.”

Teacher was walking around to tables with laptops. Groups of 3 & pairs were collaborating with shape making & drawing.

Children spent approx for 15mins on these activities.

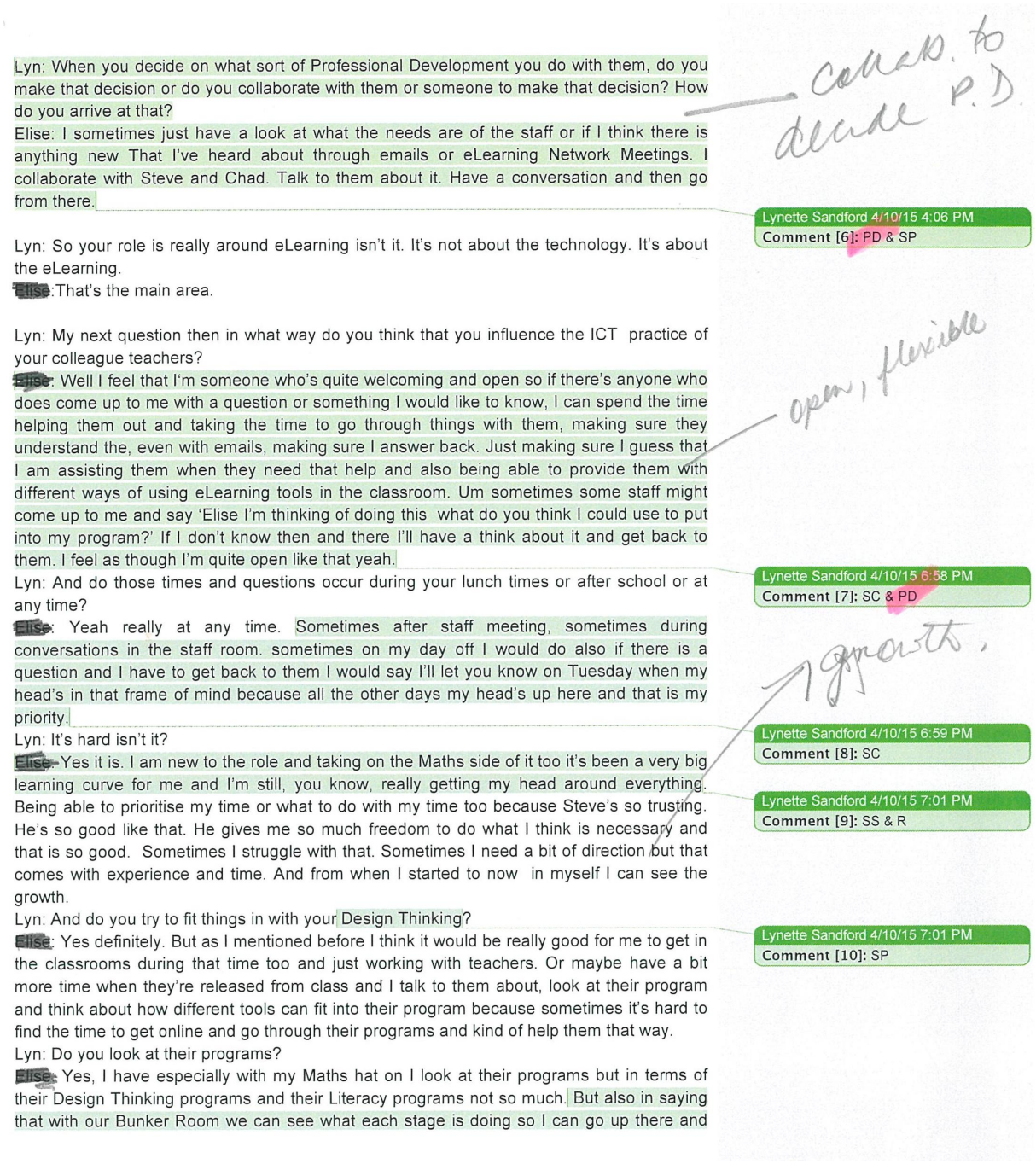
T’er: ‘People using rubber bands & geoboards put them away. Others using macbooks & laptops bring your work to the floor in front of the Smartboard. If you’re working on a chromebook make sure you close that page & put it where you got it from. Then we can debrief.10-9-8-.....”

All children sat in floor in front of the Smartboard with all rubber bands away & chromebooks packed up.

T’er: ‘Today these people who were working on a computer you need to label edge, face & vertices.’ Those children selected were asked to point to the appropriate part of the shape - edge, vertex, face etc while others looked at the Smartboard.

A group of boys returned to the room. ‘I’m going to do one last thing with this 3D shape.” The bell rang before it was completed & students from other classes were returning to the middle room. Students then got ready for lunch.

H. CODING SAMPLE



Lyn: When you decide on what sort of Professional Development you do with them, do you make that decision or do you collaborate with them or someone to make that decision? How do you arrive at that?
Elise: I sometimes just have a look at what the needs are of the staff or if I think there is anything new That I've heard about through emails or eLearning Network Meetings. I collaborate with Steve and Chad. Talk to them about it. Have a conversation and then go from there.

Lyn: So your role is really around eLearning isn't it. It's not about the technology. It's about the eLearning.
Elise: That's the main area.

