Accounting for Teachers’ Choices to Use, or Not to Use, Web 2.0 Technologies in Upper Primary School Classrooms

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Abstract

The pace of global, technological change has exceeded predictions (Dorr, 2017) and presented a challenge to education systems to maintain currency (Schleicher, 2015). In many Australian schools, technology devices and online resources have been in classrooms for close to two decades; Australian primary school teachers’, however, have yet to demonstrate consistent or embedded use of these technologies.

This thesis investigates factors that have impacted on teachers’ choices to use, or not to use, Web 2.0 in their classroom. Web 2.0 technologies, in this research study, are those that enable communication, collaboration and creativity skill development in students. In comparison to general technologies, devices or websites, Web 2.0 technologies are important as the are linked to growing evidence of their potential, positive impact on student learning (Dunlap & Lowenthal, 2011).

Web 2.0 technology needs to be better understood and is the focus of this thesis. Research in the field of primary education, teacher use of technology and Web 2.0 technologies has been identified as limited (Jimoyiannis, Tsiotakis, Roussinos & Siorenta, 2013). This study provides insights into teachers’ choices to use Web 2.0. These insights may support teachers and leaders to make informed decisions that increase the use of Web 2.0 technologies in upper primary schools.

Australian national census data (Australian Bureau of Statistics, 2011) has indicated a growing trend in out-of-school technology use by 10-12-year-old children. This age group, in grades five and six in the Australian education system, seems to represent a significant moment in technological engagement, towards increased social media and Internet use. These students enter classrooms with skills, knowledge and expectations that could be mobilised for improved learning outcomes. This research understands and frames teachers as the critical mediator between the device and the student’s potential learning. This research recognises the importance of understanding the factors underpinning teachers’ choices to use, or not to use, Web 2.0 in their classroom.
This qualitative research study has strategically brought together Harre’s positioning theory and Charmaz’s constructivist grounded theory to generate findings and co-construct meanings with participants. Through a two-phased study, a nomination sampling strategy identified nine Web 2.0-using teachers, across four Victorian primary schools, and invited them to participate in two interviews, classroom observations and a focus group. Data were co-created with participants and the iterative interactions supported member-checking of the constructivist grounded theory analysis. In phase two, nine primary school teachers from a fifth school were invited to participate in a 90-minute professional learning workshop focused on key findings from phase one, designed to validate or critique the emerging themes.

Findings suggest that the Victorian primary school teachers in this study pro-actively sought out, and created, collaborative teams that supported their learning and aided them to maintain currency within the fast-changing technology world. Leaders’ engagement in classroom practice was highlighted as a key factor in teachers’ choices. School leaders are suggested as holding a critical place in teachers’ decisions to use Web 2.0. Risk-taking, working through failure with colleagues and demonstrating resilience were identified as attributes of these technology-using teachers. This thesis reveals the impact that feeling connected to others and to wider, global changes has had on teachers’ choices to use Web 2.0 technologies. Connections were evident within and across teaching teams, across schools, through Internet interactions on social media, and within the context of global technological changes.
Declaration

This is to certify that:

. The thesis comprises only my original work towards the D.Ed. except where indicated in the Preface;

. Due acknowledgement has been made in the text to all other material used; and

. The thesis is less than 55,000 words in length, exclusive of tables, maps, bibliographies and appendices.

Signed:

[Signature]
Acknowledgements:

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Chapter One: Background to the Research

Teachers in today’s schools are located at a point in educational history where their day to day actions are increasingly mediated by and through technology. This research investigated the decisions teachers made in a technology-enabled classroom to understand better the factors that contributed to teachers’ use, or non-use, of technologies for learning. This question was raised amongst continued concern that students are not yet learning about or accessing the digital resources that may improve their learning and their workforce readiness (The Regional Australia Institute, 2016).

In a primary school classroom, where technology use is often mediated by the teacher, the lack of perceived technological skill and understanding has become an increasing concern (Australia Curriculum, Assessment and Reporting Authority, 2015). The most recent National Assessment Program testing demonstrated that Australian students’ digital literacy had, “decreased...significantly by 22 scale points between 2011 and 2014” (Australia Curriculum, Assessment and Reporting Authority, 2015, p. xxii).

These results are regressing despite numerous injections of funds and resources into Australian schools. Two major federal government initiatives were the Digital Education Revolution (DER) (Digital Education Advisory Group, 2013) that saw all Australian 15-year-old students receive a laptop and the Building Education Revolution (BER) (National Building Education Revolution Coordinator, 2011) that provided new buildings and internet connectivity to schools in a $16.2 billion project across the country. The BER and DER projects focused on devices and infrastructure, not on teachers or pedagogical strategies. This has been a critique of these two projects and a rationale provided for the lack of change in teachers’ practice and students’ learning experiences (Crook, Sharma, Wilson, & Muller, 2013).

At the same time as these major national projects, a minority of teachers continued to make use of digital resources in ways that support student learning (Selwyn, 2010). This study has taken these teachers as the unit of focus for this research. Learning
from those who are making use of digital technologies has provided the opportunity to understand the barriers and enablers that teachers face and, potentially, overcame to use technologies in the classroom. This research seeks to inform school teachers and leaders on the structures, both physical and personal, that may be successful in supporting teachers to move towards enhanced Web 2.0 use in the upper primary classroom.

1.1 Background and Context of the Research

This research has focused on a branch of digital technologies referred to as ‘Web 2.0’. In 1999, DiNucci claimed that "the first glimmerings of Web 2.0 are beginning to appear ..." (DiNucci, 1999, p. 32). Web 2.0 resources have been known by several names that emerged in the past 20 years. Murugesan shared that, "Web 2.0 is also called the 'wisdom-Web', 'people-centric Web', 'participative Web', and 'read/write Web' " (2007, p. 34).

While Web 2.0 can be defined in a number of ways (Allen, 2009; Kamel Boulos & Wheeler, 2007; Murugesan, 2007) these definitions also have similarities in meaning. One commonality appears to be the concepts of:

- Collaboration;
- Creativity; and,
- Communication.

The subset of digital technologies, called Web 2.0, have been identified as the focus of this research because of the challenges of the diverse uses of technology in the classroom. What might be considered low-level use of technology, such as creating a digital presentation or using email, does not have a significant evidence base to confirm its impact on student outcomes. Web 2.0 resources, such as blogs, interactive activities, co-created online resources or multi-media communications, do, however, have an emerging research base that suggests a positive impact of Web 2.0 resources on student learning (Ang & Wang, 2006; Doherty, 2011; Gregory & Lloyd, 2010; Passey,
1.1.1 Web 2.0 and Primary Schooling

Although some academic research has focused on the use of Web 2.0 tools within secondary and tertiary teaching environments, the primary years of schooling have not yet been subject to extensive academic study (Chin, Sum, & Foon, 2008; Means, Toyama, Murphy, Bakia, & Jones, 2009). In the United States Department of Education report Means et al. (2009) identified a gap in the literature relating to the use of Web 2.0 tools in primary school classrooms.

The small number of available studies have often focused exclusively on the frequency with which technology is used in schools and tertiary institutions. It is vital that the use of Web 2.0 in primary schools is carefully evaluated so that both teachers and students can access and benefit from the affordances of these resources.

1.1.2 The Australian Context for Technologies in Schools

In considering the apparent gap in the knowledge about primary schooling and Web 2.0 tools, however, it is pertinent to ask oneself why more research is indeed needed. Could one not take research from a secondary or tertiary education setting and “build an inferential bridge” to connect those findings to other contexts? (Shulman, 1981, p. 9).

This question, however, ignores the differences in learning needs between a primary and secondary student. Primary school teachers require evidence focused on the primary years of schooling. This evidence should reflect the unique challenges of teaching younger age groups with lower independence and higher learning support needs.

The growth of digital technologies in schools and homes was addressed in the national “Declaration on Educational Goals for Young Australians” (Ministerial Council on Education Employment Training and Youth Affairs, 2008). The third iteration of these national goals were published in 2008 following “The Adelaide Declaration on National Goals for Schooling in the Twenty-First Century”, in 1999, and “The Hobart Declaration

Rogers, Machell, & McHugh, 2004; Selwyn, 2010; Zylka, Christoph, Kroehne, Hartig, & Goldhammer, 2015).
on Schooling”, published in 1989. These most recent, 2008, goals aimed to provide a consistent vision for education departments and ministries across the country for the following ten years. With a strong focus on personal, social and academic growth, and framed within a more holistic approach to education, skills with digital technologies are acknowledged as a national imperative for the future of education:

Rapid and continuing advances in information and communication technologies (ICT) are changing the ways people share, use, develop and process information and technology. 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 (Ministerial Council on Education, 2008, p. 5).

In the years since Web 2.0 technology was brought into Australian classrooms, we have also experienced changes in society. These changes are evident in the 2015 national census that indicated 86% of all households in Australia now access the Internet from home (Australian Bureau of Statistics, 2016b).

Despite this increased access to digital technologies, Lee, Srinivasan, Trail, Lewis and Lopez (2011) and Crook, Sharma, Wilson and Muller (2013) have continued to question whether teaching and learning have changed, or improved, with the introduction of technology into schools. It should be asked, furthermore, what specific changes teachers and school leaders need to make to bring Web 2.0 use into the primary school classroom.

In making decisions to use, or not to use, Web 2.0 technologies, primary school teachers have limited research to draw on to justify or rationalise their choices. In 2006, Mishra and Koehler published a model of knowledge concepts that were proposed to frame the successful, educational use of technology. This model is called the Technological, Pedagogical, Content Knowledge model (TPCK) (Mishra & Koehler, 2006). The TPCK model (Mishra & Koehler, 2006), and its embedded knowledge types may have implications for understanding teachers’ choices to use Web 2.0 technologies. The ways in which teachers develop and interact with technological,
pedagogical and content knowledge in their teaching context has yet to be widely investigated.

Compounding this lack of research is the limited amount of evidence-based literature that might inform school leaders’ work in developing their teachers’ technology use. How can or should school leaders support their teachers with Web 2.0 use? Are there leadership strategies or school structures that support teachers better than others?

1.2 Purpose of the Study
This educational research project sought to improve the quality and relevance of primary school students’ educational experiences by better understanding the decisions teachers make to use, or not to use, Web 2.0 technologies. This research has taken the teacher as a key factor and contributor to improving student outcomes (Hattie, 2009) and has therefore focused on the teacher in the classroom. Were teachers to make more use of Web 2.0 technologies in the classroom, it could be surmised that student learning experiences would improve, leading to improved student outcomes (Lui, Wang, & Tai, 2016; Pow & Fu, 2012; Yu-Hui & Yu-Chang, 2011).

The aim of this research, therefore, was to develop a deeper understanding of approaches that support teachers in their choices to use Web 2.0 resources in their teaching practice. This research acknowledged that Web 2.0 technologies had the potential to both improve teaching and learning experiences for students and provide students with the necessary skills to be successful future learners and adults (Dunlap & Lowthenthal, 2011).

The impact of learning with Web 2.0 technologies on student learning outcomes was not, however, a focus of this research, rather, the aim was to understand the teacher’s choices to use this technology.

1.3 Research Questions
The gap identified in the literature has highlighted the need for research that can support teachers and school leaders to understand better the factors that underpin teachers’ decisions and choices in the primary school classroom.
The major research question for this study explores the relationship between three main areas: Web 2.0 technologies, upper primary schooling and teachers’ choices:

**What factors influence and underpin teachers’ choices when using Web 2.0 technologies in the upper primary school classroom?**

The three concepts of Web 2.0 technologies, upper primary schools and teachers’ choices have framed this study so that emergent themes and theories were contained within manageable boundaries, while enabling enough scope for new theories to emerge.

Three further study questions were designed to frame the research around existing literature. These were:

1. Is either collaborative or individual learning more significant to teachers’ use of Web 2.0 in the classroom?

2. What impact, if any, have sociocultural factors, within and beyond the school, had on teachers’ choices to use Web 2.0?

3. Do any school structures support teachers to use Web 2.0 in the classroom? Is there evidence for this?

1.4 Research Design

This two-phased study was conducted within Victoria, a state of Australia. Through a nomination technique, nine government primary school teachers were proposed by their leaders as users of Web 2.0 resources in their classroom. These nine teachers worked across four schools, each was in a different region of Victoria.

Phase one of the study engaged participants in interviews and focus groups at their school. This was followed by several classroom observations. This mixture of individual and group data generation strategies also sought to engage with the concepts of positioning theory (Harré, 1999), in particular, the acknowledgement that social reality is dynamically co-constructed and reconstructed as individuals interact with each other.
This approach sought to develop an understanding of how teachers were positioned, both on their own and when working with their teaching team. The diverse data generation contexts, of individual, group and classroom, offered a way to explore the connection between what teachers said to their colleagues and the researcher and what they enacted in their classrooms.

Participants engaged with the researcher a number of times. This design sought to position them as active co-creators of the data. After each interaction, the data were coded and then shared with the participants for member-checking and further discussion. This process has raised several themes that were then able to be validated across the four participating schools.

The second phase of this research sought to test and validate the findings from phase one. The emergent themes from phase one were embedded in a 90-minute workshop. This workshop was delivered to a fifth school, at which there was no major focus on digital technology use or access. Participants at this workshop were asked to provide feedback on their understanding of technology use and to share their perspectives on the findings of the research in phase one. Phase two provided the perspectives of teachers who did not use Web 2.0 technologies and framed the findings of this research from two perspectives, that of teachers who use technologies and those who do not.

### 1.5 Theoretical Framework

This study has aimed to make meaning with and through teachers who have used Web 2.0 resources in their teaching practice. To better understand how these decisions were made and what factors might support others to similarly use Web 2.0 in the classroom the two complementary theoretical frameworks of constructivist grounded theory (CGT) (Charmaz, 2014) and positioning theory (PT) (Harré, 1999) were used.

Constructivist grounded theory seeks to generate new theory where previously there was none (Charmaz, 2014). This combined data generation and analytic methodology enables the researcher to develop new theories, ideas and concepts from the data. Grounded theory, as a precedent to CGT was first designed to develop theory that was
grounded in the data, seeking to present findings that were rigorously connected through the data to the theory (Glaser and Strauss, 1967). This study has taken a similar approach but with a constructivist focus. Charmaz (2014) reports that her definition of CGT is framed by an acknowledgement that, “... any theoretical rendering offers an interpretative portrayal of the study world, not an exact picture of it” (Charmaz, 2014, p. 10). CGT was an appropriate choice to develop new concepts and themes from within the novel and rapidly-changing space of technological growth and pedagogical change in primary school classrooms. With limited theory available to inform this study, it was seen as important to use a methodological approach that would not exclude new theory. In taking a constructivist approach to grounded theory, in particular the work of Charmaz (2014), this study has iteratively questioned, reviewed and coded the data, seeking participants’ validation of emergent themes.

Positioning theory (PT), as proposed by Harré (1999), has informed this study in the analysis phase. PT takes a dynamic, socially-constructed approach to human interactions and considers that individuals create social norms and acceptable behaviours through each interaction (Harré & Langenhove, 1991). Through interaction and speech acts, such as gestures, language, body language, facial expressions and utterances, individuals position themselves and others to agree or disagree. In accepting, rejecting or re-positioning one another, groups develop norms that may impact both on their membership of a group and their personal behaviours. A teacher may act in a certain way to gain membership of a group of teachers, or may choose to reject the positioning and seek to re-position others to their point of view. PT provided a lens through which to focus on the language, positioning, team dynamics, personal learning and speech acts that teachers shared through this research.

Together, CGT and PT enabled an exploration of teachers’ understandings and decisions around their use of Web 2.0 technologies. CGT provided a structure to generate data with the participants that honoured their personal voices and meanings. PT provided a lens through which to make meaning of that data.
1.6 Limitations of the Study

This study faced limitations of scope and time that are inherent in a doctoral program, that is, the study was conducted part-time by a single researcher. Limited resources necessarily constrained the research and the researcher’s ability to access more sites, more participants or other locations beyond Victoria, Australia.

A further limitation was the role of the researcher and potential for personal bias when generating data and observing teachers in their classrooms. As a teacher and school leader, in both primary schools and within the Department of Education, the researcher took on the role of participant-as-observer. Gold (1958) points to the potential challenge of this participant-as-observer role and asks researchers to consider carefully the way that meaning is made from observations. Researchers must be careful not to misinterpret the meanings behind actions, or to retrospectively detach meanings from events, through their personal, biased, perspective.

Other limitations included the small sample size and the limited number of sites accessed. This is common in qualitative research that focuses on understanding unique phenomena in specific contexts (Bloomberg & Volpe, 2015). Larger samples across more varied settings may have offered different perspectives on the findings, and engaging with more diverse teachers, schools and socio-economic locations may have also provided different outcomes. It is, however, important to note that the participating schools and teachers were nominated by education leaders beyond the school and within the school. This nomination process led to four schools located in Victoria, each with similar, highly multicultural, and mobile populations. These initial nominations came from state education leaders and were chosen from more than 1600 schools.

1.7 Structure of this thesis

This thesis has been structured into six chapters. This first chapter has introduced the context for the research and articulated the aims and purpose of the study. This chapter has also provided an overview of the theoretical and methodological choices made to answer the major research question.
The literature review in Chapter Two discusses the interrelated fields that appear to impact on teachers’ choices to use Web 2.0 in the classroom. The literature review brings together research in the areas of:

- The use of Web 2.0 in education;
- School leadership;
- The uptake of digital technologies in schools; and,
- The position of the teacher within these diverse contexts.

In Chapter Three, the research design and theoretical frameworks are reported and discussed. This chapter includes details of the sampling and nomination approaches used. Nomination began with leaders at the headquarters of the Victorian Department of Education. Chapter Three also reports on the analytic procedures used to generate meaning with participants, through the data.

Chapter Four presents the major findings of this research. This chapter is structured around the five major themes that emerged from iterative coding and analysis of the data. Each sub-section in Chapter Four provides a diagram representing the process of coding that has led to the development of the five themes.

A discussion of the thesis findings is presented in Chapter Five. This chapter discusses answers to the major and minor study questions, as presented both in this chapter and Chapter Three Research Design.

This thesis concludes in Chapter Six by discussing implications and exploring areas for future research.

1.8 Chapter Summary

This introduction to the research project has sought to position the study within its temporal and spatial contexts, namely, the mid to late 2010’s in the Victorian state of Australia. Teachers in Australian primary schools are faced with new devices, online resources and technologies within a new Australian Digital Technologies Curriculum (Australian Curriculum Assessment and Reporting Authority, 2015). As teachers seek to
grasp the potential of these resources, there is continuing concern that changes to pedagogy are not keeping pace with the affordances of emerging technologies and devices.

This research seeks to better understand the decisions teachers make to use, or not to use, digital technologies in their primary classrooms, specifically the subset of technologies for which there is evidence of positive impact on student learning: Web 2.0.
2  Chapter Two: A Review of the Literature

2.1  Chapter Overview

There is increasing concern that the effective use of digital technologies in primary schooling has not yet received the research focus it needs to move forward (Crook, Cummings, Fisher, Graber, Harrison, Lewin … Sharples, 2008; Merdzan, 2016; White, 2008). As research considering the primary school setting is scarce (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013; Means et al., 2009), the scope of this review has required consideration of other educational contexts. It is noticeable within the literature that a major focus has been on teacher training courses in higher education organisations, with limited focus on secondary schooling. The research literature reports on trainee teachers’ use of Web 2.0 within academic courses (Hramiak & Boulton, 2013; Redman & Trapani, 2012; Zhang & Martinovic, 2008). Research focused on discussing the effective use of ICT in primary classrooms, however, is less prevalent.

This literature review has been constructed in nine sections. Each section of this review explores an area suggested by the research literature as a factor in teachers’ use of digital technologies. The chapter concludes with a reflection on the influence of aspirations and predictions on schools’ engagement with technology.

2.2  State, National and International Priorities

Web 2.0 is defined in this research as online resources or tools that engage users in collaboration, creation and communication. This definition has been previously explored in the Chapter One and is referred to here to clarify the scope of the literature review chapter.

For some time, in Australia, it has been recognised that students need to be “highly skilled in the use of ICT” (Ministerial Council on Education Employment Training and Youth Affairs, 2008, p. 5). Australian schools and educators are also experiencing a sense of a global push towards the integration of technology in education, as identified by Buchanan (2011). These global changes, both in education and across society, continue to cross borders and “mono-cultural logics” (Apple, 2010, p. 1) are developing to inform the place and purpose of education (Collins, 2010). This increasing
homogenisation sees governments shifting educational policy and practice towards the
preparation of students for success in a technology-rich, global society (Apple, 2010, p. 1). These international changes to education situate Australian policy makers, leaders, teachers and students as both participants, and change makers in global change. This is evident in national policy statements, such as the National Declaration of Educational Goals for Young Australians (Ministerial Council on Education Employment Training and Youth Affairs, 2008) and in the recent Australian Curriculum: Digital Technologies documentation (2015). This document indicates technology skills are to be core learning for all students (Australian Curriculum Assessment and Reporting Authority, 2015).

Within the Australian state of Victoria, the Department of Education has also identified a global shift towards learning with and through technology. In particular, the department highlights the use of online assessments, conducted nationally but interrogated internationally, that appear to be moving schools towards more frequent use of online teaching and learning that will inform policy and practice (Education Policy and Research Division, 2011). The Victorian Department of Education and Training (DET) has also sought to differentiate between types of online resources, identifying Web 2.0 resources as those that “allow for rich use” and “provide rich opportunities” for learning (Department of Education and Early Childhood Development, 2012) compared to those that do not. This statement is not clearly connected to research literature but indicates that the Department of Education Victoria has promoted Web 2.0 technology use in schools. Victorian teachers’ choices to use Web 2.0 resources are therefore significant factors that should align with state policy and need to be supported by, and in, school practices across the state.

To support and further embed these Web 2.0 priorities in education, the national Australian Digital Education Advisory Group (2013, p. 10) has recommended that “governments develop and disseminate strategies to engage and support the whole community in digital education”. This indicates the significance of technology skills for all members of society, and suggests there is perhaps also a broader governmental focus on national and international communities’ uses of digital technologies. The Australian Curriculum: Digital Technologies (Australian Curriculum Assessment and
Reporting Authority (ACARA), 2015) similarly begins with a rationale for educational change based on global contexts, within which schools are now deemed to be functioning:

Technologies enrich and impact on the lives of people and societies globally. Australia needs enterprising individuals who can make discerning decisions about the development and use of technologies and who can independently and collaboratively develop solutions to complex challenges and contribute to sustainable patterns of living. Technologies can play an important role in transforming, restoring and sustaining societies and natural, managed and constructed environments (ACARA, 2015, paragraph 1).

In the National Statement on “Principles on Open Public-Sector Information” (Office of the Australian Information Commissioner, 2011) this global movement towards change in schools is also expressed as seeking to engage the entire community in two-way discourse through Web 2.0 resources. The statement proposes that government departments should “employ Web 2.0 tools to support community consultation” (Office of the Australian Information Commissioner, 2011, p. 1).

Framed within these global, national and Victorian contexts and visions, teachers in Victorian classrooms are being asked to respond to these changing requirements and directives. A limiting factor to meeting these requirements, however, is the lack of evidence-based research that could provide the guidelines or a framework for teachers, and their leaders, to successfully enact these goals in their classroom practices.

2.3 Digital Technologies and Student Engagement

Web 2.0 resources for learning are identified as having positive outcomes for student learning in a decade of international research studies (Ang & Wang, 2006; Doherty, 2011; Gregory & Lloyd, 2010; Passey, Rogers, Machell, & McHugh, 2004; Selwyn, 2010; Zylka, Christoph, Kroehne, Hartig, & Goldhammer, 2015).

Existing research, such as that highlighted above, appears to have a focus on the potential of technology to enhance both student engagement and student motivation,
and through this to improve student learning outcomes. The terms motivation and engagement are frequently used interchangeably in the literature when discussing technology. Indeed, these terms often appear to overlap considerably (Russell, Ainley, & Frydenberg, 2005). Contributing to the challenge of assessing whether motivation and/or engagement are enhanced through Web 2.0 use in education is the lack of a clear definition of each term. Passey, Rogers, Machell, McHugh (2004) assessed student motivation using the criteria of goals, interest, conceptions of ability and intrinsic drive. Gregory and Lloyd (2010), in contrast, measured engagement through affective, behavioural and cognitive domains, that are perceived as different for each child as they move between contexts, a position that is supported by Jimerson, Campos and Grief (2003). Further, Jimerson et al. (2003) differentiate between motivation and engagement, defining the latter as an imperative to the former. This lack of clear language could be problematic for teachers who may hold differing definitions for engagement and motivation in their classrooms.

Within the literature, it is often implied that Web 2.0, and digital technologies in general, will automatically engage students in their learning (Department of Education Employment and Workplace Relations, 2011; National Building Education Revolution Coordinator, 2011). These expectations also imply that raising student engagement in learning will automatically improve student learning outcomes. The Australian Government’s Digital Education Revolution (DER) program (2011) expected engagement levels to increase through the distribution of digital technologies to schools. This connection does not, however, indicate exactly how technology use may impact positively on student learning outcomes.

Small scale case studies (Ciampa, 2012; Lui, Wang & Tai, 2016; Wankel & Blessinger, 2012) as well as large scale investigations and meta-analyses (Bernard, Bethel, Abrami, & Wade, 2007) appear to promote the use of Web 2.0 technologies for enhanced student learning. This point has been challenged by Bernard et al. (2007) however, who argue that it is difficult to identify why students are engaged when working with Web 2.0 resources. It may be that when using Web 2.0 in the classroom, teachers change their pedagogical approaches to be more student-centred or to encourage more peer to peer interactions. It may be that these pedagogical changes are
impacting on student engagement levels, rather than simply the technology resources in use. This research undertook to better understand the factors that impact on teachers’ choices to use Web 2.0 in the classroom, and to understand teachers’ perspectives on the place of Web 2.0 in their teaching.

2.3.1 Digital Technologies and Student Motivation

Higgins (2003) measured motivation by calculating the amount of time that students willingly engage in an activity (Higgins, 2003). Higgins (2003) reviewed research projects conducted over a three-year period to determine the impact of digital technologies on learning and teaching in British schools. His conclusions indicated that, while digital technologies can motivate learners, the digital technology resource itself had minimal impact on student outcomes; rather, the type of learning or pedagogy appeared to be the motivating factor. This research, however, should be considered within its context. Higgins (2003) concluded that computers can motivate students through rote and drill learning. He notes that this repetitious learning increased a student’s chance of exam success, which in turn enhanced motivation. This use of technology for individual, repetitive learning activities, however, does not reflect the learning possibilities presented by current interactive web resources, social media and online creation tools.

Drexler’s (2010) more contemporary research sought to engage 15 American high school students in an online learning environment. The resulting, small-scale, data suggested that, while most students experienced high levels of motivation, this online, interactive learning approach did not suit all students. Drexler (2010) concluded that providing more student-ownership of learning, in fact lowered the motivation levels of some students. He attributes this to the need for students to have specific skills that enable them to self-direct their learning. As Drexler (2010) explains, the learning skills required for success in an online environment were different to those students had previously developed. Some students did not have sufficient digital or online skills to engage fully with the online, interactive learning.

The small participant numbers in Drexler’s research (2010) may bring the findings into question (Guba & Lincoln, 1985). Undertaken with one cohort of 15 high-school
students from within one American school setting, the study results may not be empirically useful in other settings. The results are, however, similar to an equally small-scale case study conducted earlier by Brett (2004). Both studies concluded that one pedagogical approach, even if that approach is computer-facilitated, did not seem to be able to engage all students in their learning.

Brett’s (2004) research was undertaken just as Web 2.0 resources emerged across society (Allen, 2009). In 2004 there were less opportunities for online interaction, collaboration or creativity, as technology was not yet easily accessible for teachers (Putnam & Borko, 2000). The mixed results gained from Brett’s study (2004) and from Drexler’s later work (2010) may reflect the lack of time teachers had to make changes to their pedagogical approaches when moving to an online environment, rather than a deficiency of the Web 2.0 resource to motivate learners. Drexler’s (2010) more recent research may also have suffered because students and teachers both lacked experience in this newer approach to learning online. The literature suggests that digital or online resources do not automatically engage students in their learning and are not a cure-all for teachers’ classroom challenges. A more informed understanding of the pedagogical and theoretical approaches that teachers used with Web 2.0 resources could perhaps enhance the use of Web 2.0 for more students.

2.4 What Do Teachers Need to Know to Make Use of Web 2.0 Technologies?

The Technological, Pedagogical and Content Knowledge Model (Mishra & Koehler, 2006) as well as the more recent Australian Professional Standards for Teachers (Australian Institute for Teaching and School Leadership, 2011) both present the types of knowledge and skills that it is believed teachers should be able to demonstrate. These differing sets of criteria overlap in their desire to improve student learning experiences. This section next explores these two frameworks and considers what teachers are expected to know and do with technology in their upper primary school classrooms.
2.4.1 The Technological, Pedagogical and Content Knowledge Model as a Framework for Teachers’ Technology Use

In 1987 Godmundsdottir and Shulman (1987, p. 69) discussed the types of knowledge that teachers needed to become “master teachers”. This work described an overlap between pedagogical knowledge and content knowledge, together called Pedagogical Content Knowledge (PCK). PCK built on Shulman’s earlier work (1987) which delineated between the types of learning and skills a new teacher needs to become an effective teacher. He argued that content knowledge was necessary for teachers, but it was the ability to apply pedagogical knowledge to content that distinguished teachers from non-teachers. The PCK model acknowledged the need for pedagogical knowledge and content knowledge to be learned simultaneously so that pedagogically appropriate learning experiences could be designed:

The model [PCK] describes how a teacher's understanding of subject matter is transformed to make it ‘teachable’. This process of transformation taps the different sources of knowledge, the most important being Pedagogical Content Knowledge. It is this way of knowing and understanding the subject matter that distinguishes the teacher from the subject matter specialist (Shulman, 1987, p. 60).

In 2006 Mishra and Koehler (2006) reviewed the concepts laid out by Shulman and Godmundsdottir and argued for the addition of Technological Knowledge to the PCK framework. This has become known as Technological, Pedagogical, Content Knowledge Model (TPCK). Mishra and Koehler (2006) saw a challenge with the use of technology in the classroom; namely that Shulman’s PCK model did not acknowledge the changes in pedagogy and content that technology provides. Teachers, they argued, require more than knowledge of the capabilities of technology, “Part of the problem, we argue, has been a tendency to only look at the technology and not how it is used” (Mishra & Koehler, 2006, p. 1018).

In developing the TPCK model, Mishra and Koehler (2006) also sought to address the needs of teachers in the classroom, “Having a framework goes beyond merely identifying problems with current approaches; it offers new ways of looking at and
perceiving phenomena and offers information on which to base sound, pragmatic

Figure 1 provides an overview of the TPCK model as developed by Mishra and Koehler
(2006):

![TPCK Model Diagram](image)

Figure 1: Technological, Pedagogical and Content Knowledge Model (TPCK) (Mishra & Koehler, 2006)

TPCK sought to support teachers and leaders in understanding the complexity of the
integration of digital technologies into teaching and learning. The TPCK model presents
the perceived intersections between three types of knowledge: pedagogical (how to
teach), technological (how to use technology) and content (about the topic). The
diagram represents an equal balance between these three key aspects of the model.
Mishra and Koehler (2006), however, did not offer the TPCK model as a full and all-
encompassing theoretical framework for teachers, “The TPCK framework allows us to
tease apart some of the key issues that are necessary for scholarly dialogue about
educational technology” (Mishra & Koehler, 2006, p. 1046).

The above quote indicates that “some of the key issues” (Mishra & Koehler, 2006, p.
1046) are highlighted in the TPCK model. It is not considered to be a complete
reckoning of all the factors that are significant to teachers’ actions in the classroom:

> We are sensitive to the fact that in a complex, multifaceted, and ill-structured
domain such as integration of technology in education, no single framework
tells the “complete story”; no single framework can provide all the answers.
The TPCK framework is no exception. However, we do believe that any framework, however impoverished, is better than no framework at all (Mishra & Koehler, 2006, p. 1047).

Mishra and Koehler have acknowledged that their TPCK model has received criticism since its inception. In particular, TPCK does not connect the content and pedagogy factors to the teaching actions that occur in the classroom (Mishra, Koehler, & Henriksen, 2010). The model has also received criticism for its lack of recognition of the learner’s role within their environment:

The TPCK model by not including specific reference to the learner creates a potential analytical gap which can miss out on the importance of considering these particular factors in any course or task design (Unwin, 2007, p. 6).

These critiques are, to some degree, addressed by Mishra and Koehler as they explain:

Developing theory for educational technology is difficult because it requires a detailed understanding of complex relationships that are contextually bound (Mishra & Koehler, 2006, p. 1018).

In acknowledging the complexity of teachers’ uses of technology, Mishra and Koehler share their belief that the contextual factors surrounding their research are significant, yet challenging. Teachers, it is claimed, must:

... integrate knowledge of student thinking and learning, knowledge of the subject matter, and increasingly, knowledge of technology. At the intersection of pedagogy, content, and technology, is the very specialised brand of teacher knowledge represented by TPCK (Mishra et al., 2010, p. 24).

This model of technology integration might be useful for certain teachers in certain settings, but does not appear to have had a major impact on teachers’ use of technology. As Walker-Beeson, Journell and Ayers (2014, p. 119) have explained, the “teacher’s role is crucial” for classroom technology use and yet the teacher is not included in the TPCK model. This deficit draws attention to the need for a model of educational technology use that places teachers as central stakeholders.
2.4.2 The Australian Professional Standards for Teachers and Technology in Schools

In 2011, the Australian Professional Standards for Teachers (APSTs) were released nationally (Australian Institute for Teaching and School Leadership, 2011). These standards, developed by the Australian Institute for Teaching and School Leadership (AITSL), sought to support teachers to, “implement practices that have been shown to improve teaching: evaluating their impact, seeking feedback about their practices, working together, and engaging in effective professional learning” (Australian Institute for Teaching and School Leadership, 2011, p. 1). These areas are expressed across three domains:

1. Professional Knowledge;
2. Professional Practice; and,
3. Professional Engagement.

These domains are further broken down into stages of growth within the teaching profession. Teachers are categorised as Graduate, or pre-service teachers, Proficient teachers, Highly Accomplished teachers or Lead teachers. This, more so than the TPCK model, frames teaching as a learned skill and set of capabilities that are developed over time with other, more expert, teachers.

This structure for understanding the complexity of teaching offers criteria for evaluation of a teacher’s performance, and suggests an overlapping framework of responsibilities:

The focus areas and descriptors identify the components of quality teaching at each career stage. They constitute agreed characteristics of the complex process of teaching. An effective teacher can integrate and apply knowledge, practice and professional engagement as outlined in the descriptors to create teaching environments in which learning is valued (Australian Institute for Teaching and School Leadership, 2011, p. 1).

The Australian Institute for Teaching and School Leadership standards, do not, however, offer schools support or structural strategies for achieving these desired
outcomes. Their declared mission is, “to promote excellence so that teachers and school leaders have the maximum impact on student learning in all Australian schools” (The Australian Institute for Teaching and School Leadership, 2011, p. 1). Their aim is to provide a theoretical framework within which teachers can measure their progress and evaluate their professional learning needs.

On their website, the Australian Institute for Teaching and School Leadership offer what they call illustrations. These short video and/or text resources provide an indication of what each standard might look like in a school setting. They do not, however, provide examples of the structures or enablers that might sit behind teachers’ actions to support teachers’ learning. An example of this is a standard taken from the second level of development, the proficient teacher:

Use teaching strategies based on knowledge of students’ physical, social and intellectual development and characteristics to improve student learning (The Australian Institute for Teaching and School Leadership, 2011).

Designed to be a general outcome relevant to all teachers at this stage of their professional development, this standard does not explore these strategies or how teachers might be supported in the school.

Digital technologies are referred to explicitly in three AITSL standards:

- 2.6 Information and Communication Technology (ICT);
- 4.5 Use ICT safely, responsibly and ethically; and,
- 3.4 Select and use resources.

(Australian Institute for Teaching and School Leadership, 2011)

Standard 3.4 includes technology in the broader frame of general pedagogical strategies, noting that teachers should demonstrate, “knowledge of a range of
resources, including ICT, that engage students in their learning” (The Australian Institute for Teaching and School Leadership, 2011).

While the AITSL standards offer a framework for the knowledge, practices and engagement that effective teaching should contain, its aims are different to this research and the standards do not offer practical, evidence-based strategies for teachers’ and leaders’ technology-use. Those seeking to enhance technology use in their classrooms need more examples of what good technology use looks like (White, 2013b). A framework that acknowledges the impact and complexities of global, technological changes and external factors on the primary school classroom is needed.

### 2.5 Professional Learning and Development

To develop their abilities teachers in Victorian schools must complete professional learning to maintain their teaching registration (Victorian Institute of Teaching, 2015). Professional learning and professional development have distinct definitions in the literature that will be briefly introduced here.

The 2009 Teaching and Learning in International Schools survey defined professional development as, “activities that develop an individual’s skills, knowledge, expertise and other characteristics as a teacher” (Organisation for Economic Co-operation and Development, 2009, p. 49).

Fullan (2007) sees the term ‘development’ as difficult due to its historical meaning in schools, “… professional development involves workshops, courses, programs, and related activities that are designed presumably to provide teachers with new ideas, skills and competencies … ” (Fullan, 2007, p. 35).

While the Organisation for Economic Co-operation and Development definition of professional development focuses on the teacher as a learner, Fullan (2007) argues that “professional development as a term and as a strategy has run its course” (Fullan, 2007, p. 35). The debate between professional learning and professional development continues, with the terms often used interchangeably both in schools and in the research literature (Mayer & Lloyd, 2011). Despite the challenges of language, it is clear that teachers must engage in learning that seeks to advance their professional
It is not yet clear, however, what types of learning might best support teachers to engage with Web 2.0 technologies in the classroom.

2.6 Digital Technologies and Student Learning

One of the most significant and current discussions focused on the use of digital technologies in education is whether, or to what degree, student learning outcomes are improved through digital learning experiences. This section of the literature review will discuss the evidence for and against the impact of digital technologies.

Means, Toyama, Murphy, Bakia and Jones (2009) conducted a meta-analysis of 51 studies that had sought to investigate the effectiveness of online learning compared with face to face instruction. While the study encompassed more than one thousand studies, they report that only a very small number focused on online learning in school contexts. Of those studies focused on school education, Means et al. (2009) criticised the lack of an empirical basis for many of the studies’ claims, and finally included only four school-focused studies in the final meta-analysis. Despite the limited number, these studies are included in this literature review as useful indicators of data types that have been made available to date.

Means et al. (2009) concluded that online learning has marginally more impact on student outcomes than face to face teaching. Lack (2013) has criticised Means et al.’s (2009) work based on the extreme rigidity of the meta-analysis selection criteria. Lack (2013) argued that the elimination of such a large number of studies is overly restrictive and negates the validity of some of the study’s conclusions. It would seem that, for some, Means et al.’s (2009) research is too limiting. Means et al. (2009), however, see their meta-analysis as necessarily limited by the lower quality research available to them.

Notwithstanding these judgements, Lack (2013) ultimately reaches the same conclusion as Means et al. (2009). The existing data is challenging to compare and of varying quality, but suggests overall that online learning can enhance learning outcomes for students when compared to face to face, traditional learning approaches.
Both studies also reviewed the role of blended learning in education. This is defined as a content delivery method, through which students learn through both face to face and online settings (Means et al., 2009). Both studies concluded that a blended learning approach has more impact on learning outcomes than either face to face or online learning strategies alone. This finding was pre-empted by Zhoun, Varhagen, Sears, Kasprzak and Shervey (2007). Zhoun et al.’s study with pre-service teachers identified that combined face to face and online learning experiences could facilitate the development of a stronger community of learners, which Zhoun et al. (2007) considers may enhance the students’ learning.

Means, Toyama, Murphy and Bakia (2013) conducted a second series of meta-analyses in the area of online learning. This study focused on the online learning resources that had become available since their initial meta-analysis. Using similar criteria to examine relevant data, the findings of this second report appeared to mirror their earlier results.

In this second study, student learning appeared to be more successful through a blended learning approach than through face to face teaching alone (Means et al., 2013). This suggests that online learning may have increased in effectiveness since the 2009 analysis. This has perhaps occurred because more online resources are available and, with time, students and their teachers have become more familiar with ways to use online and digital media. With measurable growth in students’ use of, and interest in, digital resources (Project Tomorrow, 2013; Thomson, 2015), teachers can be seen to need ongoing support and time to engage with the changing pedagogical landscape, beyond case study or meta-analysis data.

With little definitive research focused on primary schooling, there is an acknowledged lack of support for teachers and school leaders who seek to develop their knowledge and skills with Web 2.0 technologies. This research has sought to begin investigating this gap.
2.7 Challenges of Research into Web 2.0 and Digital Technologies

The limited number of empirically-based studies that have investigated the effectiveness of digital technologies for learning presents a challenge to teachers, policy-makers, researchers and to this study. Research has often focused on the use of technology by one teacher, within their specific context (Chong, 2008; Knobel & Lankshear, 2009; Lui et al., 2016; McLean, 2009; Tse, Yuen, Loh, Lam, & Ng, 2010). These are each small case-studies, which present issues of reliability and transferability (Lincoln & Guba, 1985; Patton, 2001) and so potentially limit the ways that teachers in classrooms might use or build upon these studies’ findings.

2.7.1 Types of Teacher Stories about Technology Use

There appear to be several different perspectives at work within schools concerning teachers’ technology use, making the investigation of teacher practices more challenging. Clandinin and Connelley (1996) explore these different perspectives through a theory of layered stories that teachers tell about their practice. This theory proposes that teachers tell, enact and concurrently share, three separate stories about their teaching work. These three stories are named as the sacred, the secret and the cover stories (Clandinin & Connelly, 1996).

The sacred story is that which embodies the core values, actions and beliefs of the community and their profession. This might be, for example, a school-wide belief that student well-being is more important than any other teaching responsibilities. To speak or act against the sacred story may lead a teacher to be called to account for behaviour that does not align with the sacred story. Failure to uphold a sacred story could result in being seen as other within the school community. These sacred stories can create a sense of accountability as well as belonging with the school community. Sacred stories have influence within school communities and this can create challenges for researchers. In this study it was recognised that, in order to understand teachers’ choices to use Web 2.0, the researcher would have to engage with deeply held personal beliefs.

Clandinin and Connelly (1996) state there is another layer to be considered when trying to understand peoples’ actions. A teacher’s cover story is what they say
publically to others about their work. It may include the sacred aspects of the school culture. If, however, a school’s sacred story differs from the teacher’s actual beliefs and values, the cover story may differ. An example that explicates this difference and the implications is when a teacher discusses a great science lesson that was just taught with colleagues, when in reality the teacher did not feel comfortable with the lesson at all.

Alongside these sacred and cover stories that teachers share about their teaching practice are the secret stories that teachers enact in their own private spaces (classrooms, homes or offices). Secret stories might include the actions they take in their classrooms when no one is watching, and that may contradict or modify the school’s sacred values. A secret story, however, may not be enacted outwardly at all.

It is within this complex context of layered and storied interactions that teachers tell and show us, as researchers, about their work in their schools. Secret stories are shared only with trusted others. An understanding of teachers’ cover, secret and sacred stories may, however, help to better make sense of their choices to use Web 2.0.

This is one of the challenges to research that seeks to better understand teacher commitments to specific teaching practice, such as Web 2.0 technologies. Consequently, these types of stories can influence the type and validity of informative research that is available.

2.7.2 Teacher Concerns about Student Safety
Online safety for students, particularly younger children, is frequently cited by teachers as a barrier for using Web 2.0 in classrooms (Kritzinger, 2015; Martin & Noakes, 2012; Sharples, Graber, Harrison, & Logan, 2009). Perhaps this concern has also limited the amount, rigour or validity of the research available. At times, there appears to be more of an implication of danger than proof of a significant or specific threat. In 2012 the Department of Education in Victoria (2012) referred to their provision of “safer online spaces” for teacher and student use. They did not, however, reference any specific threat that may exist in online environments or what has motivated their choices to create their own, safer Web 2.0 environments for student
use. This implicit threat frames the online world as unsafe for children and as a space to be carefully managed by teachers and parents.

Crook, Cummings, Fisher, Graber, Harrison, Lewin et al. (2008, p. 5) go further and imply that the “more playful” aspects of Web 2.0 technologies pose a similar threat to students as other, more “morally suspect”, websites. Crook et al. (2008, p. 5) linked the pressure schools feel to restrict student Internet access to a “widespread anxiety” for student online safety that is felt by both school leaders and society in general. These blanket statements do not, however, clarify specific concerns or provide information about the type or degree of concerns expressed by parents or school leaders. Notably, these ominous comments position students as needing adult intermediaries between technology and the child. This presents a challenging juxtaposition that asks teachers and parents to choose between providing both protection from, and exposure to, digital technologies. This may, in turn, become a sacred story of the school: we have to protect the children. Seeking to be seen to provide a safe environment for students may further inhibit teachers’ choices to use Web 2.0 technologies in the classroom.

The “unidirectional relationship” (Turvey, 2006, p. 309) many students experience with the Internet at school may be a consequence of these fears and thereby hinder researcher efforts to develop definitive data on their effectiveness for learning. As Turvey (2006) explains, students appear to use technology as directed by teachers, often in individual online spaces where the feedback is from the teacher to the student. Safety online is a challenging and fast-changing space for students and adults to navigate. A question remains as a barrier to teachers’ technology use: how open should Web 2.0 resources be so that primary school students are provided with an online learning environment that is both safe and educationally effective?

2.7.3 Functionality of Educational Web 2.0 Resources and Student Expectations

In recent years, there has been a proliferation of digital technology resources available to both students and teachers. This might be seen as a barrier to research into digital technologies. Despite the perceived usefulness and ease of use of these tools, it would seem that free online resources have created a further challenge for teachers and
researchers. Zixiu and Stevens (2011) reported an inverse relationship between students’ familiarity with services such as Facebook or MySpace and the perceived usefulness of a higher education course wiki. The more familiar that students claimed they were with social media websites, the less useful the students found the course-provided wiki space. This study of 205 higher education students found that personal experiences and interactions with digital resources such as Facebook and MySpace had created an expectation of high level design, ease of use and open access. Students did not see these attributes and features evident in their online learning space (Zixiu & Stevens, 2011). This suggests that a further barrier to increasing Web 2.0 use may be the quality of design, usability or user interface of educational websites and resources.

2.7.4 Research and Fast-changing Technologies

Recent growth in the personal use of digital technologies (Australian Bureau of Statistics, 2011) has heightened the need for more research into how and why these resources are being used, or not used, in education (White, 2013a). More recently, statistics indicate this growth is a continuing trend around Australia. The 2014-2015 ‘Household Use of Information Technology’ report indicates that, on average, each household has six Internet devices, this number increases to seven devices if there are children under 15 living in the home (Australian Bureau of Statistics, 2016b). While there is some variation in this statistic across Australia, the ABS highlighted that this not of great significance and variation appears to be based on geographic location rather than on socio-economic status or other cultural measures:

The difference in the participation rates was not statistically significant between children living in major cities (91%) and remote and very remote areas of Australia (88%) (Australian Bureau of Statistics, 2016b).

Scardamalia and Bereiter (2006, p. 101) assert that as technological advancement continues to evolve, “progress is measured by comparison to what has gone before, rather than by distance to a predetermined end-point”. The ability to clearly identify and measure the ways in which technology is being used in schools is therefore in a constant state of flux, presenting further challenges for researchers. For this reason, this research project focused on teachers’ use of Web 2.0 and sought to provide a
useful framework through which future researchers might also identify support mechanisms. This may better inform both teachers’ technology use in classrooms and contribute to the research literature.

The literature seems to have painted a picture of a growing disconnect between students, teachers, governmental priorities and global pressures (Jimoyiannis & Komis, 2007). Jimoyiannis & Komis, (2007, p. 249) called for “active learning” and “authentic professional learning” for teachers seeking to use digital technologies. There is a challenge clearly emerging from the literature (Fu, 2013; Merdzan, 2016; O'Connor, Goldberg, Russell, Bebell, & O'Dwyer, 2004) for providing this support for teachers. When support frameworks or research are not easily accessible nor relevant to the primary school setting, implementation is necessarily difficult. This appears to have contributed to a disconnect of differing of expectations, values and accountability between students, teachers and school leaders.

The following section reviews research that investigates the place of the individual teacher in Web 2.0 use. The complex nature of teaching is acknowledged and explored through a focus on both internal (personal) and external (socio-cultural) barriers and enablers impacting on teachers’ abilities to embed digital technology in primary school classrooms.

### 2.8 The Place of the Individual in Technology Integration

Many governmental initiatives have called for increased integration of digital technologies within education systems (Law, Pelgrum, & Plomp, 2008). In 2015, the Director for Education and Skills for the The Organisation for Economic Co-operation and Development (OECD) noted that as technological progress accelerated, education was failing to keep pace, leaving vast numbers of people, including today’s students, struggling to adapt to a rapidly changing world and contributing to widespread suffering (Schleicher, 2015).

In Australia, several recent government initiatives have focused on improving digital infrastructure and teacher and student access to online resources (Department of Education Employment and Workplace Relations, 2011). Similarly, there has been an
increase in at-home use of technologies (Australian Bureau of Statistics, 2016b) suggesting that students and teachers have increased awareness, and possibly skills, in using digital technologies. While some schools continue to struggle to fund technology programs or to provide adequate professional learning for teachers (Selwyn, 2016), many schools within Victoria do now have access to internet-connected technology devices (The Victorian Department of Education and Training, 2011). The root of the ongoing challenge of limited technology adoption in schools perhaps lies with individual teachers and leaders within schools.

2.8.1 Self-Efficacy and Teachers’ Use of Technology

The current literature seems to indicate a limited consensus on the attitudes or values that most likely facilitate teachers’ increased integration of Web 2.0 resources. A review of the current literature offers two general types of research. One type of study demonstrates the ways in which a teacher’s mindset or beliefs have either hindered or assisted a project (Pow & Fu, 2012). There are also studies that question whether a project’s success was overly impacted by the positive attitude of participating teachers (Cheng, Lou, Kuo, & Shih, 2013; Turvey, 2006). This research investigates the relationship of the individual teacher to the success, or otherwise, of a project.

Self-efficacy, as defined by Bandura, (1977) is a significant contributing factor to human action and agency. In his social learning theory, Bandura (1977) describes self-efficacy not as a fixed belief in one’s abilities but rather as an individual’s changing cognitive, social, emotional and behavioural responses to situations. A person’s belief in their ability to succeed is, according to Bandura (1977; 1995; 1997), fundamental to being competent or successful at a task. Believing that one can achieve a goal, therefore, materially impacts on one’s ability to accomplish that goal. More recently, Bandura (2002) has reflected on the growth of technology throughout society. He emphasises the significance of sociocultural factors to any successful widespread change and hypothesises that society-wide change will continue to occur at the level of each individual rather than through a single mass alignment. This is in contrast to a mass shift towards a digital world, as technology companies seem to propose. The reality, perhaps, appears to be similar to that predicted by Bandura (2002). This means
that the individual will evaluate, experiment and finally engage with technology that is perceived as necessary to their own context.

It would appear, when one reflects on the slow rate of technological change in schools, that Bandura’s (2002) paper has proven predictive. In Australia teachers have experienced more than a decade of technology and infrastructure growth, however, there appear to be only minor changes to teaching and learning practices (Jimoyiannis et al., 2013). As White (2008) contends, we do not yet understand why pedagogical and technological change occurs for some teachers, and not for others. White (2008) believes this may be because research so far has focused on what is occurring in classrooms rather than why change is, or is not, occurring. This focus has culminated in current studies appearing to prioritise investigations of specific resources such as blogging, wikis or online learning management systems (Cerezo, Sanchez-Santillan, Puerto Paule-Ruiz, & Carlos Nunez, 2016; Eteokleous-Grigoriou & Nisiforou, 2013; Newland & Byles, 2014). These studies offer little help to understand the pedagogical or individual learning needs of teachers or leaders should they wish to use the digital resources used in the study.

According to Bandura’s theory of self-efficacy (1977) an individual’s level of self-efficacy (sometimes termed self-belief), impacts on their ability to learn skills. Self-efficacy, as initially defined by Bandura (Bandura, 1977) can be described through four key aspects:

1. Mastery Experiences;
2. Vicarious Experiences;
3. Verbal Persuasion; and,
4. Emotional Arousal or Affective State.

These four aspects of self-efficacy development may support individuals to learn new pedagogical skills that may better support the deeper use of digital technologies. Several studies have identified the relationship between lower self-efficacy levels and limited teachers’ Web 2.0 use (Andreassen & Bråten, 2013; Dohn, 2009; O’Connor et
al., 2004). These studies have identified that teachers’ self-efficacy can be an enabler or barrier to Web 2.0 use. These studies have highlighted the pertinence of the individual teacher’s choices in classroom use of Web 2.0.

2.8.2 Research for Technology Integration
Several studies have sought to help develop teachers’ skills in using digital technologies through pilot programs. These programs often have broad aims. It has been noted that these aims appear to align more with change/leadership literature (DuFour, 2004) than with effective classroom technology use. These studies sometimes propose leadership actions or procedures to be imposed on teachers, rather than presenting teacher professional learning as an activity that can occur with teachers. Several of these leadership-focused strategies are highlighted below:

- Providing time for collegiate sharing between teachers (O’Connor et al., 2004) (Ertmer & Ottenbreit-Leftwich, 2010; Hramiak & Boulton, 2013; Jimoyiannis et al., 2013; Pow & Fu, 2012);

- Providing modelled and shared examples of good practice within the school and bringing in examples from beyond the school (Chen, Cato, & Rainford, 1999; Hord & Sommers, 2008); and,

- Supporting teachers to have positive learning experiences (Ertmer & Ottenbreit-Leftwich, 2010; Mueller, Wood, Willoughby, Ross, & Specht, 2008; Zhao & Frank, 2003).