Lyn: My next question then in what way do you think that you influence the ICT practice of your colleague teachers?
Elise: Well I feel that I'm someone who's quite welcoming and open so if there's anyone who does come up to me with a question or something I would like to know, I can spend the time helping them out and taking the time to go through things with them, making sure they understand the, even with emails, making sure I answer back. Just making sure I guess that I am assisting them when they need that help and also being able to provide them with different ways of using eLearning tools in the classroom. Um sometimes some staff might come up to me and say 'Elise I'm thinking of doing this what do you think I could use to put into my program?' If I don't know then and there I'll have a think about it and get back to them. I feel as though I'm quite open like that yeah.
Lyn: And do those times and questions occur during your lunch times or after school or at any time?
Elise: Yeah really at any time. Sometimes after staff meeting, sometimes during conversations in the staff room. sometimes on my day off I would do also if there is a question and I have to get back to them I would say I'll let you know on Tuesday when my head's in that frame of mind because all the other days my head's up here and that is my priority.
Lyn: It's hard isn't it?
Elise: Yes it is. I am new to the role and taking on the Maths side of it too it's been a very big learning curve for me and I'm still, you know, really getting my head around everything. Being able to prioritise my time or what to do with my time too because Steve's so trusting. He's so good like that. He gives me so much freedom to do what I think is necessary and that is so good. Sometimes I struggle with that. Sometimes I need a bit of direction but that comes with experience and time. And from when I started to now in myself I can see the growth.
Lyn: And do you try to fit things in with your Design Thinking?
Elise: Yes definitely. But as I mentioned before I think it would be really good for me to get in the classrooms during that time too and just working with teachers. Or maybe have a bit more time when they're released from class and I talk to them about, look at their program and think about how different tools can fit into their program because sometimes it's hard to find the time to get online and go through their programs and kind of help them that way.
Lyn: Do you look at their programs?
Elise: Yes, I have especially with my Maths hat on I look at their programs but in terms of their Design Thinking programs and their Literacy programs not so much. But also in saying that with our Bunker Room we can see what each stage is doing so I can go up there and

Lynette Sandford 4/10/15 4:06 PM
Comment [6]: PD & SP

Lynette Sandford 4/10/15 6:58 PM
Comment [7]: SC & PD

Lynette Sandford 4/10/15 6:59 PM
Comment [8]: SC

Lynette Sandford 4/10/15 7:01 PM
Comment [9]: SS & R

Lynette Sandford 4/10/15 7:01 PM
Comment [10]: SP

REFERENCES

Albion, P., & Ertmer, P. (2002). Beyond the foundations: The role of vision and belief in teachers' preparation for integration of technology. *Tech Trends, 46*(5), 34-38. doi: 10.1007/BF2818306

Anderson, J. (2010). *ICT transforming education: A regional guide.* UNESCO Bangkok. Retrieved from http://unesdoc.unesco.org/images/0018/001892/189216e.pdf

Anderson, R.E., & Dexter, S. (2005). School technology leadership: An empirical investigation of prevalence and effect. *Educational Administration Quarterly, 41*(1), 49-82. doi: 10.1177/0013161X04269517

Angers, J., & Machtmes, K. (2005). An ethnographic-case study of beliefs, context factors, and practices of teachers integrating technology. *The Qualitative Report, 10*(4), 771-794. Retrieved from http://go.galegroup.com.ezproxy1.acu.edu.au/ps/i.do?

Atkinson, P., Coffey, A., & Delamont, S. (2003). *Key themes in qualitative research: Continuities and changes.* Walnut Creek, CA: Altamira Press. Retrieved from https://play.google.com/store/books/details/Paul_Atkinson_Key_Themes_in_Qualitative_Research?id=NVQdAAAAQBAJ

Atkinson, P., Coffey, A., Delamont, S., Lofland, J., & Lofland, L. (Eds) (2007). *Handbook of ethnography.* London, England: Sage. Retrieved from https://play.google.com/store/books/details/Paul_Atkinson_Handbook_of_Ethnography?id=KtEx1-A9SvMC

Aubrey, C. & Dahl, S. (2014). The confidence and competence in information and communication technologies of practitioners, parents and young children in the early years foundation stage. *Early Years*, *34*(1), 94-108, doi: 10.1080/09575146.2013.792789

Australian Curriculum, Assessment and Reporting Authority (ACARA) (2015). *Information*

and communication technology (ICT) capability. Retrieved from http://v7-5.australiancurriculum.edu.au/generalcapabilities/information-and-communication-technology-capability/introduction/scope-of-ict-capability

Australian Government, Australian Government, Department of Education and Training (DET) (2009). *Belonging, being, becoming: The early years learning framework for Australia.* Retrieved from https://docs.education.gov.au/system/files/doc/other/belonging_being_and_becoming_the_early_years_learning_framework_for_australia.pdf

Australian Government, Department of Education and Training (DET) (2011). *Review of funding for schooling: Final report December 2011.* Retrieved from https://docs.education.gov.au/documents/review-funding-schooling-final-report-december-2011

Australian Government, Department of Education, Employment and Training (DEET). (2013). *DER mid-program review, Assessing progress of the DER and potential future directions. Final report*. Retrieved from https://docs.education.gov.au/system/files/doc/other/digital_education_revolution_program_review.pdf

Australian Government, Department of Education, Employment and Workplace Relations (DEEWR) (2013). *Digital education advisory group: Final report.* Retrieved from https://docs.education.gov.au/documents/digital-education-advisory-group-final-report

Australian Information and Communications Technology in Education Committee (AICTEC) (2008). *Joint ministerial statement on information and communications technologies in Australian education and training: 2008–2011*. Australian Information & Communications Technology in Education Committee, Australia. Retrieved from http://www.scseec.edu.au/site/DefaultSite/filesystem/documents/Reports%20and%20publ

ications/Publications/ICT%20Publications/AICTEC%20Joint%20Ministerial%20Statement%20on%20ICT%20Education%202008-2011.pdf