These approaches might be seen to limit teachers’ abilities to make personal choices about their own learning needs. The implementation of these suggestions could be challenging. While time might be able to be carved from a busy school week for sharing and modelling good practice, it must be questioned whether schools have enough models of good practice to be able to share. Do teachers and leaders have access to proven, effective examples of digital technology use? While Web 2.0 tools are often declared as effective for learning (Aljeraisy, 2015; Cheng et al., 2013; Chwo, 2015) the practicality of providing examples of evidence-based practices without a
body of directly related research, from primary school contexts, continues to be a major challenge for school leaders and teachers.

As school leaders continue to seek research that supports their work with teachers in schools, more literature is needed that focuses on the teacher as an individual learner. Teachers bring unique backgrounds and skills that influence the identities they take on in their schools (Windschitl & Sahl, 2002). Teachers also have different levels of self-efficacy around technologies (Kramarski & Michalsky, 2014). Some may have developed skills with personal technology use, with social media, online games, emailing or online banking. Others may have educational or administrative skills such as creating shared documents or marking assignments online. These disparate uses may impact on teachers’ abilities, or their perceived abilities, to further integrate technologies beyond simple website use.

### 2.8.3 Generational Labels for Technology Users

As technology pervades all aspects of life for many of us, labels, names and supposed identifiers have also emerged to categorise the ways in which people use technology. The labels that appear to currently be most used are those developed by Prensky (2001). These labels continue to be used despite ongoing contention and claims that these binary assertions are wrong and potentially unhelpful. Prensky’s definitions name the younger generation as the digital natives indicating those born into the current digital culture. The rest of the population are classified as digital immigrants, they may migrate into the digital world, but it is implied that they can never be as fluent in the language of technology as those who are native-born.

Academics have criticised these generalisations as too restrictive in defining a person’s ability to use technology (Helsper & Eynon, 2010). Despite continual voices of dissent, the terms ‘native’ and ‘immigrant’ continue to persist in mainstream media (Baird, 2013; Naughton, 2016; Topsfield, 2010a; 2010b). In these, and other media reports, teachers are often positioned as ‘immigrants’ to the technological landscape, who are unlikely to achieve the same levels of fluency demonstrated by their students. There is a risk that these labels may impact on primary school teachers’ self-efficacy and perceptions of their capacity to use, or not to use, technology for learning. If primary
school teachers took these definitions as absolute, they may believe that they do not have the capacity, or self-efficacy (Bandura, 1977), to effectively learn and use digital technologies in their classroom.

Helsper and Eynon (2010) have validated that these words are concerning. They reflect that labels such as digital and native may be harming daily interactions between teachers and students. They similarly propose that teachers may also limit their aspirations when they are labelled as digital immigrants as this positions teachers as never able to become a digital native (Helsper & Eynon, 2010; Smith, 2012). This concern aligns with Bandura’s (1977) work on self-efficacy, namely, that goal setting and aspirations are intrinsically linked to a person’s self-efficacy beliefs, and that, notably, low self-efficacy leads to self-limiting behaviour. This suggests that using labels to describe technology use may be a factor impacting on teachers’ digital technologies use in the classroom.

Significantly, since his initial definitions were published in 2001, Prensky has shifted his language away from his definition of natives and immigrants (2001) to a more inclusive and broader continuum of technology use (Prensky, 2009). Supporting the concept of a continuum of technological expertise and fluency, Greenhow, Robelia and Hughes (2009) and Livingstone and Helsper (2007) likewise explore technological fluency as a continuum along which individuals progress, or not. As Bennett and Maton also argue:

... we must go beyond simple dichotomies evident in the digital native debate to develop a more sophisticated understanding of our students’ experiences of technology (Bennett & Maton, 2010, p. 321).

Clarifying the labels used to describe primary school teachers is considered significant to this research project. Teachers are positioned not only by their direct contact with others in their schools, homes and social lives, but also by the media, professional organisations and community expectations (Harré, 1999). The ongoing debate around the language of users and non-users of technology suggests that a teacher’s identity might be influenced through their own and society’s language and expectations as well as through specific, digital technology skills or knowledge. This study has sought to
explore these connections to further understand if or how teachers make decisions to engage with these technologies.

2.8.4 Teachers as Technology Users

As previously discussed, Bandura (1977) stated that levels of self-efficacy can influence the goals one sets and even the desires one has for learning or experiencing new things. While at a general level this may seem conclusive, setting a goal would seem unlikely if one believes it is an impossibility, there is possibly another argument here. If self-efficacy levels are so integral to action, and many in the non-education world attach meaning to the concepts of digital native and digital immigrant, how is it possible, then, that some teachers do take on the challenge of technology integration in their classrooms? How are these teachers not being disheartened or intimidated by their lack of knowledge, experience or skill, particularly when coupled with the lack of positive models of practice?

It has been suggested that teachers with prior experience of technology for personal use more readily attempt to integrate new learning tools such as Web 2.0 into their professional practice (Zhao & Frank, 2003). Several studies have proposed that a teacher’s personal use of technology can promote their use of technology in the classroom (Dohn, 2009; Ertmer & Ottenbreit-Leftwich, 2010; Mehan, 1989; Mueller et al., 2008; Project Tomorrow, 2012b; Zhao & Frank, 2003; Zixiu & Stevens, 2011). As primary school teachers’ personal use of technology increases, as indicated through national census data (Australian Bureau of Statistics, 2016a), their use of digital resources in the classroom may likewise grow. This correlation between personal and professional technology use has been noted by the large-scale, American-based, Project Tomorrow survey (2012a) and by Mueller, Wood, Willoughby, Ross and Specht (2008). To further support the idea that personal technology use informs professional use, Redman and Trapani (2012) and Lee (2006) both examined pre-service teachers’ use of ICT and noted that as teachers’ personal use of technology increased, their use of digital resources for education also grew. It is important to note the potential causation effects of these studies. Each type of technology use may have informed the other. For example, a teacher’s use of social media may have informed their use of
educational social media tools such as Edmodo². These studies do indicate, however, that increasing a teacher’s personal technology use may contribute to more professional technology use in the classroom.

These research studies have started to situate teachers’ personal technology use as linked, in critical ways, to their professional, in-classroom use. How teachers might transition from their personal space to their professional space in their technology use remains to be explored.

The Project Tomorrow (2012a) report, mentioned above, is a significant resource in understanding teachers’ use of technology for educational purposes. The survey annually invites all school districts across the USA, and internationally, to participate online. In 2011 more than 36 000 teachers, 300 000 students and 44 000 parents from 5616 schools participated. These participant numbers have remained similar for the years from 2011 to 2016. According to the survey findings, in 2008 only 22% of teachers and administrators used digital technologies for professional purposes; in 2011 that percentage had risen to 45%. While this growth is proposed as an indicator of imminent change for education (Project Tomorrow, 2012a), it would appear that Bandura’s (2002) declaration that access to technology alone will not change society, continues to hold true. The Project Tomorrow (2012a) survey data confirms this. Reporting that 70% of their sample, of more than 36 000 teachers, now own a personal mobile device, the report claims that a majority of teachers say they are willing to make use of those same digital resources in the classroom. A promising sign is the more recent 2014 survey conducted by Project Tomorrow (2014). This survey data showed an increase in teachers seeking to use digital technologies, in particular, using digital games for learning. This growth in teachers’ awareness or engagement in digital technologies is noted in the survey findings:

² [www.edmodo.com](http://www.edmodo.com)
From 2008 to 2013, the number of teachers who identified digital games as a key component in their version of the ultimate school rose 48 percent (Project Tomorrow, 2014, p. 4).

Given the recognition of the relationship between the individual teacher and the classroom use of digital technology, this current study aims to bring to light the range of factors influencing teachers’ choices. There is a need to better understand, and to be able to support, teachers who have yet to engage with Web 2.0 technologies. The following section explores another layer of complexity in understanding teachers’ choices to use, or not to use digital technologies: external pressures and the contexts within which teachers teach and learn.

2.9 External forces impacting on teachers’ use of Web 2.0

2.9.1 The Impact of Family and Community Expectations on Teachers’ Web 2.0 Use

Recent evidence suggests that wider community expectations are significant in influencing teachers’ choices about technology use. Senge, McCabe, Lucas et al. (2011) have argued that, while society appears to be moving towards increased technology use, school leaders and community members continue to demand an in-school focus on standardised testing and assessment practices that possibly limits students access to technological skills. Despite societal changes and expectations, Senge et. al. (2011) note that governments are implementing more formal, standardised testing. While Senge et. al (2011) conducted their research within the USA, similar shifts in government policies within Australia appear to also emphasise standardised testing. This is evident with the introduction of the My School website3 in 2010. This national-wide, Australian website provides community members with numerical data on the success, or otherwise, of every government school across the country (Australian Curriculum Assessment Reporting Authority, 2010). It appears that this could be an ongoing challenge for teachers; how do they meet the demands of the government,

3 https://www.myschool.edu.au/
their local communities and the students in their care, while also teaching and learning through and with digital technologies?

Beyond government policies and actions, parental pressure to provide what is perceived as a traditional education, such as teacher-directed, offline teaching, also appears to be significant to teachers’ use of technology. Chen (2008) has argued his qualitative study in Taiwan identified parental pressures that focused on students’ exam success. Examinations in Taiwanese society are, according to Chen (2008), held in high regard as predictors of success in life. Teachers in his study reported pressure to provide examination success for each student. This community expectation pressure was seen to emanate from the parents’ desire for their child to be successful in formal testing. Chen’s (2008) study connected teachers’ reluctance to use Web 2.0 resources, even when they claimed to see value in its use, to these external, parental and societal pressures. These Taiwanese, societal pressures positioned examinations as more important than learning through technology and appears to have created a preference in teachers to focus on exam skills rather than technology skills. This had relevance for this study as these pressures may also impact on Australian teachers’ decisions to use technology in their classrooms.

In Australia, the goal of secondary schooling is not presented as only passing examinations. Instead, the federal Department of Education (DET) states that education systems should seek to offer a range pathways for students’ futures (Department of Education and Early Childhood Development, 2013). These pathways aim to provide a broader definition of success, and do not focus only on examination results. There continues, however, to be a strong national focus on standardised testing as demonstrated through the annual National Assessment Program for Literacy and Numeracy (NAPLAN) examinations (Australian Curriculum Assessment and Reporting Authority, 2016). While it cannot be concluded that this focus on formal testing has impacted Australian teachers, Chen’s (2008) study does prompt consideration of broader societal pressures. These social, political and cultural conditions, within which teachers are making decisions to use, or not to use, Web 2.0 technologies, may be significant to understanding teachers’ actions with technology in their classrooms. It would appear that a broad, community approach to change might
better support teachers and students to more effectively use digital technologies for learning and teaching (Hramiak & Boulton, 2013; Senge et al., 2011).

### 2.9.2 School Values and Web 2.0 Technologies

The values that a school community holds can have a significant impact on the choices teachers make (Dinham, 2008). There are also many stake-holders who may influence the community’s values: leaders along with teachers, parents, neighbours, local business owners or local councils or authorities.

Schatzky (2000) explored how communities create and maintain their values. He related the external, physical world to the internal, social relationships and interactions between individuals. For those working in schools, this suggests that the school environment made up of buildings, corridors, classrooms, teacher spaces, outdoor facilities and the school’s physical location within a community may influence the values that a school community embraces. For example, a traditionally set up classroom may reinforce traditional, didactic pedagogies, while open-plan learning areas may encourage shared learning (Saltmarsh, Chapman, Campbell, & Drew, 2015). Senge et al. (2011) have proposed that changed physical settings can impact positively on the development of professional learning communities, which in turn may support the development of new skills and higher levels of self-efficacy in teachers.

Contradicting this finding is Hattie’s (2009) research, drawn from more than 800 meta-analyses focusing on factors impacting on improved student learning. His meta-analysis showed that physical classroom layouts have limited impact on student learning. With this present study’s focus on the teacher and their decisions to use, or not to use, technology, the physical layout of classrooms was not a focus of research. Rather, the research investigated how teachers interacted, supported or hindered each other’s learning and Web 2.0 use within and across learning spaces.

Chen (2008, p. 72) has suggested that the “environment surrounding the teachers has a strong influence on teachers’ decision making”. By bringing together the research of Senge et al. (2011) and Chen (2008) there emerges a possible connection between the values that a school holds, and what teachers choose to do or feel they are permitted
to do with technology. This appears to be an important field for further investigation and closer examination.

### 2.9.3 The Impact of Leadership on Educational Web 2.0 Use

Within schools, it is often the role of leaders to determine the direction and focus of their particular school (Dinham, 2008). Within Victoria, autonomy in schools is increasingly prized, as school principals are accorded more decision-making power through programs such as the Towards Victoria as a Learning Community (TVLC) program (Communications Division for Flagship Strategies, 2012). This creates roles for Victorian principals, and their leadership teams, as key drivers and influencers of pedagogy, including digital pedagogies, in their schools.

Hramiak and Boulton (2013) have argued that leaders who promote the use of technologies in schools generally have teachers who are more likely to use digital resources. Ertmer and Ottenbreit-Leftwich's study (2010) also concluded that within a strong school culture, teachers would inevitably conform to the dominant perspective. This offers a potential insight into how leaders might better support the use of digital technologies in upper primary schools. With a principal focusing on progressive, evidence-based pedagogy, it may be possible for leadership to have a significant impact on teachers’ decisions to use technology in their classrooms.

The current evidence has suggested that support for teachers should be designed either for the individual teacher (Chee, Mehrotra, & Liu, 2013) or through the provision of a digital infrastructure and resources (Fu, 2013). Fu (2013, p. 112) argues that increased technical and administrative support assists teachers to “transform a teaching environment” through technology. This places the responsibility for technology integration with the individual teacher. Once provided with infrastructure and digital devices it is the teacher who must then decide how to embed these resources into their teaching. However, Chee et al.’s study (2013), with 42, 15-year-old Singapore students, points to improved student outcomes through participation in school-based, online gaming. Their teaching approach gave significant attention to the professional development of each teacher. This provided personalised support that sought to meet individual needs. The researchers in Chee et al.’s (2013) study provided
regular feedback and formal training for teachers, within and outside the classroom, to support student learning experiences. Their research report refers to these in-depth teacher support practices as “handholding” (Chee et al., 2013, p. 24). While this term may appear to imply a child-like approach to teacher professional support, the term perhaps instead promotes a sense of community, that signals side-by-side learning and shared positive outcomes. Chee et al.’s (2013) research provides examples of a model of support that successfully impacted on student learning outcomes. It might be concluded, then, that ongoing, personalised professional learning is a necessary tool for teachers to embed digital technologies in their classroom practice.

Despite Chee et al.’s (2013) success in their study, it is important to acknowledge that this type of in-class, teacher-focused support with technology learning is limited in other research projects. Often, technology hardware is presented to teachers who are assumed to know how to use it effectively (Department of Education Employment and Workplace Relations, 2011) or short training programs are offered that focus on the software or device rather than on pedagogical applications. To address the challenges of what types of support could be most useful for teachers, a minor question of this research, as noted in Chapter One, was framed to ask: Do any school structures support teachers to use Web 2.0 in the classroom? Is there evidence for this?

2.9.4 Access to Technology and Online Resources
Numerous studies have argued that limited access to digital devices or a reliable Internet connection can impede teachers’ technology use in schools. The biggest issue and concern for graduate teachers, according to Project Tomorrow (2012a), is securing access to reliable digital devices. Project Tomorrow’s (2012a) survey reports on responses from student teachers. It is of interest and concern, therefore, that even before beginning their career, these new teachers are aware, and wary of, the lack of adequate and reliable access to technology in schools. While it could be argued that these judgments are assumptions made by those not yet fully engaged in the teaching profession, there is some merit in their responses as these students would have already been teaching in classrooms as part of their training, and possibly across several different sites and schools.
Selwyn, Boraschi and Özkula (2009) have identified a further challenge to teachers’ use of technologies in schools; the frequently obstructive limitations placed on Internet access in schools. Restricted access to certain webpages, online communities or Web 2.0 resources can limit teachers’ attempts to integrate technologies into learning programs. Buchanan (2011) has likewise identified a similar challenge with the Australian Federal Government’s Digital Education Revolution (DER) (Department of Education Employment and Workplace Relations, 2011) program, within the state of New South Wales (NSW). This program offered a laptop computer to every student in every year nine classroom across the country. Buchanan (2011) calls attention to the NSW Department of Education and Training's strict rules on the use of these government-provided laptops. Buchanan (2011, p. 75) further claims that the success of this revolution has been “somewhat negated by policy prohibitions” as teachers have been limited in what they can attempt, trial or implement.

The literature suggests that physical access to digital devices, as well as logistical concerns around access to online resources, continue to challenge the integration of Web 2.0 in the classroom. Crook, Sharma, Wilson and Muller (2013) further argue that limited access to technology in schools is not an easily-solved problem. They conclude that teachers' use of digital devices remains limited even when they are provided with effective access to the technology they require. The factors that interweave to result in this lack of technology use by teachers is therefore in need of further, and more clarifying, research.

2.9.5 Time Constraints and Constant Change
Time to learn, explore, ask questions and trial new technologies is a significant theme in the literature. Considerable time is believed to be needed for teachers to change their practice with, and their understanding of, digital technologies. Coates and Friedman (2009) go further to claim that providing time for teachers to learn is an imperative for deeper technology integration in schools. This is challenging to provide when we reflect on the many demands placed on teachers’ time. Numerous studies provide suggestions of the ways in which teachers should engage with technologies, all of which may take significant time for planning, learning and implementing.
Teachers are expected to undertake a wide range of activities when using technology in the classroom. These expectations appear to come from researchers, school leaders, teaching colleagues and wider school communities. These expected actions have been documented and shown to include:

- Design ICT tasks that meet student needs (Chin, Sum & Foon, 2008);
- Support students to make connections within their learning (Drexler, 2010);
- Enable and encourage feedback and interaction online (Hall, 2009);
- Develop “autonomy, capability and creativity” in their students (Drexler, 2010, p. 114);
- Interact with other teachers beyond their classrooms and schools (Zhao & Frank, 2003);
- Identify a clear purpose in their own, and their students’, learning (Higgins & Russel, 2003); and,
- Make appropriate judgements for assessing the students’ learning (Jenkinson, 2009).

This list is not exhaustive but does highlight some of the demands and practices expected of teachers’ time if they wish to engage fully with digital devices and resources in their classrooms. To support the integration of technology, teachers’ time must clearly be used effectively. This learning should also be ongoing, focused and purposeful (Chee et al., 2013). Exactly what this should look like in a primary school setting remains to be explored and forms an important area of investigation for this study.

### 2.10 Aspirations and Visionary ICT Use in Schools

As technology continues to evolve, it is clear that the notion that digital technology has a transformative power for education is becoming increasingly pervasive (Scott, 2011).
Perhaps deriving from people’s desire to know what the future holds (Scott, 2011) or from the desire to inspire educators to delve deeper into the use of ICTs (White, 2008), the community discourse surrounding technology in education appears to be largely aspirational rather than based on the current context of teachers in schools.

In many of the studies explored in this literature review, the impact of technology has not been empirically proven, but rather expressed as an aspirational desire. White (2013b) has identified a lack of distinction between empirically sound data and the aspirational wishes of enthusiasts. White (2013b, p. 1) goes further and criticises the “... posturing by technology evangelists ...” that has occurred in more recent times.

There is a plethora of literature that advocates how and why technologies should be used in classrooms (Alexander & Levine, 2008; Hu, 2013; Jenkinson, 2009) and it appears widely accepted that new technology has potential for educational enhancement. Some educators and researchers, however, appear to be moving more quickly in their vision of the future than technology or pedagogy is moving in classrooms. An example of this is from Whitby (Edwards, 2006, paragraph 6). He predicts that in the future the “walls of a classroom will become redundant”. Downes (2010, paragraph 1) likewise explains that the popularity of his website is connected to teachers searching for “… new directions in the field for practitioners and enthusiasts”.

This type of effusive declarations about the future of education has been openly questioned by Scott (2011). Scott (2011) has cautioned that predictions such as these can become mandates for future action, in turn forcing us towards a future for education that may not have naturally occurred or be pedagogically appropriate. Scott (2011, p. 1) advocates for small “qualified suggestions”, rather than the sweeping, often less research-based, reforms proposed by futurists such as Downes (2010) and Whitby (Edwards, 2006).

This pragmatic consideration of the large amount of future-focused rhetoric in the field has informed this study, which sought to uncover the “qualified suggestions” (Scott, 2011, p. 1) that might explain the choices that teachers make regarding technology use in their classrooms.
Chapter Summary

Learning with digital technologies, and by extension with Web 2.0, appears in the literature to be a growing, contentious and complex area. A main theme continues to be the evolving role of the teacher (Project Tomorrow, 2012a). As a leader of students, the teacher is key to facilitating the change in pedagogy needed for full integration of technologies. Many current studies indicate, either explicitly or implicitly, that the job of fully integrating technology rests with the individual educational practitioner in the classroom, often despite challenges within the physical or professional contexts that surround them. Consideration of teachers attitudes about technology use in the classroom are therefore significant to increase the use of Web 2.0.

This review has also identified the significant role that national, state-wide and local policies and leaders play in the integration of digital technologies. Leaders at all levels need to support and engage teachers in the use of learning technologies, and some successful strategies have been identified through the research (Chee et al., 2013; Hramiak & Boulton, 2013; Rosman, White, & Hoad, 2008). However, it is not yet clear which of these diverse strategies are most likely to enhance digital technology integration for teachers in upper primary school classrooms.

The research has indicated that a teachers’ sense of self, and identity, can significantly impact on the ways in which technologies are used in their classroom (Bandura, 2002). Indeed, the individual teacher would seem to have not only the biggest impact on student learning within the school setting but also to be particularly resistant to change (Chen, 2008). This poses a significant challenge to teachers and leaders as new technologies emerge, and expectations in the profession and the media continue to demand more and more change to classroom practices.

Numerous challenges to the successful use of technology in schools have been identified through this review. However, it is timely to note that there also exist many pockets of excellence in the research. In particular, there are a number of studies that have focused on digital technology use and their relationship to student outcomes in school settings (Ang & Wang, 2006; Chin et al., 2008; Kennewell & Morgan, 2006; Martin & Noakes, 2012).
These studies often report on teachers working alone, in small teams or within focused whole-school programs. This offers limited transferability of findings to other settings.

The current literature has failed to engage with teachers’ uses of technology, and why some teachers choose to do so, and others do not. Understanding the numerous challenges that teachers face in making use of Web 2.0 for teaching and learning represents a significant gap that this research project has sought to investigate.

Research is specifically needed that focuses on the 10 to 12-year-old student for whom technology access is increasingly ubiquitous and relied upon for social interaction, as these children approach secondary education. It is critical to further explore this age group of technology users, as recently demonstrated in the 2013 Australian Communications and Media Authority (ACMA) survey (2013). This report has indicated that 10 to 12-year-old students are a tipping point wherein social, educational and leisure activities occur and represent a significant jump in online use. This is in stark comparison to the younger survey sample of eight to nine-year-olds. As the ACMA report states, “propensity to use … social network services significantly increases once they [students] turn 10 or 11 years …” (Australian Communications and Media Authority, 2013, p. 37).

A scarcity of research focused on the primary school teacher’s context has been identified in this review. Teachers working with upper primary school students require new pedagogical and technical skills to be able to leverage Web 2.0 resources for student learning. Providing effective support and learning for teachers must be the focus of research, so that they might fully engage with effective online resources, such as Web 2.0.

The following chapter explains and justifies the theoretical underpinnings of this study and provides the argument for the methodological framing. These overarching theoretical perspectives have informed the method, sampling and analytic strategies that have sought to address the gap in literature identified in this review.
3 Chapter Three: The Research Design

3.1 Chapter Overview

This chapter explains the design of this research and the rationale for the choices made. The major study question asked, “What factors influence and underpin teachers’ choices when using Web 2.0 technologies in the upper primary school classroom?” The major and minor research questions are discussed in section 3.2.

The use of positioning theory (Langenhove & Harré, 1994) and the ways it has informed the sampling, methods and analysis in this study is elaborated on in section 3.3.

In section 3.4, the approach taken to sampling and participant selection is reported, followed, in sections 3.5, 3.6 and 3.7, by a detailed explanation of the methods chosen for data generation in both phases of the study. Section 3.6.5 reports on a data generation activity that was carried out with students. For reasons explained further in section 3.6.5, the data from this activity did not prove useful and has been excluded from the data analysis.

Data in this research was analysed using constructivist grounded theory methods, aligned with Charmaz (2014), and this is discussed in sections 3.8 and 3.9.

Following this, in section 3.10, a discussion of the ethical considerations of the study are explored. This chapter concludes with an overview of the chapter in section 3.11.

3.2 Study Questions

The literature review indicated that limited evidence-based research is available that focuses on upper primary school teachers’ technology choices. This study sought to identify and examine the diverse range of influences that teachers perceived as impacting on their use, or non-use, of Web 2.0 in their upper primary school classrooms. This research has not focused on specific Web 2.0 technologies, nor on how those technologies were used in the classroom. Instead, the lived experiences of teachers were investigated (Clandinin & Connelly, 2004) to make more useful sense of their decisions to use, or not to use, Web 2.0 technologies for learning.
To understand teachers’ choices, this study has privileged teacher voices in their school, team and personal contexts. The major study question has sought to represent the voices of teachers:

**What factors influence and underpin teachers’ choices when using Web 2.0 technologies in the upper primary school classroom?**

Three sub-questions also formed part of the study design:

1. Is either collaborative or individual learning more significant to the teachers’ use of Web 2.0 in the classroom?

2. What impact, if any, have sociocultural factors, within and beyond the school, had on teachers’ choices to use Web 2.0?

3. Do any school structures support teachers to use Web 2.0 in the classroom? Is there evidence for this?

These minor questions framed the research around the teacher, their school context and other, beyond-school factors. These questions were purposefully broad to enable new theories and themes to emerge from the data analysis.

A constructivist grounded theory approach to analysis (Charmaz, 2014) was chosen to support investigation and theory generation in this lesser researched field.

### 3.3 Theoretical Perspectives Informing the Study

#### 3.3.1 Interpretivism: Acknowledging the Multiple Realities of Participants

The perspective taken in developing and implementing this study’s methodology was informed by the literature review. This review highlighted a range of potential factors that appeared to influence teachers’ decision-making in secondary and tertiary settings. These factors included internal factors such as shifting identities and perceived self-efficacy levels and external factors such as school leaders’ visions, responsibilities to team members and a school or societal focus on digital technologies as learning tools. With this complexity, the study required a structure that would enable participants to express their personal perspectives through their actions, their
language, their interactions with colleagues and their work in classrooms with students.

An interpretivist approach, through a qualitative methodology, was therefore selected to investigate, and respect, teachers’ complex identities. Sometimes referred to as the constructivist perspective (Lincoln & Guba, 2011), interpretivism frames researchers as individuals who bring their own world views into social settings, including their research settings. Interpretivism as an epistemological framework acknowledges multiple perceptions of reality, while also recognising that knowledge and reality are co-constructed between participants, their backgrounds and experiences, their environments and the researcher (Connelly & Clandinin, 1990). This perspective therefore more fully honours the perceived truth and perspectives of participants (Fossey, Harvey, McDermott, & Davidson, 2002).