Australian Information and Communications Technology in Education Committee (AICTEC) (2009). *Digital education revolution implementation roadmap. Advice to the productivity agenda working group schooling sub-group*. Retrieved from https://docs.education.gov.au/

Australian Institute for Teaching and School Leadership. (2014). *Australian professional standards for principals and the leadership profiles.* Retrieved from http://www.aitsl.edu.au/docs/default-source/school-leadership/australian-professional-standard-for-principals-and-the-leadership-profiles.pdf?sfvrsn=8

Baker, R., (2009). *Pedagogies and digital content in the Australian school sector*. Education Services Australia. Retrieved from http://www.ndlrn.edu.au/verve/_resources/ESA_Pedagogies_and_Digital_Content_in_the_Australian_School_Sector.pdf#search=Pedagogies and Digital Content in the Australian School Sector

Banks, F., Leach, J., & Moon, B. (2005). Extract from new understandings of teachers' pedagogic knowledge. *The Curriculum Journal*, *16*(3), 331-340. doi: 10.1080/09585170500256446

Barley, R., & Bath, C. (2014). The importance of familiarisation when doing research with young children. *Ethnography and Education, 9*(2), 182-195. doi: 10.1080/17457823.2013.841552

Bates, R. (2008). Teacher education in a global context: towards a defensible theory of teacher education. *Journal of Education for Teaching, 34*(4), 277–293. doi: 10.1080/02607470802401388

Board of Studies Teaching and Educational Standards NSW (BOSTES) (2012). *New*

NSW syllabuses: Integrating ICT capability. Retrieved from https://syllabus.bostes.nsw.edu.au/support-materials/integrating-ict/

Bowen, G. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27-40. doi: 10.33116/QRJ0902027

British Educational Communications and Technology Agency (BECTA) (2008). *Harnessing technology: Next generation learning 2008-14: A summary.* London: BECTA Retrieved from http://webarchive.nationalarchives.gov.uk/20101102103654/http://publications.becta.org.uk/display.cfm?resID=37346

Brookfield, S. (2000). Transformative learning as ideology critique. In J. Mezirow & Associates (Eds.), *Learning as transformation: Critical perspectives on a theory in progress* (pp. 125-148). San Francisco: Jossey-Bass.

Bullock, D., (2004). Moving from theory to practice: An examination of the factors that preservice teachers encounter as the attempt to gain experience teaching with technology during field placement experiences. *Journal of Technology and Teacher Education*, *12*(2), 211-237. Retrieved from http://www.learntechlib.org.ezproxy1.acu.edu.au/j/JTATE/v/12/n/2

Catholic Education Office Sydney (2008). Position paper: eLearning with the iLea@n model. Retrieved from http://www.ceosyd.catholic.edu.au/About/Documents/dp-elearn.pdf

Catholic Education Office Sydney (2011). *Strategic improvement plan: Building on strength*. Retrieved from http://www.ceosyd.catholic.edu.au/About/Documents/rpt-BuildStrength.pdf

Chandra, V., & Mills, K. (2014). Transforming the core business of teaching and learning in classrooms through ICT. *Technology, Pedagogy and Education, 24*(3), 285-301. doi: 10.1080/1475939X.2014.975737

Condie, R., & Munro, B. (2007). *The impact of ICT in schools: Landscape review*. BECTA: United Kingdom. Retrieved from http://dera.ioe.ac.uk/1627/7/becta_2007_landscapeimpactreview_report_Redacted.pdf

Cope, B., & Kalantzis, M. (Eds) (2005). *Multiliteracies: Literacy learning and the design of social Futures.* London, England: Routledge. Retrieved from https://play.google.com/store/books/details/Bill_Cope_Multiliteracies_Lit_Learning?id=Tsz9TTaigZQC

Craft, A., Cremin, T., Hay, P., & Clack, J. (2014). Creative primary schools: developing and maintaining pedagogy for creativity. *Ethnography and Education, 9*(1), 16-34. doi:10.1080/17457823.2013.828474

Cresswell, J., W. (2012). *Educational research: Planning conducting and evaluating quantitative and qualitative research* (4th ed.). Boston, MA: Pearson.

Crick, R. D., & Wilson, K. (2005). Being a learner: A virtue for the 21st century. *British Journal of Educational Studies*, *53*(3), 359-374. Retrieved from doi: 10.1111/j.1467-8527.2005.00300.x

Crook, C., & Harrison, C., (2008). *Web 2.0 technologies for learning at key stages 3 and 4*. Coventry, England: BECTA. Retrieved from http://dera.ioe.ac.uk/1480/1/becta_2008_web2_summary.pdf

Crook, C., Farrington-Flint, L., Harrison, C., Tomas, C. and Underwood, J. (2010). *The impact of technology: Value-added classroom practice*. Coventry, England: BECTA. Retrieved from http://oro.open.ac.uk/34523/1/the_impact_of_technology.pdf

Crossley, D., & Corbyn, G. (2010). *Learn to transform: Developing a 21st century approach to sustainable school transformation,* (2nd ed.). London, England: Continuum. Retrieved from

https://play.google.com/store/books/details/David_Crossley_Learn_to_Transform?id=RkUdCgAAQBAJ

Cuban, L. (2001). *Oversold and underused*. Cambridge, MA: Harvard University Press.