With an interpretivist perspective, as Lather (2006, p. 38) explains, “reality is subjective and constructed … truth is many.” Bourdieu and Wacquant’s (1992) ‘habitus’ similarly challenges the idea of a single fixed personal identity, or reality, in declaring that, within every context, socio-cultural behaviours and language acts influence identity, efficacy and agency. This understanding of reality as co-constructed, constantly changing and intimately personal provides “… a more textured and productive view of the social phenomena …” (Moss, 1996, p. 21). This was seen to facilitate a deeper understanding of the personal decision-making of teachers in this study. Bourdieu and Wacquant (1992) further support this view of reality as unfixed and changeable, declaring. “… social reality exists, so to speak, twice, in things and in minds, in fields and in habitus, outside and inside social agents” (p. 127).

3.3.2 Positioning Theory

Informed by an interpretivist approach, and seeking to honour the diverse perspectives on teaching and decision-making held by each participant, the study was shaped and informed by positioning theory (Harré & Van Langenhove, 1999). This methodological choice sought to explore the complexity of the use of Web 2.0 in classrooms that was emphasised in the literature review.
As has been stated previously, and evident in literature review, Web 2.0 use in upper primary school classrooms has received limited research focus (Merdzan, 2016). There is consequently limited existing, specific theory to inform the design of this study. Many empirical research projects in education appear to take a case-study approach. Case-study approaches were not considered sufficiently deeply focused on the individual and their decision-making processes to answer the research questions in the study.

The use of positioning theory (PT) (Harré & Langenhove, 1991) was therefore seen as an imperative to ensure that data could be deeply interrogated to provide a more insightful understanding of the complex ways that teachers made decisions, rather than to focus on the decisions themselves.

Teachers are positioned, as are all humans, either by themselves, called self-positioning, or by others (Harré & Langenhove, 1991). In schools, teachers interact with others and form various, dynamic identities such as leaders, learners, team members, coaches or professionals. As they take up each identity, teachers interact through speech acts (Harré & Langenhove, 1991) to position others in opposition or alignment with themselves.

For example, teachers in primary schools in Victoria often work in teams to plan lessons and sometimes collaboratively teach the students in their care. This team approach sees the team members develop expectations of specific behaviours, actions and verbal interactions by and between team mates (Shotter, 2012). In PT, these are called rights and duties and can be reinforced and challenged, moment by moment, within each interaction between members of a particular social context. The ways in which teachers negotiate, re-negotiate or challenge differing identity types is called positioning.

A social context can be defined as any interaction within which individuals interact, verbally or non-verbally, in any location, virtual or real (Schatzki, 2005). Teachers work in complex social contexts and have expectations of rights that they will be accorded, for example the right to be able to make suggestions at team planning meetings and for their suggestions to be respectfully heard. These rights are therefore linked to
teachers’ assumptions of what the role of a team member in their team is or should be. To maintain their rights, teachers must also enact specific responsibilities for their team membership to be valid, for example they must enable other teachers to similarly to be heard and to contribute to the team planning meeting.

This positioning and repositioning of people in relation to their rights and responsibilities is, according to Harré (1999), the way in which reality is created and social constructs emerge. Reality is therefore an individually perceived construct that is perpetually challenged or reinforced as individuals position, challenge, and reposition themselves and others.

This understanding of the dynamic nature of reality is further complicated when one reflects on the numerous contexts within which teachers work. Examples of these contexts include, but are not limited to, interactions with school leaders, with members of other teaching teams, with other school colleagues, with parents, with their class of students, with individual students, with professionals beyond the school, with friends beyond school, with various family members, with the education union and with the media.

This research has been designed so that several, but not all, of these contexts could be investigated and understood. These numerous contexts to which teachers belong represent a complex network of interactions that teachers negotiate on a daily basis. This study has been limited to investigating those contexts that exist within the school, or are referred to by teachers as influencing their choices to use Web 2.0.

Harré (1999) connects individuals’ rights and duties within each of these social settings to what he calls storylines, that is, stories about themselves that individuals create, modify, reject or accept in each social interaction. These storylines shift for each person as they enter and leave each social setting. Stories, rights, duties and speech acts coalesce in every social context to create what Harré calls the local moral order (1999).
3.3.3 Positioning and Re-Positioning
Positioning theory considers conversations as central to all social interactions, within which local moral orders are established and upheld (or challenged) by members of the social group (Langenhove, Melbourne Graduate School of Education Lecture, May 5, 2014). These local moral orders include the accepted behaviours, values and expectations of the group and define what should and should not be said or done. This ongoing negotiation of rights and duties is enacted in every situation and is repeated each time individuals interact. This is expressed by Van Langenhove and Harré:

... in all discursive processes two essential things happen: (i) people position themselves and others and (ii) people present versions of the material and social world by means of rhetorical reconstructions (1994, p. 362).

3.3.4 The Impact of Positioning Theory on the Research Design
The study sought to understand how teachers’ language and actions might reveal the factors that impacted on their choices to use Web 2.0. This was achieved by using a range of research tools in several contexts: individual interviews, focus groups and classroom observations.

Positioning theory (PT), as methodology, epistemology and ontology, has framed this study design. PT seeks to understand, and honour, the constantly re/enacted rights, duties, storylines and identities of individuals as they enter social settings and conversations (Harré & Davies, 1990). The use of PT informed the types of data collected and the settings in which data was generated. This is significant to acknowledge because, as Guba and Lincoln explain:

The investigator and the object of investigation are assumed to be interactively linked ... the ‘findings’ are literally created as the investigation proceeds (Guba & Lincoln, 1994, p. 111).

Indeed, as a researcher,

... we cannot separate ourselves from what we know, our subjectivity is an integral part of our understanding of ourselves, of others, and of the world around us (Angen, 2000, p. 385).
It was therefore essential to consider the impact of the researcher on participants’ contributions. The researcher’s presence in the school and the classroom created a unique social setting within which teachers are positioned as someone of interest to a researcher. The design of the study sought to compensate for this potential impact, although with limitations, by using a range of methods and by engaging in both group and individual interactions with the participants. These methods and interactions are described in section 3.5 of this chapter.

Van Langenhove and Harré (1994) observe that it is essential to pay attention both to how people position themselves and how they are positioned by others. Attention to positions has provided a more detailed understanding of the decisions teachers made with Web 2.0 technologies.

To conclude this discussion of the theoretical underpinnings of the study, Figure 2 represents the connections between the theoretical paradigms of interpretivist approach, positioning theory and constructivist grounded theory that have informed the development, implementation and analysis of this research study.
Beginning from an understanding of the dynamic nature of social interactions, this study has been developed to address the major research question with its focus on teachers’ choices to use Web 2.0 resources in their classroom.

3.4 Participant Sampling

3.4.1 Sampling in Phase One

Participants with Web 2.0 experience were identified through purposive sampling (Guba, 1981) and a nomination strategy (Noy, 2008). All school and participant names in this thesis are pseudonyms, in line with accepted ethical research practices.

To meet the needs of this research, teacher participants were required to have had some experience with Web 2.0 technologies in their classroom. This research, however, did not seek to engage with experts, rather teachers who were familiar with the use of Web 2.0 were believed to be able to support this research. This purposive
sampling enabled a deeper investigation into the different positions teachers took when using Web 2.0. For example, a teacher with some experience in using Web 2.0 in the classroom might see themselves as being a follower, a leader or even a reluctant-but-effective user of the technology. The study has sought to surface the varied reasons behind teachers’ choices. This approach later proved beneficial in the analysis of the data, and will be discussed in the Chapter Four.

To identify appropriate participants, a nomination or snowball (Noy, 2008) sampling strategy was used. Snowball sampling requires researchers to approach those with knowledge of the social context, and seeks their involvement and then their nomination of others in their field who may be suitable participants:

This process is, by necessity, repetitive: informants refer the researcher to other informants, who are contacted by the researcher and then refer her or him to yet other informants, and so on. Hence the evolving ‘snowball’ effect (Noy, 2008, p. 330).

As Noy (2008) explains, this iterative approach requires an investment of time, however, in this research, nomination sampling led to participants who were recognised as users of Web 2.0 in the classroom. Participants were well-regarded by their in-school peers and leaders at the Department of Education (Victoria). This provided a strong basis for data generation and analysis.

The Digital Learning Branch (DLB) of the Department of Education in Victoria, Australia, has oversight of all digital learning across the state. With more than 1600 schools across the state of Victoria (primary and secondary), the Director of the DLB provided the initial nominations of participants. Six schools were suggested as candidates for possible inclusion. After meeting with the school principals, four of these school leaders agreed to participate and another two schools were nominated. These schools were then approached, with one school accepting the invitation to contribute to the research, and a further three schools nominated. At the conclusion, eleven school principals were approached, with four agreeing to participate in the research.
Initial contact with school principals was by phone. Having explained participants’ potential roles in the study and the time commitment that could be anticipated, each principal was asked to consider the range of expertise within their grade five and grade six teaching team and to nominate three or four teachers. Individual teachers were then approached through email and met the researcher at an introductory meeting at their school. During this short, 15-minute meeting the purpose of the research, their potential contribution and the anticipated benefits of the study were explained.

The nomination sampling approach led to nine teachers from four primary schools across Victoria joining the study, most of whom worked in a teaching team within their school.

Across Australia, information about a school’s socio-economic background is shared publicly online through the national My School website (Australian Curriculum Assessment Reporting Authority, 2010). This information is presented numerically using the “Index of Community Socio-Economic Advantage” (ICSEA) scale. This score is designed to, “enable meaningful comparisons of National Assessment Program - Literacy and Numeracy (NAPLAN) test achievement by students in schools across Australia” (Australian Curriculum Assessment Reporting Authority, 2010). The ICSEA scores seek to represent the impact of the socio-economic background of students’ families on student achievement. It is one measure of a school’s socioeconomic status. The median ICSEA value for Australia is calculated at 1000, with higher numbers indicating higher socioeconomic advantage. All four schools in phase one of the study reported ICSEA scores close to the mean, with three of the four slightly below this level. This positions the participating schools as representative of the state-wide average for all schools, providing for possible transferability for the study findings.

4 [www.myschool.edu.au/](http://www.myschool.edu.au/)
Table 1 provides an overview of the numbers of participants at each school and their teaching contexts. The table also provides the general location of each school and details of school composition.

<table>
<thead>
<tr>
<th>School Name</th>
<th>No. Participants</th>
<th>Total Teaching Staff</th>
<th>School ICSEA score</th>
<th>Gender of Participants</th>
<th>Student enrolment</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Park Primary School</td>
<td>3</td>
<td>47</td>
<td>1036</td>
<td>Female x 2 Male x 1</td>
<td>679</td>
<td>Outer Western suburbs of Melbourne</td>
</tr>
<tr>
<td>Gregstone Primary School</td>
<td>3</td>
<td>40</td>
<td>988</td>
<td>Female x 2 Male x 1</td>
<td>530</td>
<td>South Eastern suburbs of Melbourne</td>
</tr>
<tr>
<td>Homedale Primary School</td>
<td>1</td>
<td>15</td>
<td>965</td>
<td>Male x 1</td>
<td>203</td>
<td>Suburbs of a regional, Victorian town</td>
</tr>
<tr>
<td>MacArthur Primary School</td>
<td>2</td>
<td>145</td>
<td>971</td>
<td>Female x 2</td>
<td>1780</td>
<td>Outer Western suburbs of Melbourne</td>
</tr>
</tbody>
</table>

Table 1: Overview of Participating Schools and Participants in Phase One

3.4.2 Sampling in Phase Two

In phase two of the study, a teaching team at one further school contributed to emerging theory. The school staff undertook a 90-minute professional learning workshop designed to engage with teachers with little Web 2.0 experience. Using the researcher’s existing professional network, four schools were invited to participate in phase two. These schools were approached by the researcher based on her knowledge of schools across the state. The principals of these schools reported that they did not have a large focus on digital technologies or on Web 2.0. They were selected so findings could be validated against the data from phase one schools, by comparing schools where principals had a focus on technology use, with those who did not.

From the four schools, one agreed to be involved. This school was in the eastern suburbs of Melbourne and had an ICSEA score of 1088, similar to the schools in phase one. The school principal stated that these teachers had limited technology abilities.
As a condition of participation, the principal requested that all staff members (n=22) be offered the 90-minute workshop. Although the study sought only to work with grade five and six teachers, this request was accommodated. Upon further investigation, it was discovered that the grade five and six teaching team was small (n=4). The grade three and four teaching teams were, therefore, also invited to participate in phase two, bringing the total number of participants to nine.

While all members of the teaching staff attended the 90-minute workshop, only the nine teachers from grades three, four, five and six were invited to complete the online questionnaire that followed the workshop. This enabled closer comparison of the data as the teachers in both phases worked with students in similar age groups. The questionnaire was modified to enable participants to indicate which teaching team they worked within. This enabled a clearer analysis of teacher responses based on their team membership. This sample of nine teachers comprised of eight females and one male. This break down is broadly representative of schools across Victoria within which females dominate the primary school teaching profession (Australian Bureau of Statistics, 2016a).

### 3.5 Research Procedures and Tools

Several methods were selected to generate data within this two-phased project. This enabled the triangulation of data and the interrogation of emerging theory. This research design aligned with the study’s positioning theory approach (Harré, 1999); multiple interactions with participants meant that there were a number of ways to investigate, compare and corroborate teachers’ adopted and changing, positions and repositions within different settings.

The ability to re-visit participants through several interactions (two interviews, a focus group and classroom observations) enabled participants to validate or reject the interpretations of their data (Table 2). Using complementary methods within a staged research model avoided “decomposing” the data into separate, parallel but unlinked studies (Yin, Green, Camilli & Elmore 2006, p. 43). As Yin et al. explain, research designs should allow “each method [to] reach into the realm of the other” (2006, p. 44). These repeated interactions also ensured that data generation methods
maintained a clear focus on the research question and avoided an overwhelm of both data and analysis. Table 2 presents an overview of the research design.
<table>
<thead>
<tr>
<th>Phase One</th>
<th>Data Collection Technique</th>
<th>Artefacts</th>
<th>Duration</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview #1</td>
<td>Audio-recordings, transcriptions of recordings, Personal Meaning-Making Maps (PMMM), Researcher notes and memos</td>
<td>25 minutes</td>
<td>Individual teachers (9)</td>
<td></td>
</tr>
<tr>
<td>Focus Group</td>
<td>Collaborative Interactive Discussions (CIDs)(written), Researcher notes and memos</td>
<td>20 minutes</td>
<td>Group of teachers at each school (9)</td>
<td></td>
</tr>
<tr>
<td>Interview #2</td>
<td>Audio-recordings, transcriptions of recordings, Personal Meaning-Making Maps (PMMM), Researcher notes and memos</td>
<td>25 minutes</td>
<td>Individual teachers (about 9)</td>
<td></td>
</tr>
<tr>
<td>Classroom Observations</td>
<td>Observation notes - focused on types of uses the classroom technology supports Researcher notes and memos</td>
<td>Total of 90 mins within each teaching space</td>
<td>Individual teachers in their classrooms (about 9)</td>
<td></td>
</tr>
<tr>
<td>Drawn Responses to two prompts</td>
<td>Students’ drawings (x2 per student)</td>
<td>25 minutes</td>
<td>35 students across four schools</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase Two</th>
<th>Professional Learning Activity</th>
<th>Artefacts</th>
<th>Duration</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Learning Activity</td>
<td>Researcher notes and memos Collaborative concept-maps from participants</td>
<td>90 minutes</td>
<td>Group of teachers (22)</td>
<td></td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Online questionnaire responses, administered through Google Forms</td>
<td>15 mins</td>
<td>Individual teachers (9)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Overview of Research Design

Bourdieu and Wacqant (1992, p. 247) challenged researchers to avoid “rest[ing] content with the mere description of [an] experience without questioning the social conditions that make it possible”. As this research project sought to understand the choices of teachers to use Web 2.0 for learning, generating data that offered insight into teachers’ social contexts required a qualitative investigation and analysis of teachers’ work and personal contexts. Without questioning, and understanding, the
teachers’ contexts, the study risked limiting its focus to the “traces of effects …” (Bourdieu & Wacquant, 1992, p. 249). This could result in misunderstanding the significant social constructions within which teachers positioned themselves and each other. This study design responded to, and addressed, this challenge by implementing multiple data generation sessions with teachers in their workplaces.

Using the analysed data and research literature, a 90-minute Professional Learning (PL) workshop was developed in phase two of the study. This workshop sought to increase teachers’ awareness of Web 2.0 technologies in upper primary school classrooms by presenting the concepts raised as enablers in phase one. Validation of the PL workshop occurred through an online questionnaire. An in-depth overview of each phase of this research now follows.

### 3.6 Phase One

#### 3.6.1 Initial Interviews and Personal Meaning Making Maps

Each of the nine phase one participants had a 20-minute, one-on-one interview. During this 20-minute interview teachers created a Personal Meaning Making Map (PMMM) (Falk & Dierking, 2000). This tool is similar to a mind or concept map, but provides participants with a single word or question in the centre of a large blank sheet of paper. They record anything they see as relevant to the conversation. An example of a completed PMMM can be found in Appendix One. These interviews were audio-recorded and then transcribed. The transcripts were returned to participants for member-checking and then entered into MAXQDA\(^5\) software for coding purposes. This database software facilitated fine-grained analysis of the data by storing the codes and data together. The software did not develop codes or categories, as other software can. Instead, MAXQDA software provided a database of coding connected to the data. This enabled a streamlined process for managing the large number of codes, data sets and emergent categories that were developed in this research.

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\(^5\) [http://www.maxqda.com/](http://www.maxqda.com/) MAXQDA software has been recommended by Corbin & Strauss (2008) as a useful database software tool for grounded theory research.
The PMMM was an idea-generating and conversation-provoking device. Teachers were invited to consider the initial statement in the centre of the blank page and to add their ideas, thoughts or questions. The researcher sought clarification and explanation of the participant’s written notes and drawings, which directed the interview conversation. A PMMM was chosen to meet the needs of this theory-generating study. Using a PMMM ensured interviews were driven by teachers’ understandings and beliefs, rather than by any pre-conceived ideas of the researcher (Dierking, Falk, & Storksdieck, 2013). Providing participants the opportunity to direct the interview through the PMMM tools enabled new concepts, theories and areas for investigation to emerge. The PMMM engaged teachers in three, successively deeper, levels of inquiry. First, the PMMM asked participants to respond to the written prompt, next they were asked to explain their PMMM during the first interview. The third level of analysis took place during the second interview. During which, the researcher asked for clarification of their choices and actions by referencing their previous interview transcript, their PMMM and observation notes taken in their classrooms.

The PMMM provided participants with the phrase ‘ICT use in my classroom’. Participants reflected on how, why, when and for what technology was used in their classroom. They wrote key words, phrases or ideas they believed to be important. Participants were invited to share their thoughts and ideas without self-censoring their contributions. The researcher also clarified with the participants that they would be able explain their PMMM as the interview progressed.

It is important to note that participants were not asked to differentiate between the concepts of Web 2.0 and Information and Communications Technologies (ICT) for this task. This lack of delineation sought to open the interview to a broader perspective on the overall topic of technology.
3.6.2 Focus Group and Collaborative Interactive Discussions

The teams of participants at each school next participated in a short focus group and completed a Collaborative Interactive Discussion (CID) (Redman & Rodrigues, 2014). Figure 3 presents a sample of the CID created for this research.

A Collaborative Interactive Discussion (CID) is a written conversation around a prompt and question. Each teacher received a copy of the CID sheet, including the written
prompt and two questions. The teachers read the prompt and wrote their responses, and subsequently passed their paper to their neighbour. Each teacher then read the same prompt, and their neighbour’s response on the paper in front of them. Participants next replied to the prompt and their colleague’s comment, either through drawing icons or pictures or by writing. The papers were passed around the table until each member had contributed to each collaborative interactive discussion page. To enable comparison of the CID data with other data collected, teachers wrote their initials against their comments and drawings.

The focus of the CID was to explore the ways that teachers, in their teams, positioned themselves as leaders and learners of technology in this setting and to compare this to their individual interview data. This group activity aimed to identify the local moral order (Harré, 1999) that might be evident within the school. The CID also provided a device to identify the “sacred stories” (Clandinin & Connelly, 1996 p. 5) that teachers may highlight as school-wide imperatives that they may not have discussed in their individual interviews.

The CID developed for this research contained a short, informative paragraph about the use of the SAMR Model of Technology Integration at the ‘Redefinition’ level (Government of Western Australia, 2013). The SAMR model is often used in the Victorian Department of Education and Training and the school leaders at the four phase one schools had reported that this model was in use. This provided common language and ideas to begin the group discussion through the CID activity. The SAMR model was initially developed by Puentadura (2010) and offers a framework and language to consider the ways in which a teacher might use technology. The full framework is provided in Figure 4:
Having read the brief statement about the SAMR model, participants were asked to reflect and share their responses to the following questions:

- What do you think, feel and/or believe about the use of ICT in this way?
- What has in the past, or might in the future, support your use of ICT in your classroom?

Observational field notes were taken by the researcher during this activity and teachers were invited to include additional comments to their own copy of the CID at the end of the focus group. These concluding remarks provided an opportunity for teachers to comment or re-position others or themselves as the focus group concluded.

3.6.3 Classroom Observations

Classroom observations were undertaken between the first and second interview. While teacher actions and choices to use Web 2.0 had previously been investigated through the Personal Meaning Making Map (PMMM) and the Collaborative Interactive Discussion (CID) tools, the classroom observations were necessary to investigate teachers’ attitudes in action. Redman and James (2016) have proposed a similar two-step approach to data generation. This has enabled the research to better
understand and compare what a teacher said with what they did. While intensive observations were beyond the scope of this study, analysis has shown that the data generated was useful in understanding teachers’ positioning behaviours in the classroom.

Observations were undertaken during times when teachers were using Web 2.0 tools in their regular program; teachers were advised that there was no need to adjust their regular classroom practice. Key foci for these observations were developed from the thematic analysis of the PMMM, researcher notes, memos and CIDs. A reminder here is that, in this study, neither the students themselves, nor their work, were explicitly observed.

The teacher participants all worked within open-plan, non-traditional spaces. Working in open-plan learning spaces was not a prerequisite for participation, rather this coincidence emerged from the nomination sampling strategy. Teachers in all four schools taught in a collaborative and flexible manner that impacted on the way in which these observations took place.

Originally, the research design called for two classroom observations of each teacher. However, it became apparent that it would not be possible to observe a single teacher working on their own with one class group of students, due to the flexible way in which these teachers used the open-plan teaching spaces. The observations were therefore conducted as the researcher moved around the space to ensure all teacher participants could be observed. At times, teachers also worked together to team-teach a lesson. In these cases, observation notes focused on both teachers and their interactions between each other and with the students. This approach to observations led to different teachers being observed for different amounts of time. Where possible, and to minimise disruption to the class, the researcher attended an entire teaching period. This has also impacted on the total observation times at each school. The combined observation times for each school are included in Table 3:
### Table 3: Classroom Observations Conducted

<table>
<thead>
<tr>
<th>School name</th>
<th>Number of Observations Conducted</th>
<th>Number of Participating Teachers</th>
<th>Total observation time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Park Primary School</td>
<td>3</td>
<td>3</td>
<td>3.5 hours</td>
</tr>
<tr>
<td>Gregstone Primary School</td>
<td>4</td>
<td>3</td>
<td>3 hours</td>
</tr>
<tr>
<td>Homedale Primary School</td>
<td>2</td>
<td>1</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>Macarthur Primary School</td>
<td>2</td>
<td>2</td>
<td>2.5 hours</td>
</tr>
</tbody>
</table>

#### 3.6.4 Second Interview

To conclude their contributions to the research, phase one teachers were invited to a second interview. The focus for this interview was informed by the research literature as well as by concepts that had been raised by other participating teachers. By returning for a second interview, emergent findings were tested with the participants. At this interview, transcripts of their first interview were returned, and feedback was sought on the interpretations of their meanings. This triangulation enabled a co-creation of data between myself and the participants across the four schools.

These conversations were audio-recorded and transcribed for analysis. Transcripts from the second interview were returned to participants by email for member-checking and validation. Interview transcripts were again coded in MAXQDA, using this software as a database to bring together the data and the analysis. This enabled the comparison of first and second interview data with other data sets.

#### 3.6.5 Student Drawings

Student perceptions of Web 2.0 use were sought through a drawing activity. This method of data collection aimed to understand students’ perspectives on their teachers’ use of Web 2.0. The use of thematic drawing analysis is promoted by Kuhn (2003) to support students to explore a more complex topic. The potential complexity of the topic of ‘ICT use’ suggested that a drawn response was appropriate for this research.
Within the grade 5/6 cohort at each school, students who had consented to participate were invited to join the researcher in a separate, empty classroom to complete two drawings during a 25-minute activity. These students were familiar with the researcher through observations in their classrooms and through their teachers’ introduction of both the researcher and the research focus.

With the students, the researcher briefly explored the term ICT, the type of contribution sought, and the need to include only student initials but not names on their pages. Each prompt was then considered in turn and students were given 10 minutes to draw each response. Students were asked to include as much detail as possible in their drawing to make their thoughts clear. There were advised that key words might be used to clarify their thinking. The final drawings ranged from basic concept maps to drawings of themselves using devices to lists and diagrams. The two prompts used for the drawings were:

- *In my world, using ICT for learning looks like this...*

- *ICT in my world looks like this...*

A sample of a student drawing is shown in Figure 5.

![Figure 5: Sample Student Drawn Response](image)
The term ‘in my world’ aimed to focus the student on the personal nature of their response and reiterated the expectation of an individual response.

These drawn responses, however, did not offer substantive data for this research. This is perhaps because the written prompts were too broad. The phrases were initially chosen to encourage broad thinking. Students, however, appeared to struggle to respond and a number claimed they did not know what to draw. The resulting drawings showed great similarity between students seated next to each other and many drawings became lists of websites and devices that the students used.

Were this data generation strategy to be used again, it would be important to seek to engage the students in a sequence of lessons or interactions on the topic before asking them to draw. This may mitigate the challenges they felt in drawing a response to the question. Drawing an answer to a prompt or question did not appear to be a common activity in these schools, and this may have also contributed to the lack of useful data that was generated. In maintaining a focus on the research questions, it became clear that the student drawings could not contribute to an answer. The student drawings, therefore, have been excluded from the findings and discussion sections of this research.

3.7 Phase Two

3.7.1 Professional Learning Workshop

Having completed phase one, ongoing analysis of the generated data led to several emergent themes. These themes appeared to be reinforced across the four participating school settings and provided insight into the ways in which teachers made decisions to use, or not to use, Web 2.0 resources. The usefulness of this theory to other school contexts, however, was not yet clear. An in-school workshop, addressing the concepts that had been raised, was created to test emerging theory with teachers in another school.

Drawing on Harré’s (1999) positioning theory and Charmaz’s CGT approach (2014) to inform the structure of the 90-minute workshop, teachers were invited to reflect on
their use of Web 2.0 and its effectiveness in the classroom. Five themes explored during the workshop were:

- Societal changes and a connection to schooling;
- Exploring examples of Web 2.0 use in other schools;
- Developing team connections and commitments to trial new skills and resources;
- Creating a plan for personal development; and,
- Exploring ways for teachers to learn Web 2.0 skills within and beyond school.

This workshop sought to engage teachers, who did not claim to have extensive Web 2.0 use, in discussions about what hindered them or influenced their decisions to use these technologies. The topics listed above, generated through phase one of this research, had been highlighted by Web 2.0-using teachers as positively influencing their choices to use technology. This workshop, then, sought to validate these themes as relevant to the use of technology by investigating whether the lack of these themes was indeed impacting negatively on teachers’ choices to use Web 2.0.

The full workshop resource, as a PowerPoint presentation, is included at Appendix Three.

3.7.2 Web 2.0 Evaluation Questionnaire
Prior to the workshop, potential participants were invited to a brief after-school meeting. Here the researcher introduced themselves and the research focus and invited teachers to complete and return ethical consent forms.

In line with the school leaders’ request, all teachers at the school (n=22) participated in the 90-minute workshop held during their regular weekly meeting time.

Three weeks after attending the workshop, teachers were emailed an invitation to complete a post-workshop questionnaire. This online questionnaire was developed to evaluate the positions teachers took towards the use of Web 2.0 in education, having explored the concepts raised by phase one teachers. It sought to explore their
positioning by school leaders, their team members and by society. The questionnaire covered the following concepts:

- Personal beliefs about Web 2.0 education;
- Personal self-efficacy levels about technology;
- Prior experience with, or use of, Web 2.0 or ICT in general;
- Beliefs about the role of education in the wider society;
- Perceived levels of agency accorded to teachers by the school leaders; and,
- Perceived level of support, or lack thereof, for their team's and school's ICT or Web 2.0 integration.

Using a Likert scale of one to five, and seeking several longer written responses, nine participants from grades three, four, five and six were asked to respond to 20 statements. The questionnaire can be found in Appendix 2.

### 3.7.3 Professional Learning Workshop Review

The questionnaire data was analysed quantitatively and qualitatively to evaluate the effectiveness of the PL workshop. The purpose of this analysis was to validate, or invalidate, the theories identified by phase one participants.

Text responses were coded qualitatively using MAXQDA software to connect these data to existing data sets. In using the same codes, categories and themes that had emerged from previous data analysis, the researcher sought to make sense of teachers' experiences of the PL workshop in comparison to the data from phase one. Axial coding (Charmaz, 2014), the comparing of categories to other categories and sub-categories, was particularly useful at this stage as it brought together data from phases one and two. Likert scale responses were analysed using central tendency measures; mean, median and mode.
3.8 A Constructivist Grounded Theory Approach to Data Analysis

Data generated through this research used a constructivist grounded theory (CGT) approach based on the work of Charmaz (2014). CGT is defined by Charmaz as interpretivist, and co-constructed:

My approach explicitly assumes that any theoretical rendering offers an interpretative portrayal of the study world, not an exact picture of it (Charmaz, 2014, p. 10).

There are strong connections between CGT and positioning theory, these include:

- A focus on interpreting dynamic social contexts;
- Development of data with participants;
- An acknowledgment that research findings are based on socially constructed realities; and,
- Fine-grained data generation and analysis.

CGT therefore provided a suitable analytic process for interpreting the data in this research. Charmaz (2003 p. 28) promotes CGT analysis for social or psychologically focused studies, stating that “[constructivist] grounded theory methods are suitable for studying individual processes, interpersonal relations and the reciprocal effects between individuals and larger social processes”. To support this study’s focus on teachers’ beliefs and actions within their school, teams and classrooms a CGT approach was seen as both necessary and appropriate.

There continues to be debate around the use of grounded theory, particularly with its focus on interpretivist approaches to meaning making (Mjoset, 2005). Mjoset (2005) identifies a key question that is asked in the debate of grounded theory:

In a sense, the question here posed is whether grounded theory can be defended with reference to state of the art philosophy of science (Mjoset, 2005, p. 3).

In discussing the need for contextual and time-bound research, Abbott (2001) rebuts Mjoset’s question and sees research that honours the lived-experiences of individuals as a necessary companion to traditional, scientific inquiry. Abbot (2001) states that,
“knowledge becomes great only when it has internal consistency” (p. 121). Abbott (2001) further frames interpretivist research as, “a comprehensive, interesting and compelling account of social life” (Abbott, 2001, p. 121). Mjoset (2005) similarly discredits challenges to grounded theory and positions this approach to research as necessary to understand complex human activities and interactions. He challenges purely quantitative research that does not explain causal relationships and sees a need for theory to be accepted as another type of scientific experiment:

“... lack of causal variables-based statistical methods do not yield causal explanations, but they yield “sophisticated descriptions”. Theory is developed as a thought experiment. “(Mjoset, 2005, p. 5).

While challenges to the effectiveness of grounded theory continue to be debated (Backman & Kyngas, 1999), it appears that much discontent with this generative and qualitative method arises from a misinterpretation of what it entails. Suddaby (2016, p. 633) notes that, “... with some concern, ... ‘grounded theory’ is often used as rhetorical sleight of hand by authors who are unfamiliar with qualitative research and who wish to avoid close description or illumination of their methods”.

In light of these critiques, this research has engaged with one, clear interpretation of grounded theory and presents a transparent process on engagement with literature and with data. This can be seen in Chapter Four: Research Findings, which introduces each theme through a diagram of the coding stages and theme development.

This research has sought to develop “thick description[s]” (Guba & Lincoln, 1982, p. 248) to “impart a vicarious experience of [teachers and their actions], and ... to facilitate judgments about the extent to which working hypotheses from that context might be transferable” (Guba & Lincoln, 1982, p. 248). In generating data through the methods previously described, a deeper understanding of the contexts and the individuals was developed.

This choice of an analytic approach offered increased clarity to readers of the completed research. Developed theories can be traced from their initial emergence in the data through thematic development and categorisation to final conclusions. According to Fossey et al. (2002), research findings should “include evidence of the
evolving design of the study, making transparent the ways in which the data gathering
and analysis processes informed each other and the study design” (p. 729). The
transparent nature of CGT was considered vital to enhancing the validity of this study.

CGT involves a unique view of the way in which research literature is used. To ensure
open codes are generated without reference to existing studies, the literature review
for a grounded theory project should be undertaken before data is generated (Corbin
& Strauss, 2008). This doctoral study was challenged by this approach as the
researcher was a novice and sought guidance from the literature.

Charmaz and Blackwell (2007) argue that research should be open to new and
unanticipated findings and not constrained by existing theory or literature, “The point
is for any grounded theory researcher to remain as open as possible in the early stages
of the research” (Charmaz & Belgrave, 2007, P. 49).

With this explanation from Charmaz and Belgrave (2007) in mind, the researcher
sought to engage with research literature but remained open to engaging with
additional literature as the study progressed. Chapter Two in this thesis has presented
a broad investigation of the literature of educational technology in primary schooling.
In Chapter Five, emergent themes are discussed through literature and theory that
were not part of the original review.

3.8.1 Emergent Theory

Data generation methods for this study were chosen to enable theory to emerge from
the data without the constraints of pre-existing researcher beliefs and without
deviating too far from the study questions. The use of individual (PMMM) and group
(CID) methods supported the investigation of personal stories about ICT and Web 2.0
use. Codes, categories and themes emerged from ongoing analysis of events, actions
and concepts. These were identified, refined, searched for and validated in an ongoing
process from the first initial data collection activity, as a key component of grounded
theory process (Corbin & Strauss, 1990). Through this iterative and reflective process
emergent theory was challenged and refined at each stage of the research.
3.8.2 Constant Comparisons
When taking a grounded theory approach, “data collection and analysis are interrelated” (Corbin & Strauss, 1990, p. 219). As new data were uncovered previous data were reviewed. This occurred multiple times throughout the study. This “simultaneous data collection and analysis” (Charmaz, 2006, p. 19) formed an ongoing cycle that forced the researcher, “back to the data and forward into analysis” (Charmaz, 2006, p. 23). Each piece of evidence was compared to others using thematic coding and categorisation. In so doing, the researcher moved beyond a descriptive interpretation of the setting and instead gave “priority to the studied phenomena or process” (Charmaz, 2006, p. 22). Further, in-depth analysis was undertaken after stage one to ensure that theoretical interpretations were accurately informing the next stage of the study.

3.9 Researcher Actions

3.9.1 Memoing
During the process of grounded theory, the researcher uses specific tools. The most significant of these are memos. These “extended notes” (Charmaz, 2006 p. 11) formed a key component of data collection and interpretation. Memo writing began early in this research process and continued throughout. As Charmaz (2006, p. 72) explains, “we start by writing about our codes and data and move upward to theoretical categories and keep writing memos throughout the research process”. Memos written in this research similarly began as commentary on initial codes and continued to develop into more theoretical reflections as the research progressed. These memos were used to corroborate emergent themes and to trace themes through the data to their initial appearance.

3.9.2 Data Coding Methods and Stages
Charmaz (2006, p. 37) explains that coding is imperative to the grounded theory process, stating that “coding is the pivotal link between collecting data and developing an emergent theory to explain these data”.

The act of coding data is explained as “categorising segments of data with a short name that simultaneously summarises and accounts for each piece of data” (Charmaz,
Charmaz (2006) promotes two stages of coding, and also supports the approach of axial coding that is described by Corbin and Strauss (1990). The two initial stages of coding (Charmaz, 2014) can be summarised as:

1. **Initial coding** – This coding is usually undertaken through a line-by-line analysis of memos, elicited or extant texts. At this stage, data is compared with other data.

2. **Focused coding** - This approach to coding reflects on the initial coding and reviews the themes and concepts that are emerging. Codes are compared to other codes and themes at this stage.

Axial coding takes this process further by relating “categories to their subcategories, and these relationships [are] tested against data” (Corbin & Strauss, 1990 p. 423).

This study employed three stages of coding: initial, focused and axial. These three stages of coding brought emergent codes together into categories around the core phenomenon of Web 2.0 use. This approach ensured that the links between codes, categories and sub-categories were carefully and continually considered and compared to the data in its context.

### 3.10 Ethical Considerations

As this study involved access to both students and teachers in Victorian state schools, ethical approval to conduct research was required from both the Department of Education, Victoria and from The University of Melbourne.

Consent for research activities in schools was first gained from the Victorian Department of Education (Appendix 5). This consent was then provided to the Human Ethics Advisory Group (HEAG) within the University of Melbourne (Appendix 6). The application demonstrated the merit of the proposed research, the risk management plan, the recruitment of participants for the study, and the plans for gaining (and storing) data (National Health and Medical Research Council, Medical Research Council, Australian Research Council, Australian Vice-Chancellor's Committee, 2007).
Principals, in both phase one and phase two, who agreed to participate in this research signed and returned plain language statements and consent forms for their school’s involvement in the study (Appendices 7 and 8). This did not, however, constitute acceptance of participation by teachers.

Teachers were invited to an informal meeting at their school and provided with an overview of the research and a copy of plain language statements and consent forms (Appendices 9 and 10), as approved by the University of Melbourne Human Ethics Advisory Group. These documents clarified participants’ contributions to the study and the anticipated time commitment. Finally, plain language statements and consent forms were distributed to all students in the classrooms of teachers who provided consent (Appendices 11 and 12). These forms were co-signed by both parents and students.

This study did not outwardly address any intrusive or sensitive issues. Teachers’ names and school identifiers were kept confidential and pseudonyms for individuals and schools have been used in this thesis and in all publications arising from this research and will remain so within the limits of the law.

Participants were also able to request for any unprocessed data to be returned to them at any time and could withdraw from the study at any time.

In line with its interpretive perspective and acknowledgement of multiple realities, this study, in addition to parental consent, requested direct consent from students. This acknowledged the important voice that students had in the social construction of the classroom and was considered important to appropriately value the students’ perspectives during data collection. At 11 and 12 years of age, these students were considered able to understand the purpose of this research project and their potential role in it.

### 3.11 Chapter Summary

This chapter has offered a detailed description of the methodology of this research project. The theoretical perspectives informing the choices have been discussed, in particular the use of positioning theory (Harré, 1999) to inform the design and to
make meaning from the generated data. Constructivist grounded theory (Charmaz, 2014) analysis has been shown, in this chapter, as having provided rigour to the study findings and was further strengthened by member checking, triangulating data sets and by acknowledging the researchers positioning in each interaction.

In phase one, participants were drawn from four school settings. A total of nine primary school teachers in upper primary school classrooms participated. A snowball nomination strategy was used to discover and invite these participants to contribute to the study. This began with the Department of Education, Victoria and ended with school principals and the teachers themselves. Two of the schools were located in the western suburbs of Melbourne, one in the south-eastern suburbs of Melbourne and one in the suburbs of a large regional town in Victoria. Each participant contributed to the research through two interviews, one focus group and several classroom observations.

In phase two, a 90-minute professional learning workshop sought to ask teachers at another school about their perspectives on Web 2.0 resources. Finally, phase two participants completed a post-workshop survey.

Given the limited research around upper primary school teachers’ use of Web 2.0, these methodological choices sought to generate new theory. This chapter has connected the methodological choice of positioning theory to the analytic approach of constructivist grounded theory and to the researcher’s purpose of uncovering why some teachers choose to use Web 2.0 technologies, and some do not.

The following chapter reports on the findings of this research.
4 Chapter Four: Research Findings

4.1 Chapter Overview

As explained in Chapter one, this research project sought to better understand the factors that may have influenced teachers’ use, or non-use, of Web 2.0 technologies in the upper primary school classroom. The data in this chapter were analysed through the lens of positioning theory, and the close coding processes of constructivist grounded theory.

The chapter presents the results of twelve months of data generation. The key findings from interviews, Personal Meaning Making Maps (PMMM), Collaborative Interactive Discussions (CIDs), observations and, in phase two, a professional learning workshop and online survey are detailed here with a focus on the voices of the teachers. To increase the validity of these findings, participants in phase one were invited to review or change the emergent themes coding as the study progressed. In phase two, participants were asked to corroborate or refute the themes generated in phase one through a workshop and an online survey.

4.2 Chapter Structure

This chapter explores and explains five key themes that have emerged from the analysis. The first three sections of this chapter focus on data from phase one of this research. These sections address three themes that concern the personal, or internal, factors that teachers in phase one identified as significant to their use of technology. These are:

1. Seeking equity for all students;

2. Using multiple strategies for personal learning; and,

3. Demonstrating risk-taking and continual learning.

The final two sections of this chapter report on data from both phases of the study. These two further themes explore contextual factors:

4. School leadership; and,
5. Student learning.

The phase two qualitative survey offered insights into the ways these teachers viewed their Web 2.0 use, however, this was not able to be interrogated to the same depth as the data from phase one. Survey responses did not provide as much detail or the opportunity to question participants about their responses. Quotes from open questions in the survey were, however, useful in providing context to phase two participants’ answers, and are used in this chapter to support the claims made.

The overall structure of this chapter is illustrated in Table 4:

<table>
<thead>
<tr>
<th>Section Number</th>
<th>Theme</th>
<th>Focus Codes Reported on Within Each Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3</td>
<td>Seeking equity for all students</td>
<td>Acknowledging the Scope of Global Workforce Changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bridging Perceived Gaps Between Diverse SES Groups</td>
</tr>
<tr>
<td>4.4</td>
<td>Using multiple strategies for personal learning</td>
<td>Developing Technology Skills as a Team</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning as an Important Part of the Teaching Profession</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning Through Others</td>
</tr>
<tr>
<td>4.5</td>
<td>Demonstrating risk-taking and continual learning</td>
<td>Demonstrating Persistence When Technology Fails</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reflecting on Own Practice and Learning Needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Taking Control of Technology in the Classroom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acknowledging a Change in the Teacher’s Position in the Classroom</td>
</tr>
<tr>
<td>4.6</td>
<td>School leadership</td>
<td>Feeling Safe to Make or Use Technology in New or Different Ways</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leaders Work and Learn with Teachers</td>
</tr>
<tr>
<td>4.7</td>
<td>Student Learning</td>
<td>Valuing Student Voice in the Classroom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seeking to Make Teaching and Learning Contemporary</td>
</tr>
</tbody>
</table>

*Table 4: Structure of Chapter Four: Research Findings*

As can be seen in Table 4, the focused codes, those codes which emerged from analysis as contributing to the research questions, have been taken as the structure of
this chapter. This has enabled the reporting of each theme, through its constituent focused codes.

The diagrams presented at the beginning of each sub-section of this chapter present the connections that have been made between data, coding stages and themes. These diagrams are offered to enable the reader to trace the development of themes directly from the raw data. In presenting the connections between the data and the emergent themes, the reader can track the ways in which themes have been developed, through constructivist grounded theory analysis, in an iterative and increasingly theoretical, process.

4.3 Seeking Equity in Learning for All Students

A major theme highlighted in the data was “seeking equity for all students”. The development of this theme is presented in Figure 6 below. The illustrative quotes in Figure 6 are provided as indicators of the language and concepts raised by participants. They represent, necessarily, a sample of the data generated.
Figure 6: Seeking Equity in Learning Experiences for all Students
Figure 6 indicates the connections between codes that were made as data were generated and analysed. As can be seen, teachers in phase one used a range of language to express an understanding of technological changes that may impact on the equity of their teaching. Participants expressed that equity in this area was both a challenge and a responsibility for their profession. Teachers connected the idea that technology learning was a right for all students to the potential challenges that inequitable technology use may present. Each of these two focused codes are next explored in turn.

4.3.1 Acknowledging the Scope of Global Workforce Changes

Each of the nine participants in phase one acknowledged the pervasive spread of technology into their lives beyond school. Although expressed in different ways, each of the nine participants framed this awareness as impacting on their choices to use technology in the classroom. This section explores this focused code with examples of global change, and the consistencies that were revealed across school settings.

Simon noted that ongoing technological changes were also a factor in his choices to use technology:

So it’s just the way the world’s going ... and the technology that’s going to be used for everyday life ... and ... um ... you know what they’re going to do in their future and stuff. So there’s ... sort of no way around it really ... I think (Simon, Gregstone Primary School, Interview 2).

Simon’s presented technology use, not as a choice, but rather a global change due to which he must modify his teaching.

Similarly, Sarah, from Gregstone Primary School, framed her technology use as a necessity. She suggested an imperative to engage with technology, due to its current presence in 21st century society:

It's a skill. This is the 21st Century, it's (technology) equal to maths and electricity ... ICT ... yeah ... (Sarah, Gregstone Primary School, Interview 2).
Sarah’s position, on the significance of technology in primary education, was further corroborated by Hannah, who framed her technology use as a way to prepare students for the adult world:

... being able to function in the world using ICT ... it gives them a head start on what they’re going to face as adults, I suppose (Hannah, Gregstone Primary School, Interview 2).

Hannah suggested that global changes were inescapable and that these changes led her to use technology in the classroom. In the following quote, she also discussed having a duty to prepare students for life beyond school:

... well I think we really strive for that, that deep learning that 21st-century learning um and I think ICT is absolutely a part of that, it's a part of our life and it's not going anywhere it's only going to get more ... more influential, more complicated and those sorts of things so um ... I would I think it's really crucial that the kids ... whilst you know ... reading, writing, maths ... absolutely they need to have an understanding of but equally, you know ... word processing, using excel and you know email, searching the Internet, you know, using blogs and other web 2 ... you know devices ... because really you know once they are through high school and ... you know looking for work, I think that's all going to be the skill set that they need to have, yeah (Hannah, Gregstone Primary School, Interview 2).

Hannah accepted the value of technology skills as an investment in students’ futures.

In the following two quotes, we see how the other focused code in this theme was developed, that of seeking equity in learning for all students. Hannah, from Gregstone Primary and David, from Royal Park Primary, expressed an understanding that they, as teachers, were preparing students for an imaginable future. This vision was connected to their use of technology in their personal lives:

... but I guess more than that, it’s just the opportunity, those future opportunities I guess ... yeah (Hannah, Gregstone Primary School, Interview 2).
... them [students] being able to, well ... basically use the resources that they'll have, or ... they'll have to be able to actually apply themselves in when they go into their future ... (David, Royal Park Primary School, Interview 1).

Hannah and David positioned themselves as preparing students for the future. They expressed a sense of duty towards their students, based on their perceptions of technological changes in their own daily lives.

All nine participants in phase one expressed a similar understanding and connection to global and community technological changes.

4.3.2 Bridging Perceived Gaps Between Diverse SES Groups

This code explores the ways in which teachers in phase one discussed the socio-economic background of their students. Most teacher participants (seven of nine) commented on the social status of their students. They suggested that their understanding of students’ backgrounds had impacted on their choices to use technologies for learning.

As has been previously noted, the schools in phase one reported similar student populations to each other, close to average socio-economic backgrounds. All but two participants shared that they saw a lack of technology use or learning as creating possible future disadvantages.

Through interviews and during classroom observations, seven phase one teachers conveyed this perspective. An example was seen in Sally’s classroom. During her first interview, she explained that her knowledge of the local community and surrounding area had informed her sense of duty towards the students in her care. The researcher asked, “So it sounds like it [your choice to use technology] came from your sense of wanting to ensure equity?” Sally replied:

I think ... I grew up in this area, so like, I’ve seen what these schools are like, I’ve been in these schools, so I guess it kind of hit close to home ... in a way. So I just wanted the kids ... to be able to take something away from a day, and that was in my own teaching philosophy... (Sally, MacArthur Primary School, Interview 1).
To counteract any potential disadvantage, she expressed a deep concern to expose her students to technologies in the classroom. According to Sally, her students came from similar social backgrounds to herself.

All nine teachers in phase one signalled that technology learning offered the students opportunities beyond school. In her first interview, Hannah suggested that digital technologies were non-negotiable for learning. In her second interview, she framed her use of technology as informed by her hope that students would be, "... able to function in the world using ICT... it gives them a head start on what they’re going to face as adults, I suppose" (Hannah, Gregstone Primary School, interview 2).

Victoria also reflected on her students’ social backgrounds, and saw the school as having a role in bridging perceived gaps between diverse SES groups:

... students here don’t come from wealthy families ... it’s fair to say ... so I just feel like ... that might not have been a priority for them to have that technology had it not been at this school (Victoria, Royal Park Primary School, Interview 1).

Sally, and her MacArthur Primary School colleague, Liz, were seen to make comments to their students including, “if you don’t have your iPad today, you can do this instead ...” (Sally) and “who can you share with today?” (Liz).

When asked for further insight into this behaviour during a follow-up focus group, Sally and Liz commented on a desire for equity in offering these complex options for learning. Their school, MacArthur Primary School, did not supply digital devices to students, instead, parents could choose to send any digital device to school for classroom use. This had led to a large range of both types of devices and age of devices used in the classroom; some students brought new MacBook laptops, and others brought five-year-old smartphones. Despite obvious inequities in accessing devices within the classroom, Sally and Liz described a personal commitment to equity in learning experiences for their students.

In phase one, all nine participants indicated that they perceived technology as providing important learning opportunities. Liz expressed this in saying: “I believe that
ICT, used correctly and integrated into the curriculum will open up opportunities to all students” (Liz, MacArthur Primary School, CID).

In highlighting potential logistical challenges that his students might face with technology, Victoria’s Royal Park Primary School colleague, David exhibited a focus on equity as a factor in his technology choices. Both Victoria and David connected their choices to use technology to an understanding of their students’ backgrounds and home lives:

Speaking to a lot of them [students], they might have an iPad here [at school] and be able to connect to the Internet here, but they don’t actually have the internet at home … Some of them aren’t even allowed to charge different things at different times just because there’s a cost behind it [to electricity usage] (David, Royal Park Primary School, Interview 2).

Matt seemed to similarly identify teaching as broader than meeting curriculum expectations. He echoed the sentiments of other participants and presented technology as providing important learning opportunities for his students:

I think it’s just a new avenue to learning. They haven’t … some of them haven’t been exposed to this type of technology, but having that technology you’re exposing them to the wider, broader world, and just giving them that gateway to secondary school because obviously … as they get older and older … technology’s going to become more prominent in their lives, and having technology in the school, you’re exposing them to that type of learning as well (Matt, Homedale Primary School, Interview 1).

4.3.3 Summary of Seeking Equity in Learning for all Students

Seeking equity for all learners emerged as a major theme from this research. A majority of participants (seven of nine) in phase one used explicit language to express the pertinence of equity, global change and gaps in technology experiences to their choices to use Web 2.0.

The following section describes the types of personal and professional learning participants indicated as significant to their use Web 2.0 for learning.
4.4 Teachers Use Multiple Strategies for Learning to Use Technologies

The participants in phase one of this research were all members of a teaching team at their school, with whom they planned and taught their students. They acknowledged a sense of shared responsibility for learning within, through and across their team.

Learning in this context appeared to have a two-fold definition. Initially, participants described learning as the experiences they provided to their students. Through interviews and classroom observations, however, it became clear that participants also saw learning as a professional duty that they carried out.

Figure 7 outlines the development of codes for this theme and indicates the connections between each open and focused code.

Not every team member at each school participated in this research, however, where the entire team was not involved in the research, the research participants highlighted the influence of their entire team, including non-participants, on their choices to use digital technologies. For ethical reasons, references to other, non-participating, teachers at each school have been excluded from this thesis.
Figure 7: Teachers use multiple strategies when learning to use technologies

Yeah it's very social and everyone's willing to help each other, and every team that I've been in over the past three years has been like that, we just share what we know and build up different strengths and just play with them.
(David Interview 2)

So it's all about always trying to educate yourself to become a better teacher so you can pass that onto the kids as well.
(Matt Interview 2)

Just through collegial discussions and lesson plan sharing, and then they introduced us to things.
(Sarah Interview 1)

... we as teachers get to learn from our students as much as they learn from us and learn from their peers as well.
(Hannah Interview 2)
Iterative coding of the data identified three focused codes, shown in Figure 7:

1. Developing skills as a team;
2. Learning as an important part of teaching; and,
3. Learning through others.

Teachers shared learning responsibilities and afforded each other, and themselves, time to develop technology skills. Learning was seen as an ongoing team activity and an important part of their teaching practice. Furthermore, teachers in this research appeared comfortable to learn from others, including their peers, colleagues and students. They saw professional leaning as an opportunity to engage with others, rather than an obstacle to be overcome. There were a number of similarities in language and actions between teams across the four schools. These are explained in the following sections.

4.4.1 Developing Technology Skills as a Team

This focused code emerged as significant to how the participants continued to learn and trial new technology resources.

Teachers developed these skills by focusing on team learning and team support. Technology skills were developed as a team, almost as a single entity. As Hannah commented, “... it was a matter of wrapping your head around it as a team ...” (Hannah, Gregstone Primary School, Interview 1).

Hannah’s word choice in the above quote reflected the language used by other participants. Hannah is discussing a new technology hardware that had been brought into her classroom. In saying “wrapping your head around it as a team”, she is referring to the collective skills of this team of teachers.

There was a shared responsibility for the learning of everyone in the team. Each member was positioned as being both a learner and a teacher, often moving fluidly between these identities within a single sentence or phrase.
This type of interaction was observed in the open-plan learning areas within which the four teams in phase one worked. Through a total of eleven observations, nine encounters of this type were observed. Teachers left their teaching space to approach another team member for pedagogical or technical support during a lesson. Support was always provided. This was either a short verbal reply, “yes, it’s on the website - page xxx”, an offer of an alternative digital device, “here, take my iPad for now”, or an offer to physically support each other.