Curriculum Corporation (2006). *Statements of Learning for Information and Communication Technologies (ICT).* Carlton South, Australia: Curriculum Corporation. Retrieved at http://www.curriculum.edu.au/verve/_resources/SOL06_ICT.pdf

Denzin, N., K. & Lincoln, Y., S. (2011). *The sage handbook of qualitative research.* Thousand Oaks, CA: Sage. Retrieved from https://play.google.com/store/books/details/Norman_K_Denzin_The_SAGE_Handbook_of_Qualitative_R?id=Z-5yAwAAQBAJ

Dimmock, C., & Goh, J.W.P. (2011). Transformative pedagogy, leadership and school organisation for the twenty-first-century knowledge-based economy: the case of Singapore. *School Leadership & Management*, *31*(3), 215-234. doi:10.1080/13632434.2010.546106

Drake, P. (2010). Grasping at methodological understanding: a cautionary tale from insider research. *International Journal of Research & Method in Education*, *33*(1), 85-99. doi:10.1080/17437271003597592

Emerson, R.M. (2009). Ethnography, interaction and ordinary trouble. *Ethnography*, *10*(4), 535-548. doi:10.1080/17437271003597592

Emerson, R.M., Fretz, R.I., & Shaw, L.L. (2011) *Writing ethnographic fieldnotes* (2nd ed.). Chicago, IL: University of Chicago Press. Retrieved from https://play.google.com/store/books/details/Robert_M_Emerson_Writing_Ethnographic_Fieldnotes_S?id=k83BlbBHubAC

Erickson, F. (1984). What makes school ethnography 'ethnographic'? *Anthropology and Education Quarterly, 15*(1), 51-66. doi**:** 10.1525/aeq.1984.15.1.05x1472p

Ertmer, P. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61. doi: 10.1007/BF02299597

Ertmer, P., & Ottenbreit-Leftwich, A. (2013). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology Education, 42*(3), 255-284. doi: 10.1016/j.compedu.2012.10.008

Ertmer, P., Ottenbreit-Leftwich, A., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education, 59*(2), 423-435. doi: 10.1016/j.compedu.2012.02.001

Fine, G., A. (2003). Towards a peopled ethnography: Developing theory from group life. *Ethnography*, *4*(1), 41-60. doi: 10.1177/1466138103004001003

Fluck, A. (2011). Laptop classes in some Australian government primary schools. [online]. *Australian Educational Computing*, *26*(1), 10-15. Retrieved from http://search.informit.com.au.ezproxy2.acu.edu.au/fullText;dn=188249;res=AEIPT

Forlin, C., & Lock, G. (2006). Employing technologies to engage students with diverse needs in rural school communities. *Australian Journal of Teacher Education, 33*(1), 31-43. Retrieved from http://search.informit.com.au/documentSummary;dn=200608572;res=IELAPA

Forsey, M. G. (2010). Ethnography as participant listening. *Ethnography, 11*(4), 558–572. doi: 10.1177/1466138110372587

Frank, C. R., & Uy, F. L. (2004). Ethnography for teacher education. *Journal of Teacher Education, 55*(3), 269-283. doi: 10.1177/1466138110372587

Freebody, P., McRae, D., & Freebody, K. (2006). The le@rning federation's on-line initiative: lessons from teachers on change, technologies, and learning about English and literacy. *English in Australia*, *41*(1), 48-56. Retrieved from http://search.informit.com.au/fullText;res=AEIPT;dn=152844

Gallagher, K., Wessels, A., & Ntelioglou, B. Y. (2013). Becoming a networked public: digital ethnography, youth and global research collectives. *Ethnography and Education*, *8*(2), 177-193. doi: 10.1080/17457823.2013.792507

Gee, J. P. (2009). Reflections on reading Cope and Kalantzis "'Multiliteracies': New literacies new learning. *Pedagogies: An International Journal*, *4*(3), 196–204. doi: 10.1080/15544800903076077

Grady, M. L. (2011). *Leading the technology powered school.* Thousand Oaks, CA: Corwin. Retrieved from https://play.google.com/store/books/details/Marilyn_L_Grady_Leading_the_Technology_Powered_Sch?id=HgVk3hY4wHEC

Groff, J., (2013). *Technology-rich innovative learning environments.* Paris: OECD. Retrieved from http://www.oecd.org/edu/ceri/Technology-Rich%20Innovative%20Learning%20Environments%20by%20Jennifer%20Groff.pdf

Hague, C., & Williamson, B. (2009) *Digital participation, digital literacy, and school subjects: A review of the policies, literature and evidence.* Bristol, England: Futurelab. Retrieved from http://www.nfer.ac.uk/publications/FUTL08

Hammersley, M. (2006). Ethnography: Problems and prospects. *Ethnography and Education, 1*(1), 314. doi: 10.1080/17457820500512697

Hammersley, M., & Atkinson, P. (2007). *Ethnography, principles in practice.* (3rd ed.). England: Routledge. Retrieved from https://play.google.com/store/books/details/Martyn_Hammersley_Ethnography?id=IK1-AgAAQBAJ

Hammond, M., Crosson, S., Fragkouli, E., Ingram, J., Johnston-Wilder, P., Kingston, Y., Pope, M., & Wray, D. (2009). Why do some students make very good use of ICT? An exploratory case study. *Technology, Pedagogy and Education*, *18*(1), 59-73. doi: 10.108*0/14759390802704097*

Hargreaves, A. (2005). Pushing the boundaries of educational change. In A. Hargreaves (Ed.), *Extending educational change: International handbook of educational change* (pp. 1-14). Dordrecht, The Netherlands: Springer. doi: 10.1007/1-4020-4453-4

Harris, A. (2003). Behind the classroom door: The challenge of organizational and pedagogical change. *The Journal of Educational Change, 4*(4), 369-382. doi: 10.1023/B:JEDU.0000006067.39098.d8

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, *55*(3), 223–252. doi: 10.1007/s11423-006-9022-5

Hogan, J., Dolan, P., & Donnelly, P. (2011). Approaches to qualitative research. Cork, IE: Oak Tree Press. Retrieved from http://www.ebrary.com.ezproxy2.acu.edu.au

ITL Research. (2011). *Innovative teaching and learning research: 2011 findings and implications.* Retrieved from http://www.itlresearch.com/research-a-reports/10-reports/40-2011-itl-research-findings-and-implications

Jachyra, P., Atkinson, M., & Washiya, Y. (2015). 'Who are you, and what are you doing here': methodological considerations in ethnographic health and physical education research. *Ethnography and Education, 10*(2), 242-261. doi: 10.1080/17457823.2015.1018290

James, N., & Busher, H. (2013). Researching hybrid learning communities in the digital age through educational ethnography. *Ethnography and Education, 8*(2), 194-209. doi: 10.1080/17457823.2013.792509

Jamieson-Proctor, R., Burnett, P., Finger, G., & Watson, G. (2006). ICT integration and teachers' confidence in using ICT for teaching and learning in Queensland state schools. *Australasian Journal of Educational Technology, 22*(4), 511–530. Retrieved from

http://search.informit.com.au.ezproxy1.acu.edu.au/documentSummary;dn=155605;res=AEIPT

Jamieson-Proctor, R., & Finger, G. (2008). ACT to improve ICT use for learning: A synthesis of studies of teacher confidence in using ICT in two Queensland schooling systems. *Australian Educational Computing, 23*(2), 12-18. Retrieved from http://search.informit.com.au.ezproxy1.acu.edu.au/documentSummary;res=AEIPT;dn=174367

Jeffrey, B., & Troman, G. (2004). Time for ethnography. *British Educational Research Journal*, *30*(4), 535-548. doi: 10.1080/0141192042000237220

Johnson, L., Adams, S., & Cummins, M. (2012). *NMC Horizon Report: 2012 K-12 Edition.* Austin: The New Media Consortium. Retrieved from http://www.nmc.org/pdf/2012-horizon-report-K12.pdf

Kalantzis, M.,& Cope, B. (2012a). *Literacies*. Cambridge, England: Cambridge University Press. Retrieved from https://play.google.com/store/books/details/Mary_Kalantzis_Literacies?id=sUUhAwAAQBAJ

Kalantzis, M. & Cope, B. (2012b). *New learning, elements of a science of education.* (2nd ed.). Cambridge, England: Cambridge University Press. Retrieved from https://play.google.com/store/books/details/Mary_Kalantzis_New_Learning?id=CrcgAwAAQBAJ

Kalantzis, M. & Cope, B (2012c). New learning: a charter for change in education, *Critical Studies in Education*, *53*(1), 83-94. doi: 10.1080/17508487.2012.635669

Kalantzis, M., Harvey, A., & Cope, B. (2001). *New learning: a charter for Australian education.* O'Connor, Australia: Australian Council of Deans of Education.

Kay, K., & Greenhill, V. (2010). Twenty-first century students need 21st century skills. In G. Wan & D. Gut (Eds.), *Bringing schools into the 21st century* (pp 41-65) Dordrecht,

Netherlands: Springer. Retrieved from http://link.springer.com/chapter/10.1007/978-94-007-0268-4_3

Kersaint, G., Horton, B., Stohl, H., & Garofalo, J. (2003). Technology beliefs and practices of mathematics education faculty. *Journal of Technology and Teacher Education*, *11*(4), 549+. Retrieved from http://go.galegroup.com.ezproxy1.acu.edu.au/ps/i.do?id=GALE%7CA114521840&v=2.1&u=acuni&it=r&p=AONE&sw=w&asid=4df651db75729b027a2b754efbfe3a7c

Kinelev, V. (2001). *Information technologies in educational innovation for development: Interfacing global and indigenous knowledge*. Bangkok: UNESCO Asia and Pacific Regional Bureau for Education. Retrieved from http://unesdoc.unesco.org/images/0012/001264/126427e.pdf

Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, *59*(4), 1109–1121. doi:10.1016/j.compedu.2012.05.01

Kozma, R. (2003). Technology and classroom practices: An international study. *Journal of Research on Technology in Education*, *36*(1) 1-14. doi: 10.1080/15391523.2003.10782399

Kress, G. (2000). Design and transformation: New theories of meaning. In B. Cope & M. Kalantzis, *Multiliteracies: Literacy learning and the design of social futures* (pp. 153-161). London, England: Routledge. Retrieved from https://play.google.com/store/books/details/Bill_Cope_Multiliteracies_Lit_Learning?id=Tsz9TTaigZQC

Landri, P. (2013). Mobilising ethnographers investigating technologised learning. *Ethnography and Education*, *8*(2), 239-254. doi**:**10.1080/17457823.2013.792512

Lankshear, C., & Knobel, M. (2011). *New literacies*. (3rd ed.). Berkshire, England: Open University Press. Retrieved from

https://play.google.com/store/books/details/Colin_Lankshear_New_Literacies?id=HSdFBgAAQBAJ

Law, N., Pelgrum, W., Monseur, C., Brese, F., Carstens, R., Voogt, J., PLomp, T. & Anderson, R. E. (2008). Study design and methodology. In Law, N., Pelgrum, W.J., & Plomp, T (Eds), *Pedagogy and ICT use in schools around the world: Findings from the IEA sites 2006 study* (pp. 12-36). doi: 10.1007/978-1-4020-8928-2

Levin, T., & Wadmany, R. (2005). Changes in educational beliefs and classroom practices of teachers and students in rich technology-based classrooms. *Technology, Pedagogy and Education*, *14*(3), 281-307. doi:10.1080/14759390500200208