Sarah identified a moment of support that appeared significant to her as she began her teaching career:

... yeah, I was flustered, and it was my first year of teaching, and a teacher who was working on the opposite side of the room came over and said, ‘oh I’ll take your group while you go and set up an interactive whiteboard’ (Sarah, Gregstone Primary School, Interview 2).

This point-of-need support was informal. As a need was identified, support was offered quickly and with minimal apparent disruption to the classroom programs that were underway.

Using classroom observation notes, the interactions between team members were closely analysed to assess if any individual member of a team was approached for support more than the others.

At Gregstone Primary school, two team members were most often approached for support. These teachers, however, were also observed to be seeking support from others during the same lesson. The teachers often sought-out for support appeared to be repeatedly asked about technical issues.

At three of the phase one schools, receiving support and giving support was distributed equally between the teachers. Teachers were as likely to request support from their colleagues as to give it. They provided, and received, peer support as needs arose, and as frequently or infrequently as necessary.

Calculating these interactions numerically was challenging, as there were often more than two teachers involved in supporting each other during a lesson, and the
researcher was physically positioned in the centre of large open-plan spaces. Observations suggested that the giving and receiving of collegiate support at these three schools was at the approximate ratio of 1:1.

The significance of positive and supportive team interactions was identified in classroom observations and focus group data. Participants noted that they held similar goals and beliefs to their team, which impacted on their willingness to accept support from their team members. This conjecture was highlighted by Matt:

... and they’re sort of ... on the same page as me in the way that we think alike when it comes to being able to teach kids different ways, and ... always being flexible ... and I was using technology to help us do that (Matt, Homedale Primary School, Interview 2).

A challenge identified by all nine participants in phase one was finding time to learn new skills. Participants revealed that, although they worked closely as a team, they also had an individual responsibility to take the time to develop skills that would be useful in their classroom. As Matt reflected, “there are a lot of things that you’re learning ... ” (Matt, Homedale Primary School, Interview 1), requiring dedicated time to develop those skills.

Dedicated time for learning was revealed as an ongoing desire, held by all participants. They acknowledged that they took time to develop skills with technology, but felt they were often not afforded this chance, due to busy school schedules or competing priorities.

Five teachers commented on a lack of time that limited their chance to learn new technology skills. This was the case for one teacher who shared that, “I feel I am less confident with iPads because of not purchasing my own ... so I had no sandpit time ... “ (Sarah, Gregstone Primary School, Interview 1).

At this school, “sandpit time” was explained as personal time for exploration and play with a new technology to uncover its educational affordances. Sarah’s colleague Hannah, told the researcher that this was often done alone, without team support, when a new piece of hardware or software was introduced.
All nine participants in phase one commented that they spent personal, out of school time learning by experimenting with new technology. When asked whether she had spent any personal time learning a new resource before she introduced it to the students, Hannah replied:

Ummm ... oh ... look ... Probably in the sense that we had agreed as a team that this was what we were going to use and then we had the opportunity to log on, you know...we linked with each other as a team (Hannah, Gregstone Primary School, Interview 1).

Through interviews and classroom observations, two ways of learning new technology skills were noted. These were:

1. Within a small group at the school; and,


Hannah’s quote, below, suggested that she saw several other ways to discover and learn new technologies: through her own research, at formal professional learning or from colleagues in other classes:

It usually stems from someone having attended a Professional Development day or has stumbled upon something ... has been using something elsewhere in the school, and tends to come to a meeting or a planning day or something and will say hey, I’ve got this and I think it will suit this particular lesson for literacy or numeracy or whatever it might be’ ... (Hannah, Gregstone Primary School, Interview 2).

Sarah similarly noted that there were opportunities to seek support from her colleagues, when needed:

Even if you are working on your own, we still ... you know... all work in the back office, so we can be like – ‘look, I’m really stuck, I don’t know how to do the lesson for the younger or the lower group, does anyone have an idea?’ So, it’s like ... really ... yeah collaborative in terms of that. There’s lots of like sending links and sending ... yeah ... ‘try this, have you seen this’ and ... yeah, so it is supportive
even if you’re not team teaching, there’s a lot of team planning, and yeah support (Sarah, Gregstone Primary School, Interview 2).

4.4.2 Learning as an Important Part of the Teaching Profession

Through this focused code, phase one participants identified that learning was a core part of their professional identity, although most participants (seven out of nine) also shared that this was, at times, challenging.

Teachers expressed challenges of learning new technologies in different ways. Rachel, from Royal Park Primary School, was asked in an interview about the support she received from one of the school’s learning coaches:

So I get observed by (leader’s name) and then he comes and critiques, yeah … so … heaps, they just … sort of … support (Rachel, Royal Park Primary School, Interview 2).

Although she acknowledged the amount of support she received, it is not clear whether this was a positive intervention for Rachel.

Victoria similarly commented that constant learning was “… hard but there’s no choice” (Victoria, Royal Park Primary School, Interview 1).

This finding connects to the previous theme of seeking equity for all learners. Participants expressed that there was “no choice” but to continue to learn new technology skills, because of their desire for equity in learning for their students.

4.4.3 Learning Through Others

Learning through other teachers, who had different skills, was highlighted as a strategy for learning new technology and pedagogy skills. All nine phase one participants commented that they learned new technology skills not only from their immediate team but also from peers, colleagues and students.

In two of the three collaborative interactive discussions (CID) teachers referred to ways in which they had learned from others, both within and beyond the school.

Matt presented himself as having a responsibility, in his small school, to “pass it [his learning] on to other people”: 
Okay, there’s things that are going to pop up, there’s always going to be new curriculum, there’s always going to be new stuff coming in, and you just need to sort of take it as it comes and sort of go with it, learn it, and then pass it on to other people as well (Matt, Homedale Primary School, Interview 1).

For Matt, collegiate support took the form of Twitter conversations, emails with former colleagues at other schools and reading educational blogs. He suggested that his smaller school setting did not provide the level of learning or interactions with others that he needed for his personal development.

When she described her study tour to New Zealand, and the learning she experienced by sharing with others, Sally commented that:

Yeah, it was really validating to kind of talk to other people and for them to go, ‘oh, like you guys are so good at this. What are you doing? How are you doing this?’ And at the same time it was good to go to workshops and be like, oh I never thought of doing that (Sally, MacArthur Primary School, Interview 2).

For Hannah, learning through others was:

... just about putting your hand up for that PD or going online and seeing what’s out there, what apps are working and those sorts of things, yeah taking that ownership over it (Hannah, Gregstone Primary School, Interview 2).

Five of the nine phase one participants mentioned formal professional development (PD) programs, as Hannah does above. For the other four participants, learning was described as broader than attending formal, off-site training:

Yeah, it's very social and everyone's willing to help each other, and ... every team that I've been in over the past ... three years has been like that ... we just share what we know and ... build up different strengths and just play with them (David, Royal Park Primary School, Interview 2).

Whether they learned from their peers and colleagues within their school or from those outside their school, phase one participants situated themselves as learning from and with their teaching colleagues. Simon provided an example of this fluid shift
between teacher and learner, as was highlighted by each of the four teams in phase one:

Well ... we’ve used people’s strengths and experiences you know, people ... we’ve all had a go at different things. So, if someone’s ... as I said before ... they’ve done something that worked really well in a lesson, then they can take the lead of the whole learning so we can all learn from them, and then it goes around. So, I might have something I’ve done before that I can share with the team so they can do it as well (Simon, Gregstone Primary School, Interview 1).

These teachers also considered their students as valuable learning resources. Hannah described the pressure she felt to use digital technologies:

Oh, 100 percent um ... I certainly don’t believe that as a teacher I have all the answers because I don’t ... that’s just, it would be impossible to do so umm ... no I think it would be really neglectful of me to say you know ... you’re just a student you couldn’t possibly know how to fix that’ ... so I think ... yeah ... that giving them that opportunity to share that knowledge is really good ... really powerful (Hannah, Gregstone Primary School, Interview 1).

Hannah’s apparent openness to learning from her students was underlined by Simon and Victoria in their quotes about learning to use new technologies:

I’m not an expert at IT, and I know that they’re a generation that have come up in this ICT world, and that’s of course going to be the case that they’re more natural ... and fluid at using it than I am, so I think ... that’s fantastic that they can come forward and do that. You know ... I think it’s really good when students can be teaching themselves as well (Victoria, Royal Park Primary School, Interview 1).

... and they [the students] know ... they explore, you know ... they teach us lots of things ... there’s lots of programmes and things that they use that they can show us, and I think it’s just because they’ve had computers since their first day here (Simon, Gregstone Primary School, Interview 2).

These quotes are representative of broader findings in this research and provide further confirmation that learning through the students was significant to participants.
4.4.4 Summary of Teachers Use Multiple Ways to Learn to Use Technologies

This section has discussed the ways in which phase one teachers viewed their own learning as professionals. Learning was presented as an important part of a teaching career. Teachers engaged with peers within and beyond the school, school leaders and their students to learn and develop specific technological skills.

The following section discusses another personal factor that participants in phase one framed as underpinning their choices to use technology in their classroom. These have included risk-taking, being willing to fail and demonstrating persistence in the face of challenges.

4.5 Risk-Taking and Learning are Embedded in the Technology-Using Teacher’s Identity

Connected to their sense of duty to maintain currency and to develop new skills, participants in phase one appeared to have developed specific strategies to cope with ongoing changes to learning and teaching. This section will explore this conjecture further within the framework of four focused codes. Figure 8 provides an overview of the interconnected nature of the codes in this theme.
Taking Risks and Continual Learning is a Part of a Technology-Using Teacher's Identity

Illustrative Quotes

I'm not an expert at IT, and I know that they're a generation that have come up in this ICT world, and that's of course going to be the case that they're more natural and fluid at using it than I am, so I think that's fantastic that they can come forward and do that. (Victoria, Interview)

Yeah, it does throw you a bit, but I guess you can't... I don't know, you can't let that put you off using it (Sam, Interview)

I tend to go into a lesson knowing that this could be an issue and try and put things in place to stop that from happening so we can actually use that programme, or we can use that device (David, Interview)

So basically when I'm planning, I just sort of embed it throughout. I don't like them to do it all the time. (Liz, Interview)

Open Coding

- Accepting their lack of knowledge
- Expressing openness to new things
- Being willing to make mistakes
- Seeking new opportunities to learn
- Using risk-taking as a strategy for learning
- Acknowledging that the teachers sets boundaries for student technology use
- Seeing the teachers as guiding students' learning
- Identifying the teacher as decision-maker for student technology use

Focused Coding

- Demonstrating persistence when technology fails
- Reflecting on own practice and learning needs
- Taking control of technology in the classroom
- Acknowledging a change in the teacher's role in the classroom

Theoretical Coding

- Technology use is important enough to keep trying, even if there is a risk of failure.
- Teacher identity shifts frequently & fluidly between learner and teacher

Figure 8: Taking Risks and Continual Learning is a Part of a Technology-Using Teacher's Identity
Teachers in this study reported, and demonstrated, a willingness to take risks in their technology use. They demonstrated this in four ways that were identified and validated across the four schools in phase one.

The four focused codes that indicated this risk-taking behaviour are:

1. Demonstrating persistence when technology fails;
2. Reflecting on own practice and learning needs;
3. Taking control of technology in the classroom; and,
4. Acknowledging a change in the teacher’s role in the classroom.

Teachers willingly acknowledged a lack of knowledge and/or skills with technology. Each of these four focused codes is next explored as findings arising from the data.

### 4.5.1 Demonstrating Persistence When Technology Fails

Participants reported persisting with technology use in the classroom, even when having previously experienced issues. All phase one participants acknowledged a lack of technological knowledge. Each expressed their need for ongoing learning and support. For some this need was connected to a sense of overwhelm or challenge:

... at first it was really diffi ... it was ... oh gee, I was so far behind compared to other students ... and teachers and stuff ... cos I come from a background of not using a lot of ICT and technology ... but now ... ahh ... it’s um if I don't know how to do it, let’s go learn how to do it together (Simon, Gregstone Primary School, Interview 1).

For others, learning new technology skills appeared to be easier:

Always approach it with an open mind ... with um ... certainly with anything ICT (Hannah, Gregstone Primary School, Interview 1).

Several participants demonstrated a more cautious approach to their adoption of technology, while simultaneously moving forward with its use. They expressed openness to new things and demonstrated persistence, despite successive failures.
Matt explained his strategies for dealing with failure in his second interview. When asked how he managed when technology did not work as planned, Matt replied:

... okay, this has happened ... but what can we do ... to put in place to make sure it doesn’t happen again? (Matt, Homedale Primary School, Interview 2).

In this interview, Matt went on to reflect on a recent event in his classroom where a student had lost three weeks of written work from his laptop:

It’s not going to come back [laugh] ... what can we do now to fix that? So it is character building ... (Matt, Homedale Primary School, Interview 2).

During his interview, Simon offered a similar perspective:

I guess, yeah that’s what we believe in, with the good comes the bad, and yeah sometimes things don’t work, but you just go on, but you know at the end of the day, you know it’s worthwhile (Simon, Gregstone Primary School, Interview 2).

Persistence, for Simon and Matt, was connected to their desire for equity in technology access for their students. Simon explained that persistence felt mandatory, “but you just go on”.

Similarly, when asked what advice he might offer other teachers, Matt encouraged others to “not give up on it” and “every failure, you’ve got to think of another way of how we can improve this ... ”:

Don’t be afraid of failing, like ... there’s a lot of times where technology it will fail you, and ... you’ve got to think of ways to move on from there and not give up on it, and I think ... It’s one of those things where you sort of have to work on it for a long period of time to make it successful, and ... I think every failure you’ve got to think of another way of how can we improve this in some way? (Matt, Homedale Primary School, Interview 1).

Matt positioned himself as willing to try new technology, and then to try again if plans went awry:

I think you need to sort of embrace it and take charge and just have a go, practice it and just ... if it goes well, continue with it, and if it doesn’t go well then ... you
can think of different ways to change it to make it better in the classroom ... or in the school (Matt, Homedale Primary School, Interview 2).

### 4.5.2 Reflecting on Own Practice and Learning Needs

This focused code emerged from the analysis of teachers’ actions during classroom observations, during interviews and focus groups. This analysis connected what teachers said they did, with what they were seen to do in the classroom. Self-reflection was noted in eight out of nine participants in phase one.

Sarah, in the following quote, talked about reflecting on her practice and the support she felt she received:

> So when it comes time to look at the lesson and reflect on it and yeah, it’s just basically ... it’s more conversational than concrete ... a lot of the support ... because you are so busy, you’re always on the go kind of thing. But it could be like someone quickly grabs a book and says, ‘oh I read this over the weekend, it’s really helpful’. So yeah, just sharing of resources ... (Sarah, Gregstone Primary School, Interview 2).

Taking a slightly different focus, Sally connected her willingness to learn, and risk errors in her teaching, to her perception of the fast pace of technology growth in schools:

> So, I think as that [access to classroom technology] grew, we kind of went wow ... the teacher capacity needs to grow, and where does that come from, who do we ask? (Sally, MacArthur Primary School, Interview 1).

All nine participants appeared open to discussing their professional practice with a relatively unknown researcher. Through two interviews, a focus group and several classroom observations, they openly reflected on their use of technology, their failures and their persistence.

### 4.5.3 Taking Control of Technology in the Classroom

This focused code framed the positions that participants in phase one took up when controlling the technology used in their classroom.
Phase one participants positioned the teacher as in charge of setting boundaries for student technology use. Matt stated his understanding of his role in the classroom. Acknowledging that primary school students required structure and support for learning, he said:

To begin with, because they are primary school, there had to be some sort of teaching ... explicit teaching for them to know how to use them appropriately (Matt, Homedale Primary School, Interview 1).

Several teachers suggested that they sought to fully control the technology in the classroom and identified the teacher as decision-maker for student technology use. Simon provided an example of this. When asked who in the classroom made decisions about which technology could be used, and when it could be used, he answered, “Teachers. Yep” (Simon, Gregstone Primary School, Interview 1).

Liz offered a further level of insight into controlling the technology used in her classroom. She controlled both how, and when, the technology was used. The following quote indicated that she, and not her team, chose the technology for her students:

So basically, when I’m planning, I just ... sort of embed it throughout ... I don’t like them to do it all the time (Liz, MacArthur Primary School, Interview 1).

In her classroom practice, Liz demonstrated that, while she sought to offer her students choices in their learning, the ultimate responsibility for technology use rested with her. This was revealed through one interaction during a classroom observation. Liz asked a small group of students to access a Google Drive account and, as a group, work through a writing template she had prepared. As one group appeared to disengage with the task, Liz reprimanded their behaviour and removed their iPad. This was not expressed by Liz as a punishment, rather, she stated to the students that she was following classroom procedures for appropriate behaviour. Liz then proceeded to work with this small group using pen and paper. Liz appeared willing to use risk-taking as a strategy for learning but did not surrender the teaching experience to the technology. She maintained control of her students’ learning.
David also explained that he took control of technology in the classroom, to ensure that his teaching was as effective as possible:

I wouldn’t use it [a new technology tool] as an ongoing thing if it’s just not as effective as something else ... yeah (David, Royal Park Primary School, Interview 1).

All phase one teachers demonstrated and explained that they were willing to use risk-taking as a strategy for learning to use new technologies. This risk-taking was framed by the teachers’ desire to maintain control of the technology.

Hannah suggested that she actively sought out new experiences and risks in her classroom:

... any opportunity to kind of try something new and see as a teaching tool how it would go ... I was happy to give it a go and um ... yeah it was good I ... Really enjoyed using that one ... (Hannah, Gregstone Primary School, Interview 1).

Simon offered a similar perspective on his willingness to take risks in using new technology resources:

... maybe encourage [others], yeah, to be a risk-taker and try it all, ‘oh I haven’t done this before but I’m going to give this a go. I don’t know how to do it or how to go about it but I like what I saw someone else do it, so I'll take on, I'll give it a go’, yeah ... trying new a new technology or trying different apps or different software to present their learning (Simon, Gregstone Primary School, Interview 1).

Although phase one participants demonstrated a willingness to take risks with technology, not all participants revealed the same motivations for doing so. Rachel and Victoria, both from Royal Park Primary School, appeared to take risks with technology use during observed lessons. For Rachel, the technology she was using during one observation failed to work. With her students waiting in front of her, she moved quickly to a new website resource that she had not previously used. Victoria, during a classroom observation, asked two of her students to explain to her how to fix an error in a new software program.
Through interviews, Rachel and Victoria shared that their motivations for this technological risk-taking were connected to their team’s and school’s values. Victoria’s responses during the focus group offered different motivations to use technology than her colleagues. Victoria wrote on her collaborative interactive discussion (CID) that: “at first I found it [technology] difficult. Over time it has become part of my planning”. The next comment on the CID, written by her Royal Park Primary School colleague Rachel, attempted to reposition her towards the school’s values of team support and team planning: “Yes, but working with our team makes it easier” (Rachel, Royal Park Primary School, CID). Victoria’s second comment on the CID suggested that she accepted the repositioning attempt. She reframed her comment to support her team’s values and statements on the CID:

I too believe it is important to experiment with ICT in the classroom. Working in a community environment has allowed us to easily share … (Rachel, Royal Park Primary School, CID).

Rachel had reflected on using technology as a learning resource in an interview. Her comments indicated that she, too, felt challenged by technology in the classroom, but declared that she was “getting used to it”:

It feels good, it keeps me challenged. I don’t think it’s ever going to stop in this progression. I will be changing, I have to get used to change every year, every day, which me as a person I don’t like very much, but you know you don’t have a choice at this school … so in this profession … so it feels a little uncomfortable, but I’m getting used to it in my fifth year (Rachel, Royal Park Primary School, Interview 1).

At Royal Park Primary School, Rachel and Victoria took risks to use new technologies and demonstrated persistence, along with their colleagues. Their motivations, however, were not highlighted, by them, as personally driven.

4.5.4 Acknowledging a Change in the Teacher’s Role in the Classroom
A final focused code under this theme discusses the perceived role of the teacher in the classroom. Phase one participants demonstrated, through classroom observations and interviews, that they saw a teacher as a guide to learning. This definition included
learning alongside their students and modelling how to be a learner. Victoria revealed that, for her, teaching meant, “... changing all the time” (Victoria, Royal Park Primary School, Interview 1). Liz presented a different perspective on the role of the teacher, positioning herself as a co-learner:

It’s important to me because the kids need to know that it’s okay to not know everything, as long as you know how to find out, and that even though I’m a teacher, I still don’t have all the answers because life is a life-long learning journey (Liz, MacArthur Primary School, Interview 2).

Sarah used the word “facilitate” to express what she felt she did as a teacher in the classroom:

I guess it’s to ... well I’d say facilitate, but I think it’s more than that in a way ... like ... you’re teaching them how to like ... appropriately use technology as well in a safe way, and then you’re facilitating the lessons ... by ... yeah being there (Sarah, Gregstone Primary School, Interview 2).

In her classroom, Sarah presented content and skills to the whole class in what was termed by her as a teacher-centred, directed way. She then asked her students to decide how they might practice and present what they had learned. Sarah took up the roles of teacher, collaborator, facilitator and guide as she saw necessary for students’ learning. Teachers in this study demonstrated, and reported, that they saw the role of the teacher as focused on co-learning and guiding students’ learning.

4.5.5 Summary of Risk-Taking and Learning was Embedded in the Technology-Using Teacher’s Identity

This section reported on the strategies that phase one teachers described as enacting to support them in maintaining currency and in their shared pursuit of continual learning. These strategies were highlighted as risk-taking, reflecting on their professional practice, seeking to maintain control of the technology and acknowledging changes to the role of a teacher.

Phase one teachers were observed to move fluidly between the roles of teacher and learner, often within a single conversation. Taking risks in using new technology resources was evident at each of the four school sites.
The following section explores the contextual, school-based structures that teachers suggested were relevant to their decisions to use digital technologies.

4.6 School Leaders Who Develop a School Culture of Continual Trialling and Learning May Influence Teachers’ Decisions to Use, or Not to Use, Digital Technologies

This section focuses on school leadership and school cultural factors that appeared to impact participants' choices to use digital technology. Figure 9 connects themes to codes and illustrative data.
If there's something wrong, we've got our IT team to help us. (Rachel, Interview 2)

There's just like we know the philosophy here and the tools that we are able to use and the resources...like we know that they're available and it's recommended we use them. (Sarah, Interview 1)

I feel like I could go to them with anything and say can we use this? So yeah they're really supportive of that. (Rachel, Interview 2)

Lots of things come down from leadership, then it goes down to our coach, and then sort of gets dispersed amongst us, and we discuss it there and see how we can apply it. (David, Interview 2)

I think for the kids at our school that's what the vision is, and that's what we want to go, so yeah, so we buy into that and away we go. (Simon, Interview 2)

Figure 9: School Leaders and School Culture Influence Teacher's Decisions to Use, or Not to Use, Technology
School leadership was referred to, in interviews and focus groups, as important factors in teachers’ choices to use technology. According to phase one participants, leaders were involved and connected to classroom practices through their physical presence, by funding new technology equipment and by enacting a clear vision of learning and teaching that included digital technologies. Teachers noted that they felt safe to use technology and this was connected in the data to teachers’ willingness to take risks. Teachers also reported that school leaders had provided a robust and stable computer network within which they could work.

Two focused codes arose as themes, these were:

1. Feeling Safe to Make or Use Technology in New or Different Ways; and,

2. Leaders Work and Learn with Teachers.

4.6.1 Feeling Safe to Make or Use Technology in New or Different Ways

Having access to a stable technology infrastructure, that was well-supported by technical staff and school leaders, has emerged as a positive, contextual influence on phase one teachers’ choices to use technology in their classrooms. This code was connected to section 4.7.1 in this chapter, which reports on the barriers perceived by phase two participants when seeking to work within an unreliable technology infrastructure.

In their initial interviews, six of the nine phase one participants directly expressed that they felt able to trust the infrastructure at their school. In this study, infrastructure has been taken to mean the physical wiring, devices, software and hardware that teachers have access to in their school context. For some teachers, this also appeared to include access to technical support staff who maintained these systems.

Having faith in the reliability of the infrastructure was noted as a factor in both using new technologies and taking risks to learn new teaching strategies. As Victoria commented, phase one participants did not often have access or technical issues: “Yeah, we haven’t had too many issues in terms of things going wrong” (Victoria, Royal Park Primary School, Interview 1).
In their initial interviews, three participants did not comment either on problems with the technology or on the infrastructure at their school. These teachers were, therefore, specifically asked to reflect on their school’s infrastructure during their second individual interview. Analysis of their responses suggested that they had not previously mentioned the school’s technology infrastructure because they held an unspoken belief, or expectation, that the technology at their school would simply work.

In Sarah’s words:

... it’s about the reliability of technology ... and the resources you have ... like our school’s put a lot of money and effort and staffing into creating a network that works. So, I know that at any time of the day I turn my IWB on and my kids can airplay their work ... (Sarah, Gregstone Primary School, Interview 1).

David had not commented any challenges with technology infrastructure in his classroom. When directly asked, he struggled to recall any breakdowns or issues with the technology he used in his classroom. He finally reflected: “I think it’s [technology not working] happened ... probably ... twice in the last two years?” (David, Royal Park Primary School, Interview 2). He posed this as a question to the researcher.

Phase one participants’ use of technology demonstrated a sense of trust in the school’s infrastructure. If technology did not work as planned, these teachers had developed coping strategies. The most prominent of these strategies was a reflection on their underlying purpose in using the technology. David noted his focus on ensuring the learning experiences were successful, rather than the technology:

[I] tend to go into a lesson knowing that this could be an issue and try and put things in place to stop that from happening so we can actually use that programme, or we can use that device (David, Royal Park Primary School, Interview 2).

Sally did not appear, however, to entirely avoid a sense of frustration when technology did not work as planned. She demonstrated strategies to cope with technology challenges:
... the cable was broken, and I was like, ‘I don’t have a back-up for this’, and that’s when that stress starts to come, and then I was ... you just step back and went well ... email the YouTube link out to them, and they can watch it on their own devices, like there’s no reason for us to have to do it as a whole (Sally, MacArthur Primary School, interview 1).

In phase two, teacher participants were similarly asked to reflect on their perceptions of the reliability of their school’s technology infrastructure. One participant specifically commented on technology failures that had impacted on their choice to use technology in the classroom:

This is the major problem with ICT in schools. They are not reliable. Do we persist? Of course we do, but it does get extremely frustrating and wastes a lot of time (Participant 2, Post-workshop Survey).

In phase two, all nine participants pointed to ongoing infrastructure problems as limiting their use of technology. Participant 4 seemed to summarise the impact of technology reliability by claiming she would persist:

... but not straight away. I will move onto something that does not require the same technology and try again later in the day or the following day (Participant 3, Post-workshop Survey).

A colleague of this participant brought a different perspective to her technology use, stating that she enjoyed using “new technologies”. Although she wrote that she had high intentions to use technology, she also reported that her school’s technological infrastructure had limited her persistence:

I personally would persist if it was a problem with the tool itself as I enjoy new technologies. If it was an infrastructure problem, which we encounter a lot of at our school, then I would be unlikely to persist. Web 2.0 tools sound exciting but schools need to have the infrastructure in place to support their use ( Participant 9, Post-workshop Survey).