Levin, T. & Wadmany R. (2006). Teachers' beliefs and practices in technology-based classrooms. *Journal of Research on Technology in Education*, *39*(2), 157-181. doi: 10.1080/15391523.2006.10782478

Levin, T., & Wadmany, R. (2008). Teachers' views on factors affecting effective integration of information technology in the classroom: Developmental scenery. *Journal of Technology and Teacher Education*, *16*(2), 233-263. Retrieved from http://search.proquest.com.ezproxy1.acu.edu.au/docview/200075198?OpenUrlRefId=info:xri/sid:primo&accountid=8194

Lim, C. P., & Khine, M, S. (2006). Managing teachers' barriers to ICT integration in Singapore schools. *Journal of Technology and Teacher Education, 14*(1), 97-125. Retrieved from http://search.proquest.com.ezproxy1.acu.edu.au/docview/200082134?accountid=8194

Luke, A. (2008). *Digital innovation in schooling: Policy efficacy, youth cultures and pedagogical change (Discussion Paper).* QUT Digital Repository: Retrieved from http://eprints.qut.edu.au/14020/1/14020.pdf

Luu, K., & Freeman, J. G. (2011). An analysis of the relationship between information and communication technology (ICT) and scientific literacy in Canada and Australia. *Computers & Education, 56*(4), 1072–1082. doi: 10.1016/j.compedu.2010.11.008

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach*. (3rd ed.). Thousand Oaks, CA: Sage. Retrieved from https://play.google.com/store/books/details/Joseph_A_Maxwell_Qualitative_Research_Design?id=xAHCOmtAZd0C

McIntosh, E. (2014). *Design Thinking School* Retrieved from http://notosh.com/what-we-do/the-design-thinking-school/

McCormick, R., & Scrimshaw, P. (2001). Information and communications technology, knowledge and pedagogy. *Education, Communication and Information*, *1*(1), 37-57. doi: 10.1080/14636310120048047

Mercer, J. (2007). The challenges of insider research in educational institutions: wielding a double‐edged sword and resolving delicate dilemmas. *Oxford Review of Education*, *33*(1), 1-17. doi: 10.1080/03054980601094651

Merriam, S. B., Johnson-Bailey, J., Lee, M-Y., Kee, Y., Ntseane, G., & Muhamad, M. (2010). Power and positionality: negotiating insider/outsider status within and across cultures. *International Journal of Lifelong Education, 20*(5), 405-416. doi: 10.1080/02601370120490

Miles, M., Huberman, A.M. & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook.* (3rd ed.). Thousand Oaks, CA: Sage. Retrieved from https://play.google.com/store/books/details/Matthew_B_Miles_Qualitative_Data_Analysis?id=p0wXBAAAQBAJ

Mills, D., & Morton, M. (2013). *Ethnography in education.* London, England: Sage. Retrieved from

https://play.google.com/store/books/details/David_Mills_Ethnography_in_Education?id=8jb7AwAAQBAJ

Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) (2005). *Contemporary learning: learning in an online world.* Carlton South, Australia: Curriculum Corporation. Retrieved from http://www.scseec.edu.au/site/DefaultSite/filesystem/documents/Reports%20and%20publications/Archive%20Publications/ICT/LOW-ContemporaryLearning.pdf

Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) (2005b). *Pedagogy strategy: learning in an online world*. Carlton South, Australia: Curriculum Corporation. Retrieved from http://www.scseec.edu.au/site/DefaultSite/filesystem/documents/Reports%20and%20publications/Archive%20Publications/ICT/LOW-PedagogyStrategy.pdf

Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) (2006). *Leadership strategy: learning in an online world.* Retrieved from http://www.scseec.edu.au/site/DefaultSite/filesystem/documents/Reports%20and%20publications/Archive%20Publications/ICT/LOW-LeadershipStrategy.pdf

Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) (2008). *The Melbourne declaration on educational goals for young Australians*. Retrieved from http://www.curriculum.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals_for_Young_Australians.pdf

Morrell, A., & O'Connor, M. (2002). Introduction. In E. O'Sullivan, A. Morrell & M. O'Connor (Eds.), *Expanding the boundaries of transformative learning: Essays on theory and praxis* (pp. xv-xx). New York, NY: Palgrave

Moyle, K. (2006). *Leadership and learning with ICT: Voices from the profession*. Teaching Australia-Australian Institute for Teaching and School Leadership. Retrieved from

http://www.aitsl.edu.au/docs/default-source/default-document-library/leadership_and_learning_with_ict_-_voices_from_the_profession.pdf?sfvrsn=4

Moyle, K. (2010). *Building innovation: Learning with technologies*. Melbourne, Victoria: Australian Council for Educational Research. Retrieved from https://research.acer.edu.au

Neuman, W. L. (2011). *Social research methods qualitative and quantitative approaches.* Boston, MA: Pearson

Newman, M. (2012). Calling transformative learning into question some mutinous thoughts. *Adult Education Quarterly*, *62*(1), 36-55. doi: 10.1177/0741713610392768

Newman, M. (2014). Transformative learning. *Adult Education Quarterly*, *64*(4), 345-355. doi: 10.1177/0741713614543173

New Media Consortium (NMC) 2015. *Horizon Report: 2015 K-12 Edition.* Retrieved from http://cdn.nmc.org/media/2015-nmc-horizon-report-k12-EN.pdf

NSW Department of Education and Training (DET) (2010). *Digital Education Revolution NSW: One-to-One Computers in Schools 2010. Literature Review.* Retrieved from http://www.curriculumsupport.education.nsw.gov.au/digital_rev/leading_my_faculty/lo/student/documents/LiteratureReviewLaptops.pdf