These comments can be considered alongside the responses of phase one participants. Rachel, during phase one, reflected that leaders at her school enacted the
responsibilities of their role by providing access to effective technology devices and systems. She noted that school leaders:

... make sure that there’s something in every room. If there’s something wrong, we’ve got our IT team to help us, and we can log a job straight away and they’re down here within the day, usually to help us, yeah ... they’re really on the ball (Rachel, Royal Park Primary School, Interview 2).

Participant 4, in phase two, offered a contrasting perspective on persistence, technology support and school infrastructure. He commented that he would persist, despite facing technology challenges because, “... it is a part of the teaching and learning for my students” (Participant 4, Post-workshop Survey). Although Participant 4 expressed a sense of duty to use technology to meet the needs of his students, it is not clear why he felt able to persist, and others did not.

Six of the nine teacher participants in phase one described feeling supported to try new technology in their classrooms. Sarah reflected on the support she received from technical support staff:

... if you want to get anything added, you just go and see the tech guy here and ... you know they’re really supportive with you trialling new things and signing up, and so that kind of collegiate support (Sarah, Gregstone Primary School, Interview 2).

Matt named his school leader as a supporter of his exploration of technology in the classroom, stating that, “[the principal] has been really good at allowing us to explore different types of technology ...” (Matt, Homedale Primary School, Interview 1). Rachel reported similar feelings of support from her leaders:

I feel like I could go to them [school leaders] with anything and say can we use this? So ... yeah ... they’re really supportive of that (Rachel, Royal Park Primary School, Interview 1).

Coding of the survey data from phase two suggested that the teachers felt moderately supported by their leadership to use technology. Phase two participants were asked to
respond to the prompt: “The school’s leadership is supportive of my learning about Web 2.0 tools”.

Figure 10 presents the responses to this statement and indicates a mode of ‘3’, neither agree nor disagree. This indicates that some teachers in phase two reported feeling more supported than others.

4.6.2 Leaders Work and Learn with Teachers
As well as feeling supported to try new things, phase one teachers suggested that, by using technology, they were living out the school’s philosophy. An open code in this theme was “feeling they are living out the school’s philosophy”. The language used by participants to describe “philosophy”, however, shifted between participants and between schools. Other words used included purpose, goal, plan, focus, belief and values. When discussing these synonyms, the language of the participant is used where possible, so that their meaning is directly conveyed.
Participants at three of the four schools in phase one spoke without prompting about their schools’ philosophy regarding technology for learning. They referred to a greater purpose or vision that informed their choices to use Web 2.0 technologies. At the fourth school, Matt did not discuss any wider school agendas or beliefs. Although Matt clarified that the principal at Homedale Primary School had “been really good at allowing us to explore different types of technology”, he did not elaborate further (Matt, Homedale Primary School, Interview 1).

The three quotes below are from three individuals representing the other phase one schools. Simon, Sally and David’s comments are shared as examples. Each of their school-based colleagues offered similar reflections on their school’s philosophy in their individual interviews:

I think for the kids at our school that’s what the vision is, and that’s what we want to go, so yeah, so we buy into that and away we go. (Simon, Gregstone Primary School, Interview 2).

So the growth of technology in this school has been fast but has been phenomenal, and I think that there's the right people leading it, and our school has been very resourceful in how they've done it … (Sally, MacArthur Primary School, Interview 1).

Just like school-wide approaches where we’ve got a plan using the same documents and all do it the same way just so it’s streamlined across everything (David, Royal Park Primary School, Interview 2).

Although school leaders were not participants in this study, school leaders were mentioned by teachers as significant partners in their classroom practice. Rachel expresses that the leaders at her school both worked and learned with teachers:

… they [leaders] have lots of different roles. They make sure everything runs smoothly, they stay in the planning meetings, they make sure that we’re sticking to deadlines, they come and support us if we have a teacher down or if ... they coach us (Rachel, Royal Park Primary School, Interview 1).
Rachel’s language in the above quote indicates that leaders were willing to teach with the classroom teachers (if “we have a teacher down”). They are also positioned by teachers as leading the learning at the school. As Sarah comments, leaders at her school learned with the teachers, while still maintaining overall control of the school:

… they [school leaders] introduced us to things, we were just always pushed to use the tablet [computer], so we were moving to a one to one programme this year, so that was … kind of like any chance you got to get on technology … with them … you’d do it (Sarah, Gregstone Primary School, Interview 1).

These school leaders had introduced their staff to technology resources that they themselves had learned to use, demonstrating learning with the teachers and modelling teachers as learners.

Coding of the survey data in phase two has indicated that participants did not have a clear sense of their school’s purpose in using technologies. Phase two teachers generated a mode of 4 to the Likert-scaled prompt, “I understand my school’s vision for using Web 2.0 tools for learning”.

![Figure 11: Understanding the School’s Vision for Web 2.0](image-url)
Figure 11 demonstrates that the range of responses for this prompt was between four and two. Teachers’ opinions varied from ‘disagree’ to ‘agree’ and indicated that there was not a shared understanding or awareness of a school-wide vision for technology use.

In phase one, Simon described his school’s culture and his perspective on how school leaders supported teachers to bring the school’s vision to life:

I think it's just our environment here, our culture, ... yeah ... just give things a go and if it doesn't work out well that's ok ... we learn from it so we ... we know next time that that's too time consuming or that wasn't appropriate for what we wanted to do, so there's always the ... there's no ‘can’t’ so ... it's what the leaders would like us to do, try different things, go outside the box, and ... you know ... try all these things ... so very supportive ... so if there's anything we need, you know ... the school will go out and get it if they can (Simon, Gregstone Primary School, Interview 1).

Simon’s colleague, Sarah, perceived their school's philosophy differently. She positioned the leader’s vision, as an aspect of her school that was beyond her control:

I think it’s just the philosophy ... of maybe ... starting from the principal and stemming down (Sarah, Gregstone Primary School, Interview 1).

Rachel, at Royal Park Primary School similarly indicated that her school leaders were seen to be enacting a vision of teaching and learning. When asked how the leaders at her school supported the teachers to enact this vision, she shared that:

... they have lots of different roles. They make sure everything runs smoothly, they stay in the planning meetings, they make sure that we’re sticking to deadlines ... (Rachel, Royal Park Primary School, Interview 2).

In phase two, analysis of survey responses has indicated that teachers did not see school leaders as driving technology use in the classroom. The mean score for the question, “My school expects me to use Web 2.0 tools for learning” was calculated as 2.6, indicating that teachers had mixed responses to this question.
Figure 12 demonstrates that the responses were spread between 1 (strongly agree) and 5 (disagree). Teachers in phase two held diverse views about their leaders’ vision, and expectations, of digital technology use.

4.6.3 Summary of School Leaders Who Develop a School Culture of Continual Trialling and Learning May Influence Teachers’ Decisions to Use Digital Technologies

This section has reported on school leaders’ impacts on teachers’ choices to use Web 2.0 in the classroom. Leaders in phase one schools, according to participants, provided:

- Physical support, through the setup and maintenance of reliable core infrastructure;
- Professional learning for teachers to develop new pedagogical strategies;
- A shared sense of purpose for classroom technology use; and,
- Models of good practice, either from the leaders themselves or from others.

The fifth and final section of this chapter discusses the place of the student in this study.
4.7 Maintaining a Focus on Student Learning is Significant for Teachers’ Ongoing Use of Technology in the Classroom

Participants acknowledged the purpose of education as seeking to impact on students’ knowledge and understanding. Three focused codes emerged from data analysis and these are connected to theoretical codes, and the overall theme, in Figure 13:
Maintaining a focus on student learning may support teachers to persist with and use digital technology in the classroom.
Teachers in phases one and two demonstrated a focus on purposeful and effective teaching. They connected a desire to engage students in their learning to a desire to meet the needs of each individual child. Teachers positioned technology as a resource that enabled personalised, effective learning experiences.

Three focused codes were developed:

1. Teaching should be focused on student learning;

2. Valuing student voice in their learning; and,

3. Seeking to make teaching and learning contemporary.

These three focused codes are next reported on in detail.

**4.7.1 Teaching Focused on Student Learning**

In phase one, five of the nine participants indicated that they saw technology as providing important resources that could meet specific learning needs. David explained that when choosing a digital resource, he focused on each student to ensure equity in learning opportunities, “I just want to know that every single student is actually getting something out of it” (David, Royal Park Primary School, Interview 1). His desire to engage each student in their learning was connected to his choice to use technology. Liz similarly connected her focus on student learning to her desire for equity for all her students:

So, I guess that’s what I see as using that [laptops] as a tool to support equity. So, he’s still able to succeed, and we’re still able to assess [laughs] … and we’re not nit-picking (Liz, MacArthur Primary School, Interview 2).

Phase one teachers commented that using technology in their teaching met a range of learning needs. Focusing first on the learning needs and then on what technology might offer, Victoria offered an example of how technology and her pedagogical skills were combined:

... the style we teach here, we’re very focused on teaching to students’ needs … if we did mixed ability groups all the time it would always be those same people
being our lead learners on the iPads, and those same people struggling (Victoria, Royal Park Primary School, Interview 1).

Phase two teachers, however, were less likely to identify technology as a learning tool for all students. Data from the phase two survey indicated that infrastructure and technical issues had impacted on teachers’ choices to use technology in the classroom. In the post-workshop Survey, Participant 10 responded to the question: “If you use Web 2.0 tools in your classroom and they go wrong or break, how do you deal with the problem? Please explain”:

Haven’t really used that many. When Web tools that I’ve used create problems, it makes me rather frustrated as usually there is no one to assist in fixing the issue (Participant 10, Post-workshop Survey).

Participant 11 responded with a direct assertion, “I don’t use them” (Participant 11, Post-workshop Survey). This code is seen to be connected, as previously noted, to section 4.6.1 in this chapter. Phase one participants expressed an ability to rely on the technology infrastructure and to receive support when needed. Phase two participants verified the significance of a stable technology infrastructure to their choices to use technology by highlighting its absence.

### 4.7.2 Valuing Student Voice in the Classroom

This focused code reports on the ways in which teachers described their students as stakeholders in the classroom. Phase one teachers demonstrated an understanding of their students as individual learners. Students were described as having individual needs that could be met with the strategic use of technology resources.

Participants, who were users of technology and Web 2.0 resources, showed a majority preference (seven out of nine) for using technology to develop learner independence. In classroom observations and in interviews, seven teachers demonstrated that they understood technology as a supportive resource for their students. They also emphasised a desire for students to make decisions about their own learning. Supporting this emergent analysis, Matt spoke about learner independence when discussing his classroom practice:
I try to put most of the sort of work back onto the students and say, ‘how is this going to help us and our learning?’ (Matt, Homedale Primary School, Interview 2).

It was not clear how Matt defined “work” but he appeared to refer to students’ learning.

Sarah also expressed a desire to engage students in their own learning. When asked about her students’ use of technology, Sarah explained that she felt challenged when using technology but also noted that, because ‘individual learning’ was her goal for teaching, she must persist:

Yeah, I mean there’s definitely times where you think, oh gosh, wouldn’t that be easy if we could all have a workbook and sit together and do the same thing? But that’s just not individual learning (Sarah, Gregstone Primary School, Interview 1).

Liz similarly focused on encouraging students to have a voice in their learning. She framed student learning as her reason for supporting students to make their own decisions about technology use:

Yeah. Look … I prefer them to make decisions because that’s when you get the best work out of them (Liz, MacArthur Primary School, Interview 1).

Seven of the nine phase one participants saw student learning needs as unique to each child. During the first interview, the researcher asked Rachel why she felt she needed to accord her students so much autonomy in their choice of learning tool. She replied that technology helped her engage each student in their learning:

Because I think all students are different, and some prefer to put it on paper, and some prefer … some are more engaged doing it on their iPad, I don’t want to restrict them, so yeah, I like to give them the option (Rachel, Royal Park Primary School, Interview 1).

For Sarah, providing her students with options for learning was also a reflexive approach that offered opportunities for her own learning. She sought to learn alongside the students as they explored new technologies:
... they can write things like reflections ... and they can set goals for themselves ... I don’t mind them having that kind of control if they can teach me ... yeah (Sarah, Gregstone Primary School, Interview 1).

Further into the interview, Sarah seemed to clarify her purpose for technology use. She suggested that technology also gave her students choice in their learning and kept them engaged in their everyday schooling:

The ability to connect to the students ... So it's important for them to connect to the learning ... yeah ... Yeah, I think more so than us because we can build relationships in other ways, but for ... yeah, for them to want to come to school and to want to learn and it's not a forced thing, and it’s not a fight (Sarah, Gregstone Primary School, Interview 1).

David also connected the provision of learning choices to his desire to keep his students interested in their learning:

[my teaching is] just very open and very inquiry-based. If they want to go and search something up they can, if they’re interested in something, they’ve got that facilitation to do so (David, Royal Park Primary School, Interview 2).

Taking a different perspective on student choice in their learning, Sally emphasised her desire for equity in learning for all students:

I think like equity and personal learning is the same thing in a sense ... Like, you need to have an opportunity for every child to succeed, whether they succeed by completing one maths equation, or ... whether they succeed by completing one maths equation that’s ridiculously hard. There needs to be different opportunities to succeed, and that equity needs to be opened up through their learning (Sally, MacArthur Primary School, Interview 2).

In the above excerpts Sarah, David and Sally shared that they saw technology as providing learning opportunities, engagement and equity in their classrooms. A total of six phase one participants shared similar thinking. Valuing students as individuals, who have the right to make choices about their learning, was a clear theme in this research study.
Survey data, from phase two, revealed that teachers who used technology less frequently did, in fact, hold similar views about the potential of technology for learning. All survey participants in phase two agreed or strongly agreed that, “Teaching with Web 2.0 tools helps me meet the learning needs of all my students”.

This is reflected in the written comments of one participant who explained her purpose within the school:

My role as a teacher is to provide all learning opportunities possible to my students. It is to understand the different learning needs of my students and adapt my teaching practice to meet those needs. I am responsible for the safety and wellbeing of the students in my care as well as their educational needs. I also see my role as allowing my students access to current technologies as this is their future (Participant 9, Post-workshop Survey).

Survey responses were not able to be interrogated as deeply as the interview, observations and focus group data. There were, however, indications of shared values and beliefs about the use of technology, between teachers who use and those who do not use technology; both groups appeared to hold similar aspirations for technology use in the classroom, believing it may provide independent and personalised learning experiences for students.

### 4.7.3 Seeking to Make Teaching and Learning Contemporary

For phase one teachers, maintaining a focus on student learning was connected to a desire for learning to be contemporary and relevant for all students.

Eight of nine phase one teachers saw technology as an innovative approach to teaching and learning. There appeared to be a strong focus on ensuring that student learning was contemporary and purposeful, despite challenges they might face. For some, this appeared to be connected to a sense of pride in their work. Victoria demonstrated a sense of pride when discussing the technology she used in the classroom:

... and ... you know ... I’ve got friends who teach, and ... they’re just blown away by some of the things that we talk about doing in here ... So I think ... it’s, yeah ... kind
of cool that we’re a bit ahead of the game in that way ... (Victoria, Royal Park Primary School, Interview 1).

Victoria highlighted that her friends, who are also teachers, were impressed by her work. Victoria’s expression of pride in her work aligned with Liz’s comments that technology provided a way to showcase her teaching as innovative and contemporary:

So when people come in and watch, then they’re like oh my God, wow, I want to do that too. So that’s awesome I guess as well ... (Liz, MacArthur Primary School, Interview 1)

Sarah similarly described her choice to use technology as contemporary and exciting:

So it’s not like they’re stuck in their ways of teaching the way they did twenty years ago, it’s like ... there is like ... this excitement, and this ... every time we get a new resource or something ... like everyone wants to have a go (Sarah, Gregstone Primary School, Interview 1).

In phase two, all nine teachers agreed or strongly agreed that “Using Web 2.0 tools in the classroom offers learning opportunities for students”. The data are presented in Figure 14.

![Figure 14: Web 2.0 Offers Learning Opportunities for Students](image-url)
Only four of those nine teachers, however, agreed that they felt “well prepared to manage the educational changes that Web 2.0 tools bring to teaching”.

Figure 15 presents these two findings together and demonstrates an inconsistency between teachers’ perceptions of Web 2.0 usefulness and their personal feelings of preparedness to use Web 2.0 in their classroom.

![Figure 15: Believing in Web 2.0 Use Compared to Preparedness to Teach with Web 2.0](image)

In both phases, participants appeared to identify a desire to be considered as innovative in their classroom teaching. Sarah, as an example, used the word “innovative” a total of eight times in her first 20-minute interview.

Not all participants used the term “innovative” to describe their technology use, however thematic analysis has supported the conjecture that teachers who used technology in this study saw their work as innovative. Phase one participants expressed that being seen as innovative by their peers was important in their choice to use technology.
Phase two participants indicated a desire to use Web 2.0, and simultaneously reported that they did not feel ready or able to do so. Figure 16 presents three findings from the phase two survey to illustrate this point. Teachers reported that they perceived Web 2.0 as having useful applications for students’ futures, while also conveying their limited abilities to use Web 2.0 for this purpose.

![Comparing willingness to use Web 2.0 to feelings of readiness](image)

**Figure 16: Comparing willingness to use Web 2.0 to feelings of readiness**

### 4.7.4 Summary of Maintaining a Focus on Student Learning is Significant for Teachers’ Ongoing Use of Technology in the Classroom

This section has reported on the participants’ focus on their students’ learning. Teachers demonstrated, and reported, a desire to engage students in their learning and to provide appropriately targeted learning experiences. Technology was positioned as a strategic resource that offered opportunities for personalised learning and enhanced student engagement. This was seen to enable students to have voice and choice in their learning.

### 4.8 Chapter Summary

This chapter has presented the data analysis and findings of this research. The first three sections focused on phase one participant data and the personal, internal factors
that emerged as impacting on teachers’ technology use. The final two sections of this chapter reported on phase one and phase two data together and explored the contextual factors of school leadership and a focus student learning.

Using grounded theory analysis, the researcher generated data with participants throughout phase one of the study and sought their feedback on codes and themes that were developed. The refined themes, incorporating this feedback and phase two data, have been presented in this chapter.

Five themes have emerged as significant to teachers’ choices to use Web 2.0 technologies in their classrooms:

1. Teachers seek equity in learning for all students;
2. Teachers use multiple strategies for learning to use technologies;
3. Risk-taking and continual learning is embedded in the technology-using teacher’s identity;
4. School leaders who develop a school culture of continual trialling and learning influence teachers’ decisions to use, or not to use digital technologies; and,
5. Maintaining a focus on student learning is significant for teachers’ ongoing use of technology in the classroom.

As the literature review revealed, these themes have described teachers’ relationships to technology use as complex and personal.

Phase one teachers continually sought learning opportunities for themselves, connecting their need to learn to an identified sense of purpose: equity in learning for all students. They also provided examples of resilience and persistence in the face of technological or pedagogical challenges, again connecting these actions to their pursuit of equity for all students.

In phase two a small amount of quantitative data was generated and analysed to identify central tendencies. Phase two teachers had the opportunity to respond to a
workshop presented at their school through an online questionnaire. This data was used to further validate the findings from phase one.

The following chapter discusses the implications of these findings in informing the practice of teachers, school and system leaders, and enhancing Web 2.0 engagement and use in the upper primary school.
5 Chapter Five: Discussion of the Research Findings

5.1 Chapter Overview - Answering the Research Questions

An important issue emerging from the study findings is that a number of factors are interconnected and act together to inform and underpin teacher participants’ choices to use Web 2.0 technologies.

This research study has sought to provide insight into the factors that underpin teachers’ use of Web 2.0 technologies in schools. It is anticipated that teachers and leaders might draw on these insights to enhance the quality and relevance of primary school students’ educational experiences, through an increased use of Web 2.0.

The five themes generated and reported on in Chapter Four have been brought together to form three major factors in teachers’ choices to use Web 2.0 technologies. Figure 17 demonstrates the connections between the five themes in Chapter Four and the three factors that have emerged as significant to teachers’

![Diagram of 5 Themes Combined into 3 Factors](Figure 17: Combining Themes into Factors)
During data analysis it was evident that there was some cross over between the themes. These are represented in Figure 17 by the arrows connecting themes to factors. For example, the theme ‘seeking equity for all learners’ was raised by participants both in relationship to their understanding of global, technological changes and to their leaders’ vision of learning and teaching. Similarly, teachers demonstrated and reported risk-taking and continual learning that was informed by their range of learning strategies (profession learning for digital pedagogies) and also indicated that the support they felt from school leaders impacted their willingness to trial new technology resources.

Having connected the five themes reported on in Chapter Four to three factors that impact on teachers’ choices to use technology this chapter will explore what this research suggests for leaders and teachers in the classroom.

The study’s findings suggest that some of these factors may be more challenging to address in schools than others. In a school, team-structures, physical spaces, leadership approaches and digital infrastructure might be reasonably easily modified; personal, individual factors, however, are suggested as requiring a more nuanced, and changed approach to teacher learning, teacher self-concept and the positioning of all teachers as leaders and learners. A discussion of these factors, both in-school and personal, is the subject of this present chapter. Based on each factor discussed, a number of suggestions are also provided as illustrations of potential teacher and leader practices.

This thesis also offers a novel perspective to previous studies of in-school technology use. Rather than focusing on students’ use of Web 2.0 (Hramiak & Bolton, 2013; Selwyn, 2010), it has instead engaged with the teacher, their learning and motivations. As a result, teachers in this study were shown to have an awareness of global, technological changes that had impacted on their classroom technology use. The impact of teachers’ awareness of global change on their classroom practice has not been the subject of broader educational research and, as such, is seen as a novel contribution arising from study.
The inductive nature of grounded theory, namely, that literature should inform rather than drive the data analysis (Charmaz, 2014), has meant that several sections of this chapter relate to concepts and ideas that did not form part of this study's initial literature review. A limited number of studies were found in the fields of global technological changes, technology leadership approaches or the types of knowledge that teachers might need to fully engage with Web 2.0 in the classroom. These areas are discussed in this chapter.

This chapter first discusses the intersection of the findings from this research study. These findings are presented as a diagram and the interactions and relationships between these factors is explained.

In this study, the major research question was:

"What factors underpin teachers’ choices to use, or not to use, Web 2.0 resources in the upper primary school classroom?"

In this chapter, the major question is discussed through each of the three minor research questions in turn. The three minor questions for this research and their location in this chapter are presented below:

**Section 5.4:** Is either collaborative or individual learning more significant to the teachers’ use of Web 2.0 in the classroom?

**Section 5.5:** What impact, if any, have sociocultural factors (within and beyond the school) had on teachers’ choices to use Web 2.0?

**Section 5.6:** Have school structures supported teachers to use technology in the classroom? What is the evidence of this?

Having responded to the research questions, a final section of this chapter (5.7) discusses a framework that seeks to represent the types of knowledge with which teachers engaged. This framework re-designs the Technological Pedagogical Content Knowledge (TPCK) framework (Mishra & Koehler, 2006). The redesigned framework is considered as holding implications for teachers’ learning with technologies and for understanding the processes by which teacher choices appeared to be made.
5.2 Modelling the Factors Underpinning Teachers’ Technology Choices

With reference to Figure 18 the three main factors, derived from five themes, are next discussed in detail. The three major factors to be explored are:

1. Awareness of global change;
2. School leadership; and,

Figure 18 represents the findings of this research as a solar system. The three factors are shown as colour-coded rings in relationship to the teacher and the student.

The solar system model was adopted to represent the closeness of these factors to each other and their interactions, both between each other and the teacher. The analogy of orbiting factors, around the student, also represents the continuous,
dynamic movement that occurred between each factor, as was evident from iterative examination of the data.

5.2.1 Maintaining the Student at the Centre of Teaching and Leading
Beginning with the student at the centre, the diagram positions teachers and leaders as surrounding the student. The study’s data indicated that when the student is held as central to the decisions teachers make, teachers might be increasingly motivated to use digital technologies.

Similarly, leaders, too, appeared to state and maintain a focus on student learning in decision making processes. This focus on improving student outcomes has been reported in the literature as an impactful leadership style (Dinham, 2016), but has not previously been identified as connected to increased teacher use of digital technologies. Leaders in this study appeared to have positioned Web 2.0 technologies as useful pedagogical tools with potential to enhance student learning. It is not clear, however, that leaders consciously enacted this leadership style to increase student technology use. This finding is significant to understanding the impact of learning-focused leadership on teachers’ willingness, and ability, to use technologies in their classrooms.

5.2.2 The Teacher as the Closest Impacting Factor on Student Learning
Moving out from the student at the centre of Figure 18 is the teacher, represented as encircling the student and considered to be directing their learning. The teacher is closest to the student. Hattie (2009) reports that, within the school, teachers have the largest ability and potential to impact positively on student learning. Teachers in this research identified and connected their desire for student equity to their understanding of their students’ backgrounds and their potentially limited access to technologies at home. This study indicates that when teachers are aware of, and acknowledge, their own impact on their students’ learning they are more likely to strive for equity in learning experiences for all students.

Seeking equity in educational systems is not a new idea (Gittell, 1998; Lazar & Reich, 2016). However, seeking equity for students through technology-enabled learning is not yet prevalent in the literature. While some research has indicated, and
recognised, an increasing inequity in access and use of technology (Livingstone, Bober, & Helsper, 2005), the place of equity as a driver for teacher use of technologies has not been previously explored in detail.

Indeed, it has been the quality of teaching and teachers that has been the focus of much contemporary research into equity. Dinham (2010, p. 14) concluded, however, that:

The biggest equity issue in Australian education today isn’t computers, new buildings or equipment. It’s each student having quality teaching in schools supported by effective leadership and professional learning in mutually respectful local community contexts.

Dinham’s focus on equity in access to quality teachers is mirrored in the Melbourne Declaration on Educational Goals for Young Australians (Ministerial Council on Education Employment Training and Youth Affairs, 2008, p. 7), which states as the first goal that, “Australian schooling promotes equity and excellence”. The Melbourne Declaration on Educational Goals for Young Australians (Ministerial Council on Education Employment Training and Youth Affairs, 2008) seeks to ensure students have access to equitable education experiences. With their focus on societal and community access to education, the Melbourne Declaration on Educational Goals for Young Australians (Ministerial Council on Education Employment Training and Youth Affairs, 2008) links access to technology-enabled learning with concepts of equity.

The Declaration frames equity as overcoming socio-economic challenge, stating that schooling should, “... ensure that socioeconomic disadvantage ceases to be a significant determinant of educational outcomes” (Ministerial Council on Education Employment Training and Youth Affairs, 2008, p. 7).

For teachers in this study, however, equity was enacted through their provision of Web 2.0 access and learning experiences. This finding has important implications for school and system leaders. Better support for teachers, to reflect on the challenges of limited technology use for learning, framed as an inequitable approach to teaching, may increase teachers’ use of technology. Examples of such discussions around equity might include:
• Exploring student at-home access to technologies to investigate the need for engaging in digital technologies;

• Discussing global changes and workplace or higher education opportunities that might be afforded to students through engagement in technological skills and learning; or,

• Developing networks of schools so that learning strategies and ideas might be shared and then impact on teachers’ sense of equity in technological skill access and development.