Niemi, H., Kynaslashi, H., Vahtivuori-Hanninen, S. (2013). Towards ICT in everyday life in Finnish schools: seeking conditions for good practices. *Learning, Media and Technology*, *38*(1), 57-71. doi: 10.1080/17439884.2011.651473

Orlando, J. (2009). Understanding changes in teachers' ICT practices: a longitudinal perspective. *Technology, Pedagogy and Education, 18*(1), 33-44. doi: 10.1080/14759390802704030

Orlando, J. (2013). ICT-mediated practice and constructivist practices: is this still the best plan for teachers' uses of ICT? *Technology, Pedagogy and Education, 22*(2), 213-246. doi: 10.1080/1475939X.2013.782702

Ortiz, R.W., Green, T., & Lim, H. (2011). Families and home computer use: Exploring parent perceptions of the importance of current technology. *Urban Education*, *46*(2), 202–215. Retrieved from doi: 10.1177/0042085910377433

Organisation for Economic Co-operation and Development (OECD) (2001). *Education policy analysis 2001*. Paris: OECD. Retrieved from http://dx.doi.org/10.1787/epa-2001-en

Organisation for Economic Co-operation and Development (OECD) (2005). *Teachers matter: attracting, developing and retaining effectivetTeachers.* Paris: OECD. Retrieved from https://www.oecd.org/edu/school/34990905.pdf

Organisation for Economic Co-operation and Development (OECD) (2008). *New millennium learners: Initial findings on the effects of digital technologies on school-age learners*. Paris: OECD. Retrieved from http://www.oecd.org/site/educeri21st/40554230.pdf

Otto, T., & Albion, P. (2004). Principals' beliefs about teaching with ICT: A model for promoting change. In R. Ferdig, C. Crawford, R. Carlsen, N. Davis, J. Price, R. Weber & D. Willis (Eds.), *Proceedings of society for information technology & teacher education international conference 2004* (pp. 1620-1627). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/p/14656

Palak, D., & Walls, R.T. (2009). Teachers' beliefs and technology practices. *Journal of Research on Technology in Education*, *41*(4), 417-441. doi: 10.1080/15391523.2009.10782537

Patton, M.Q. (2014). *Qualitative research and evaluation methods: integrating theory and practice* (4th ed.). Thousand Oaks, CA: Sage. Retrieved from https://play.google.com/store/books/details/Michael_Quinn_Patton_Qualitative_Research_Evaluati?id=-CM9BQAAQBAJ

Pedro, F. (2006). *The New Millennium Learners: Challenging our Views on ICT and Learning*. Paris: OECD. Retrieved from https://www.oecd.org/edu/ceri/38358359.pdf

Pelgrum, W. (2008). School practices and conditions for pedagogy and ICT. In N. Law, W.J. Pelgrum & T. Plomp (Eds). *Pedagogy and ICT use in schools around the world,* (pp. 67-120) doi:10.1007/978-1-4020-8928-2

Pelgrum, W., & Law, N. (2003) *ICT in education around the world: trends, problems and prospects.* UNESCO International Institute for Educational Planning. Retrieved from https://publications.iiep.unesco.org/

Phelps, R., & Graham, A. (2008). Developing technology together, together. *Journal of Computing in Teacher Education*, *24*(4), 125-134. Retrieved from http://dx.doi.org/10.1080/10402454.2008.10784598

Prestridge, S. (2007). Engaging with the transforming possibilities of ICT: A discussion paper. *Australian Educational Computing*, *22*(2), 3-9. Retrieved from http://search.informit.com.au.ezproxy2.acu.edu.au/fullText;dn=165279;res=AEIPT

Prestridge, S. (2012). The beliefs behind the teacher that influences their ICT practices. *Computers & Education, 58*(1), 449-458. doi: 10.1016/j.compedu.2011.08.028

Puentedura, R.R (2006). Transformation, Technology, and Education. Retrieved from http://hippasus.com/resources/tte/puentedura_tte.pdf

Queensland Department of Education and Training Queensland (2011) *Smart Classrooms: A Strategy for 2011-2014.* Retrieved from http://education.qld.gov.au/smartclassrooms/documents/strategy/pdf/smart-classrooms-strategy.pdf

Raby, C., & Meunier, H. (2011). Factors influencing ICT integration according to the teacher's level of pedagogical integration. *Society for Information Technology & Teacher Education International Conference*, *Paper.* Retrieved from https://www.researchgate.net/publication/277733879

Ravitch, S.M., & Riggan, M. (2012*). Reason and rigour: How conceptual frameworks guide research*. Thousand Oaks, CA: Sage. Retrieved from

https://play.google.com/store/books/details/Sharon_M_Ravitch_Reason_Rigor?id=8RliCgAAQBAJ

Schibeci, R., MacCallum, J., Cumming-Potvin, W., Durrant, C., Kissane, B. & Miller, E-J. (2008). Teachers' journey towards critical use of ICT. *Learning, Media and Technology, 33*(4), 313-327. doi: 10.1080/17439880802497065

Schiller, J. (2003). Working with ICT: Perceptions of Australian principals. *Journal of Educational Administration.* Proquest, *41*(2), 171-185. Retrieved from doi: 10.1108/09578230310464675

Scrimshaw, P., (2004). *Enabling teachers to make successful use of ICT.* BECTA: United Kingdom. Retrieved from https://core.ac.uk/download/files/161/4151892.pdf

Selwyn, N. & Husen, O. (2010). The educational benefits of technological competence: an investigation of students' perceptions. *Evaluation and Research in Education*, *23*(2), 137-141, doi: 10.1080/09500790.2010.483515

Sikes, P. (2007). On dodgy ground? Problematics and ethics in educational research. *International Journal of Research and Method in Education, 29*(1), 105-117. doi:10.1080/01406720500537502

Smeets, E. (2005). Does ICT contribute to powerful learning environments in primary education? *Computers and Education, 44*(3), 343-355. Retrieved from doi: 10.1016/j.compedu.2004.04.003

Southworth, G. (2002). Instructional leadership in schools: Reflections and empirical evidence. *School Leadership and Management: Formerly School Organisation*, *22*(1), 73-91. Retrieved from doi:10.1080/13632430220143042

State of Victoria, Department of Education and Early Childhood Development (DEECD) (2009). *eLearning Planning Guide.* Retrieved from http://www.education.vic.gov.au/Documents/school/principals/curriculum/elp09.pdf

Sterling, S. (2010). Transformative learning and sustainability: sketching the conceptual ground. *Learning and Teaching in Higher Education*, *5*, 17-33. Retrieved from http://www2.glos.ac.uk/offload/tli/lets/lathe/issue5/lathe_5_s%20sterling.pdf

Stutchbury, K., & Fox, A. (2009). Ethics in educational research: introducing a methodological tool for effective ethical analysis. *Cambridge Journal of Education*, *39*(4), 489-504. doi: 10.1080/03057640903354396

Taylor, E. W., & Cranton, P. (Eds.) (2012). *Handbook of transformative learning: Theory, research, and practice.* Hoboken, NJ: Jossey-Bass. Retrieved from http://au.wiley.com/WileyCDA/WileyTitle/productCd-0470590726.html

Tondeur, J., Devos, G., Van Houtte, M., van Braak, J., & Valcke, M. (2009). Understanding structural and cultural school characteristics in relation to educational change: the case of ICT integration. *Educational Studies*, *35*(2), 223-235. DOI: 10.1080/03055690902804349

Tondeur, J., Cooper, M., & Newhouse, CP. (2010). From ICT coordination to ICT integration: a longitudinal case study. *Journal of Computer Assisted Learning*, *26*(4), 296-306. doi: 10.1111/j.1365-2729.2010.00351.x

Underwood, J., & Dillon, G. (2011). Chasing dreams and recognising realities: teachers' responses to ICT. *Technology, Pedagogy and Education, 20*(3), 317-330. doi: 10.1080/1475939X.2011.610932

Volman, M., Van Eck, E., Heemskerk, I., & Kuiper, E. (2005). New technologies, new differences. Gender and ethnic differences in pupils' use of ICT in primary and secondary education. *Computers and Education*, *45*(1) 35–55. doi: 10.1016/j.compedu.2004.03.001

Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of the 21st century. *Journal of Computer Assisted Learning*, *29*(5), 403-413. doi: 10.1111/jcal.12029

Wagner, T., & Dintersmith, T. (2015). *Most likely to succeed: Preparing our kids for the innovation era.* New York: Scribner. Retrieved from https://play.google.com/store/books/details/Tony_Wagner_Most_Likely_to_Succeed?id=WFkjBQAAQBAJ

Welsh Assembly Government. Department for Children, Education, Lifelong Learning and Skills (2008). *Transforming Schools with ICT: The Report to the Welsh Assembly Government of the Schools ICT Strategy Working Group*. Retrieved from http://gov.wales/dcells/publications/publications/reports/schoolsict/ictstrategyworkinggroup-e.pdf?lang=en

White, G. (2008). ICT trends in education. *The National Education Magazine*, Nov 2008: 6-12. Retrieved from http://search.informit.com.au/documentSummary;dn=450538966046307;res=IELAPA

Williams, D., Coles, L., Richardson, A., Wilson, K., & Tuson, J. (2000). Integrating information and communications technology in professional practice: an analysis of teachers' needs based on a survey of primary and secondary teachers in Scottish schools. *Journal of Information Technology for Teacher Education*, *9*(2), 167-182. doi:10.1080/14759390000200089

Wood, E., Mueller, J., Willoughby, T., Specht. J., & Deyoung, T. (2005) Teachers' perceptions: barriers and supports to using technology in the classroom. *Education, Communication & Information, 5*(2), 183-206. doi: 10.1080/14636310500186214

Wrigley, T., Thomson, P., & Lingard, B. (2012). In *Changing schools, alternative ways to make a difference in the world.* Routledge. Retrieved from https://play.google.com/store/books/details/Terry_Wrigley_Changing_Schools?id=rymtAgAAQBAJ

Yang, H. (2012). ICT in English schools: transforming education? *Technology, Pedagogy and Education, 21*(1), 101-118. doi: 10.1080/1475939X.2012.659886

Yin, R. K. (2014). *Case study research: Designs and methods* (5th ed.). Thousand Oaks, CA: Sage. Retrieved from https://play.google.com/store/books/details/Robert_K_Yin_Case_Study_Research?id=AjV1AwAAQBAJ

Youdell, D. (2010). Queer outings: uncomfortable stories about the subjects of post-structural school ethnography. *International Journal of Qualitative Studies in Education*, *23*(1), 87–100. Retrieved from doi**:** 10.1080/09518390903447168

Zammit, K., Sinclair, C., Cole, B., Singh, M., Costley, D., Brown a'Court, L., & Rushton, K. (2007). *Teaching and leading for quality Australian schools: A review and synthesis of research-based knowledge.* Teaching Australia. Retrieved from https://www.researchgate.net/publication/255612953_TEACHING_AND_LEADING_FOR_QUALITY_AUSTRALIAN_SCHOOLS