5.2.3 Learning to use Digital Technologies
The next step out in the solar system diagram (Figure 18) are the types of learning strategies that this study indicated as necessary for progressing teachers’ skills for classroom technology use: Professional Digital Pedagogies (PDPs). These strategies for personal and professional learning are seen to be individual to each teacher. These PDPs are discussed in-depth in Section 5.4.4. Within Figure 18, PDPs are located between the school leadership and the individual teacher who draws on those approved learning strategies as required.

5.2.4 School Leaders’ Impact on Teachers’ of Web 2.0 Technologies
The next orbiting factor, in blue in Figure 18, represents the school leadership, taken in this research to be inclusive of those in a team of leaders in authority at a school. The impact of school leadership on student outcomes is represented in Figure 18 as mediated by teachers’ learning through to the student.

School leaders are also positioned as mediators of teachers’ awareness of global change. Leaders should seek to provide access to, and engagement with, examples of changing technology careers, industries and higher learning opportunities. School leaders might highlight these global changes by:

• Engaging with technology industry partners to provide insight and examples of skills in practice;
• Working with parents and teachers to explore new technologies used at home, for example artificial intelligence or voice-activated devices; or,

• Supporting teachers to explore emerging, new or industry-based technology resources and devices, for example geography-focused, location-specific software or augmented reality excursions.

As new technologies emerge and are made available to consumers, leaders will need to maintain currency and ensure that they, too, are aware of the changing contexts within which they work, live and learn.

5.2.5 Global Technological Changes and Teachers’ Decisions to Use Web 2.0

The final factor is represented in Figure 18 as encompassing all the identified factors, including the student and the teacher: an awareness of global change. Teachers and leaders are positioned as understanding the changing nature of the global workforce as a key influence on their choices to use technology. This awareness, however, is mediated by the leaders, teacher learning and the teacher themselves. For this reason, Figure 18 (repeated below for the readers’ convenience) represents this factor as the furthest from the student.
5.2.6 The Intersection and Interactions of these Factors

Figure 18 highlights the intersection of three factors with the teacher and the student on the left side of the diagram. This intersection represents the complex and iterative interactions that each factor appeared to have with the others. The interactions of the three factors, PDPs, school leadership and awareness of global change, were personal to each teacher and appeared to shift as teachers’ needs changed.

An awareness of global change appeared to have steered some of these teachers to seek more contemporary learning experiences. For others, global awareness drove teachers to use technology to provide more equitable learning experiences for all their students.

Figure 18, therefore, seeks to provide a visual representation of the intersection of all three factors that were identified in this research. The teacher stands apart, yet closest to the student. As the three factors circle the teacher, they also notably remain constant around the student, who is impacted indirectly through their teacher.

This diagram is offered as a framework from which teachers and leaders might develop support structures for Web 2.0 use in their schools. Working from an awareness of global changes, leaders might develop, model and support diverse learning structures for their staff.

5.3 Connections with the Literature Review

With the rise of Web 2.0 technologies, and with a new Australian Curriculum focused on digital technologies, it is significant to note that teachers in this study did not suggest that technology access or support had restricted their technology use (Coates & Friedman, 2009). Nor did they refer to external pressure to use traditional, non-digital, learning methods from parents (Chen, 2008). These constraints are frequently identified in the related literature as inhibiting teachers’ uses of technology. These factors were not identified by teachers in this research.

That teachers in phase one of this study did not refer to substantial challenges with technology access or support, is perhaps related to their sense of duty to ensure that learning was contemporary and relevant for all their students. Technology was seen as
a way to meet teachers’ responsibilities to their students; it is possible that a lack of resources or support was seen as less relevant as they made decisions within the broader, global context of technological change.

There is, therefore, potential power in raising teachers’ awareness of the global technological contexts within which they work. This may increase teachers’ willingness to engage with Web 2.0 technologies and to better inform their choices in their classrooms. Teachers’ awareness of global changes is a new theory derived from this research and warrants further investigation.

5.4 Answering Minor Research Questions

The next section of this chapter discusses in detail the three minor questions that were developed for this research. For each minor question illustrative quotes, useful theoretical frameworks and, at times, new literature sources are explored. This process reflects the constructivist grounded theory processes of Charmaz (2009) that seek to generate new theory that can be framed by other literature only after data analysis. These three questions together draw together theories and strategies that contribute to answering the major research questions. The final section of this chapter brings together the outcomes from these minor questions and the three main factors in teachers’ use of technology that are highlighted in Figure 19.

5.5 Minor Question One: Is either collaborative or individual professional learning more significant to teachers’ use of Web 2.0 in the classroom?

This research has identified that collaborative learning was a core strategy for teachers to learn new pedagogical and technological skills. Personal learning strategies were also used by these teachers and they appeared to choose from a range of strategies, both collaborative and individual, to meet their learning needs. This research has, however, highlighted the significance of collaborative, team-based learning practices for teachers seeking to use Web 2.0 technologies for teaching. This collaborative approach to learning is suggested a strategy for developing teachers’ use of Web 2.0 in the classroom.
5.5.1 Strategies and Resources for Teacher Learning

The strategies that teachers discussed, and were used as tools for learning, are collated and presented in Table 5:

<table>
<thead>
<tr>
<th>Individual Learning Strategies</th>
<th>Collaborative Learning Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal exploration online</td>
<td>Team teaching with new technologies</td>
</tr>
<tr>
<td>‘Playing online’</td>
<td>Learning together in same physical space</td>
</tr>
<tr>
<td>Seeking assistance from their own children</td>
<td>Modelling skills to their peers (practising)</td>
</tr>
<tr>
<td>Observing students in the classroom</td>
<td>Seeking online support from others (Skype, email, Facebook)</td>
</tr>
<tr>
<td>Collecting ideas into a resource folder ‘for later’</td>
<td>Chatting with peers in informal spaces (staff room, hallways, before/after meetings)</td>
</tr>
<tr>
<td>Observing their peers learning &amp; teaching</td>
<td>Making appointments with technical support staff</td>
</tr>
<tr>
<td>Searching ‘how-to’ online</td>
<td>Asking questions on online forums, blogs and social media spaces</td>
</tr>
<tr>
<td>Trialling new pedagogical and technological skills – as a team and individually</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Teacher Learning Strategies

These complex and varied strategies seem to have provided support in learning both technology skills and new pedagogy.

Each of the nine teachers in phase one had developed a personalised ‘toolkit’ of learning strategies. They expressed a desire to have a range of ways to learn new skills so that they could meet the diverse needs of their students. The term ‘toolkit’ is used here to express the purposeful way in which teachers appeared to draw on different ‘tools’ or learning strategies to meet different needs. Each tool (or strategy) was chosen for a specific purpose that met a specific need, just as a handyman would choose the right tool for the task at hand. Teachers often spoke of using several strategies to meet their own learning needs.

An example for consideration was provided by David from Royal Park Primary School during his first interview. He commented that he had watched a teacher use a resource and purposefully made his own notes. He then went away and explored the
tool in his own time on his computer at home. Finally, David searched online for specific answers to his questions, asking ‘how to’ make something happen in the classroom.

David’s varied learning strategies suggest that learning new technology and pedagogical skills necessitated, as Timperley, Wilson, Barrar and Fung (2007) state, “… multiple opportunities to learn new information and understand its implications for practice” (Timperley, Wilson, Barrar, & Fung, 2007, p. xxxvii).

Having “multiple opportunities” (Timperley et al., 2007, p. 15) to learn a new skill appears to be significant in supporting teachers to develop new skills, mentor their colleagues and share new knowledge or skills. Based on this finding, school leaders could strategically develop physical spaces and meeting schedules to support inter- and intra-team learning.

Underpinning phase one teachers’ use of technology was a complex set of professional learning tools. This research draws attention to the need for teachers and leaders to see value in alternate methods of professional learning; collaborative and individual, formal and informal.

Acknowledging that personal and interpersonal learning can enhance teacher knowledge appears to be a crucial strategy for school leaders. The iterative approach to learning new skills, content or pedagogy, proposed by this research, supports strategies that teachers like David use to learn and re-learn in a range of forums and locations. Professional learning, in this way, is also personal learning. Teachers must first learn how to learn about and with technologies themselves, before bringing this knowledge into their classrooms.

5.5.2 Connecting Student Learning to Teacher Learning

Teachers in phase one of this research pointed to similarities between the ways in which they learned and how they wished their students could learn. There did not appear to be a distinct line between how a teacher learned a new skill or technology resource and the way in which a student learned similar concepts.
Victoria expressed this view when she reflected on the ways in which the students were seen to be learning new skills:

... the other thing we find a lot of the time is that the students are often sort of more expert in ICT than we are you know and have better ideas, or will come in and say, oh I’ve got this app and I think this would be really good, and you know they’re spending time discovering apps at home (Victoria, Royal Park Primary School, Interview 1).

Teachers in phase one appeared to be open to learning new skills alongside their students, where the student became a teacher or the student and teacher collaboratively solved a problem or investigated a new resource or skill. These teachers focused on developing and modelling learning strategies to their colleagues, as well as to their students. This willingness to learn using a range of strategies was evident in classroom observations and during interviews:

I think, like, equity and personal learning is the same thing in a sense. Like, you need to have an opportunity for every child to succeed, whether they succeed by completing one maths equation, or whether they succeed by completing one maths equation that’s ridiculously hard. There needs to be different opportunities to succeed, and that equity needs to be opened up through their learning (Sally, MacArthur Primary School, Interview 2).

The teachers in this research all named equity as a driver of their technology use. Despite the need for ongoing learning, there was a consensus that being a teacher also meant being a learner, both with technology and with pedagogy. Sarah and Hannah positioned themselves as learners alongside their students:

... I’m still learning obviously as a teacher (Sarah, Gregstone Primary School, Interview 1).

I think I’m as much a student as the children that I teach I think... (Hannah, Gregstone Primary School, Interview 2).

Teachers in this study appear to have achieved a collaborative culture and were connected to each other’s learning. Timperley, Wilson, Barrar and Fung (2007)
developed a model of professional learning driven, not by teacher needs, but by student learning needs. This cycle is shown in Figure 20.

![Teacher Inquiry Model](image)

*Figure 19: Teacher Inquiry model (Timperley et al., 2007)*

Of interest to this study is the initial stage in this cycle: “What are our students’ learning needs?”. Despite not referencing the Teacher Inquiry Model (Timperley et al., 2007) this question appears to have been a driver for teachers in this study. David offers an example of this:

> I’m trying to set them up with skills to ... if they go into secondary school and they have no idea what the teacher’s talking about or anything, they have the skills to go and find out the information for themselves and setting them up with different resources and tutorials and all of that (David, Royal Park Primary School, Interview 2).

David sees a clear need for students to learn skills both to both use technology and to develop a ‘toolkit’ of learning strategies. David mirrors his own learning processes and
strategies, suggesting that there is minimal difference between adults’ learning and children’s’ learning in these classrooms.

It can be said that this research has contributed to further understanding what Timperley et al. (2007) have called the “black box”; a gap that is believed to exist “between particular professional learning opportunities and their impact on teaching practice” (Timperley et al., 2007, p. xxiii).

This research has highlighted that, although, “little is known about how teachers interpret the available understandings and utilise the particular skills offered during professional learning opportunities” (Timperley et al., 2007, p. xxiii) teachers in this research were able to express the factors underpinning their choices.

Phase one participants in this research were heard to say, and seen to enact, a belief that learning is a shared responsibility that is driven by student learning needs. The teachers appear to have worked through Timperley et al.’s (2007) cycle of teacher inquiry, asking themselves “What are our own learning needs?” (Timperley et al., 2007, p. xxiii) and, in response, seeking to develop their skills accordingly.

Despite expressing some resistance to technology use, two teachers in phase one appeared to have been similarly driven by the needs of their students to learn new skills. Rachel and Victoria demonstrated hesitancy in their responses to questions about their desire to learn. However, as noted in the findings chapter, both Rachel and Victoria used technology and demonstrated ongoing learning, perhaps driven, as Timperley suggests, by their understanding of their students’ needs.

This research suggests that teacher learning through collaboration is a key factor in the use of Web 2.0 in the classroom. Leaders and teachers should, therefore, consider the ways in which professional learning opportunities are chosen and how other professional digital pedagogies might be recognised as useful and important learning strategies.

5.5.3 Teachers’ Personal Technology Use as a Professional Learning Strategy

The evidence from this study supports the idea that teachers’ personal experiences with technology have impacted on their use of Web 2.0 in the classroom.
It is proposed that as technology has changed globally, so too have teachers’ interactions with technology outside of their professional responsibilities at school. As teacher participants increasingly engaged with technology at home, for example, in their banking, shopping, bookings and appointments, they were perhaps driven to engage with a wider range of digital resources to meet their personal needs. These technologies may have provided opportunities for them to explore potential uses of these resources in their classroom. For example, the use of a social media chat system, Google Hangouts⁶, was used by one teacher to provide support for her students at home. The teacher noted she had initially used Google Hangouts to engage with friends and family and from that experience had recognised a possible use for the resource in her classroom; she brought this technology into the classroom after experiencing its efficacy at home. This is a move from the private space to the professional space, indicating the significance of teachers’ personal use of technology to their teaching practice at school.

There continues to be wide-ranging permeation of technology into daily lives in Australia (Australian Bureau of Statistics, 2016). This is evident in everyday uses of technology that might include booking a medical appointment online, video conferencing with family overseas, using smart devices to manage health conditions or online shopping. These digital resources have the potential to make life more manageable for teachers at home. It can be reasonably suggested that having had these experiences in their private lives, teachers sought to bring these resources into their professional spaces as learning tools. This proposition has implications when providing support to teachers. Teachers’ personal experiences with technology should, perhaps, be actively encouraged and supported through experiences in their professional spaces.

These experiences might include:

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⁶ http://hangouts.google.com
• Using online chat systems for teachers to connect with family, friends and colleagues from home;

• Enabling school resources such as iPads to be taken outside of school to be used for personal activities such as taking photos, reading the news online, checking emails, playing games; or,

• Surveying teachers’ personal use of technologies and engaging them in sharing those skills, resources and potential personal benefits with their teaching colleagues.

5.5.4 Reframing ‘Professional Learning’

This research suggests that effective teacher learning, both individual and collaborative, is a key factor underpinning teachers’ choices to use Web 2.0 in their classrooms.

Professional learning (PL) in phase one schools was described as formal, off-site and led by an expert. This definition is similar to that acknowledged in the literature; professional learning is “where teachers are herded into small rooms to learn on demand, removed from classroom contexts” (Perkins, 2010, p. 15). Formal PL was, however, only one learning strategy that teachers in this study used, as discussed in section 5.4.1.

The lack of immediacy that formal, off-site PL offered, was commented on by Liz: “…like, you have to wait ‘til professional learning days and things like that …” (Liz, MacArthur Primary School). Liz did not want to have to wait for formal learning.

In this research, the learning these teachers undertook was iterative and context specific. A resource they used in a mathematics lesson, was also used in a humanities lesson, and they demonstrated a willingness to re-visit a technology resource to better understand its potential in a new context. They drew on their range of learning strategies, their ‘toolbox’, to do so. The ability of these teachers to transfer their knowledge of technology to novel contexts is proposed to validate the call from the Dean’s for Impact (2015) for a broader definition of Professional Learning:
The transfer of knowledge or skills to a novel problem requires both knowledge of the problem’s context and a deep understanding of the problem’s underlying structure (Deans for Impact, 2015, p. 4).

This research invites consideration of a new language for teachers’ learning of digital skills: ‘Professional Learning for Digital Pedagogy’. This term identifies and signals that teachers who use technologies in the classroom appear to have brought together three concepts to learn new skills.

**Professional Learning**: Teachers consider their personal technology skills in a *professional* context, working and learning with new devices and resources within their existing professional responsibilities.

**Digital**: Learning strategies are connected to a desire to use *digital* resources.

**Pedagogy**: *Pedagogies* that teachers develop enhance student learning as well as support teachers themselves to learn new skills.

Figure 21 represents these three concepts. The overlapping segments indicate the ways they appear to have interacted for teachers in this research.

![Figure 20: Professional Learning for Digital Pedagogy](image)

Together the three strategies of pedagogical, digital and professional learning represent the factors that underpinned teachers’ learning of technologies.
These ‘Professional Learning for Digital Pedagogy’ (PL4DP) strategies suggest that teachers and leaders benefit from opportunities to reflect on the specific, and personal, learning needs of themselves and their peers when seeking to use digital resources. The perception that technology was fast-changing presented a challenge to phase one teachers who sought to maintain currency, as online resources, hardware and software changed rapidly. These teachers have responded by developing a dynamic and multi-purpose learning toolkit. Armed with these tools, teachers in phase one felt ready for future waves of technological change. These PL4DP strategies were drawn upon no matter the skill or knowledge required, positioning teachers as ready for the future and confident in their ability to learn new skills or new technologies. PL4DP strategies are suggested by this research as core skills that teachers need to use Web 2.0 in the classroom.

5.5.5 Connectivism and Teacher Learning

This research has examined, and now proposes, a significant connection between teachers, between teachers and students and between teachers and technology. This has led to an understanding of the types of connectedness that teachers demonstrated and indicated as informing their Web 2.0 use.

Connectivism, as defined by Siemens (2004), moves beyond traditional learning paradigms and sees changes to information and communications as impacting on how we learn in the twenty-first century. With an apparent shift in how information is accessed and shared, Siemens (2004) suggests looking beyond ourselves, as individuals, to learn:

Over the last twenty years, technology has reorganized how we live, how we communicate, and how we learn. Learning needs and theories that describe learning principles and processes should be reflective of underlying social environments (Siemens, 2004, p. 1).

Participants in phase one of this study demonstrated a range of learning strategies, that often included learning from and with others. This research study has validated Siemens’ (2004) concept of learning through connections with others. Siemens (2008) justified the necessity of changing how we learn in saying:
The growing prominence of networked technologies for formal and informal learning suggests substantial pressures for education institutions to adapt their models to better suit the interests and digital literacy skills of a growing percentage of the learner population (Siemens, 2008, p. 7).

Siemens’ (2008) reflection that educational institutions need to change their teaching approaches to “better suit the interests and digital literacy skills” of learners (Siemens, 2008, p. 7) is validated by the conversations and practices of teachers in this study. They proposed, on numerous occasions, their desire to learn new pedagogical and technological skills to meet the changing needs of their students.

Siemens (2008) goes on to justify his concept of connectivism, saying:

> When knowledge is seen as existing in networks, and learning as forming and navigating these networks, many existing aspects of academia are subject to change (Siemens, 2008, p. 19).

Siemens (2008) appears to speak for the teachers in phase one of this study. These participants had developed elaborate and dynamic networks within and beyond their schools that supported them to learn and maintain currency in the changing landscape of digital technologies.

Siemens’ (2014) later work presents a case for the future of learning across society. Not only in schools, but also in workplaces and homes, he sees learning as:

> ... a continual process, lasting for a lifetime. Learning and work-related activities are no longer separate. In many situations, they are the same (Siemens, 2014, p. 1).

The concept that learning is ongoing and “lasting for a lifetime” (Siemens, 2014, p. 1) was evident in this study. Phase one teachers had varied learning strategies that were often enacted with their colleagues. They learned from, with and through each other. Indeed, as Sarah from Gregstone Primary School expressed:

> Even if you are working on your own, we still, you know, all work in the back office, so we can be like – look, I’m really stuck, I don’t know how to do the maths lesson for the younger or the lower group, does anyone have an idea? So, it’s like
really yeah collaborative in terms of that (Sarah, Interview 2, Gregstone Primary School).

Sarah’s expression of collaboration here appears to encompass a shared sense of responsibility for problem-solving and for providing and receiving team support. The teachers are a learning resource for each other. Siemens’ (2014, p. 4) connectivism concept presents a theoretical perspective that can help make sense of Sarah’s experiences of learning. His statement that learning is no longer a personal act, that occurs within an individual, provides a way to make sense of this type of ongoing, multi-strategy learning. The learning strategies that teachers in phase one demonstrated, indicated that learning was not seen only as an internal event, but rather an external and dynamic activity that occurred in the space between individuals. As Siemens (2014) states:

We can no longer personally experience and acquire learning that we need to act.
We derive our competence from forming connections (Siemens, 2014, p. 4).

Sarah again offers an example of a networked learning space, which was also expressed and validated by all nine phase one participants. The connections that Sarah’s team made were both personal and professional. There is a sense of personal connection in her willingness to express her lack of knowledge, “look I’m really stuck”. In expressing her lack of knowledge, she was seeking connections on a personal level. She has positioned herself as someone who needed, and willingly accepted, help from her colleagues. A sense of professional connectedness is exhibited in her comments about the skills she may need for teaching maths to a younger group of students (see quote above).

This mixture of personal and professional connectedness within the teaching teams at each school was also highlighted by Hannah:

... when we plan, whether it's individually or with a partner or a team you constantly sort of trying to think about, well, how can we enhance this ... (Hannah, Interview 1, Gregstone Primary School).

Hannah provides a sense of collaborative learning and connectivism, in this statement. Her use of the term “we” points to shared problem-solving and shared learning. Even
when planning alone for an upcoming lesson, Hannah points to the team as a shared resource or ‘hive mind’ that will, together, solve problems. Siemens (2014) connects this shift in how we access knowledge and information to the fast-paced growth in technology and global changes:

In today’s environment, action is often needed without personal learning - that is, we need to act by drawing information from outside of our primary knowledge. The ability to synthesise and recognise connections and patterns is a valuable skill (Siemens, 2014, p. 3).

The concept of knowledge being “outside of our primary knowledge” was also relevant to this study (Siemens, 2014, p. 3). Teachers in phase one appeared to access new knowledge and skills through connections within and beyond the school. They demonstrated an ability to synthesise new information from a range of sources.

Sally, from MacArthur Primary School, commented on the need to validate other teacher’s contributions to their colleagues as a way of developing connected and supportive teams of learning partners in a networked learning environment:

Like these people are doing amazing ... yeah. I think people need to be validated. So, I think they need to know that what they’re doing is good and it’s good enough, like they’re not missing a step, that they are doing quite well, but they also need to know that next step of being better, and it’s not that you need to get better, it’s just that you can get better (Sally, MacArthur Primary School, Interview 1).

Recalling that teachers in phase one of this study had been nominated by their school principal as effective users of technologies, the participants in this study had already been validated by their school leaders. Sally goes further, however, to call for validation of the information and learning that her colleagues can provide to each other within the team.

In contrast to Sally’s comments, Matt, from Homedale Primary School, discussed a perceived lack of technical support from other teachers at his school. He had, instead,
made connections beyond the school, with colleagues whom he believed had more experience than him:

Some of my friends are more advanced, they’re actual technical sort of coordinators in schools, like ... implementing the use of technology ... and so he was a really good resource to use in the classroom (Matt, Homedale Primary School).

Matt appeared to have actively sought connections with other teachers and brought them into the classroom as a strategy for learning. The colleague to whom he refers above was never physically in his classroom, or in his school, as he lived a long distance away. Matt, however, speaks of his external colleague as a “really good resource...in the classroom” (emphasis added). Matt, in conversation, suggested that he felt connected to his external colleague and offered a sense of this connection through reference to the presence of his colleague in the room.

Siemens’ (2004, p. 4) explanation that “… we derive our competence from forming connections” appears to be enacted by Matt. His learning strategies, which were as varied as other participants, had led him to network and build connections with other people beyond his school. Matt’s networked learning appeared to occur outside the physical school but his connection to his external colleague was strongly felt in his classroom. Knowledge resided both inside and beyond the school and was accessed based on the learning needs of the teacher.

The literature review chapter in this thesis has highlighted that teacher learning is a complex and challenging area. O’Connor et al. (2004) and Merdzan (2016) identified that it can be difficult for teachers to learn to use technologies in the classroom. They posited that there is a lack of support, research or practical models of technology use in schools. This deficit, they argued, had limited the effective use of technology in classrooms. Phase one participants in this study, however, provide us with a range strategies for teacher learning within a new paradigm of connected and networked teachers, who learn and teach together.

This research has suggested that teachers and school leaders should facilitate and encourage teachers to work together closely, to network within and beyond their
immediate communities and to “draw information from outside their primary knowledge” (Siemens, 2004, p. 3). This may lead to, as appeared to be the case for phase one teachers, collaborative and supportive teams that share the responsibility both for teaching students and for everyone’s learning.

5.6 Minor Question Two: What impact have sociocultural factors, within and beyond the school, had on teachers’ choices to use Web 2.0?

Sociocultural factors impacting on teachers’ use of Web 2.0, in this study, were identified as global and technological changes to work, life and learning. Acknowledgement of these global changes saw teachers in this research take a broader perspective on their work in the classroom and developed a sense of connection between their work and the wider world beyond school. In being recognised by others beyond the school, teachers felt validated in their work and driven to continue to learn and trial new pedagogies and technologies. To risk failure in the use of Web 2.0 technologies was to be socially admired as a progressive and contemporary teacher within the educational community.

5.6.1 Awareness of Global Change

As the literature review in this thesis identified, there is a national push towards developing students who are “highly skilled in the use of ICT” (Ministerial Council on Education Employment Training and Youth Affairs, 2008, p. 5). Teachers in this research appeared to feel connected to this push:

It’s all futuristic. Yeah, I think that’s how I feel ... this school is very much focused on that element, so it’s not just getting them from Prep to 6, it’s actually thinking like how can we build these kids into young adults who are going to you know have a passion or have confidence and want to change something? (Sarah, Gregstone Primary School, Interview 2).

All nine teachers in phase one, as well as nine teachers in phase two, pointed to changes in the global workforce as driving either their use of technology, in the case of phase one teachers, or their desire to use technology, for phase two teachers. This awareness was expressed as a tacit knowledge of the world at large and was often connected to their personal lives or the lives of their families. When asked to explain
what she meant by technology being “the way of the world”, Victoria replied, “I think it’s in the future, but the reality is it’s already here” (Victoria, Royal Park Primary School, Interview 2).

Teachers demonstrated a strong connection to technological change that was already underway and, simultaneously, approaching rapidly. This study now suggests that school leaders and teachers should be encouraged to engage personally and professionally with changes in the global workforce and education. This may support teachers to engage with, and use, Web 2.0 resources in the classroom.

### 5.6.2 Teacher Positive Self-Concept and Perception of Innovative Practice

Connected to teachers’ global awareness was a sense of pride and validation that they were seen to be teaching in ways others perceived as innovative. This appeared to underpin their choices to use technology in the classroom. A sense of pride in their work was also connected to teachers’ perception of themselves as innovative teachers and learners. This might be termed a positive self-concept.

Combs (1962) has described a person’s identity as shaped by two-factors within their unique perceptual field. These factors are 1) an individual’s image of themselves (self-concept) and 2) a person’s perception of their life experiences.

Dumas (1969) and Villa and Calvete (2001) have since identified and confirmed that improving a teacher’s self-concept can make success more likely in their teaching practice. Villa and Calvete (2001, p. 250) go further and suggest that the development of a positive self-concept in teachers may lead them to, “feel better prepared to cope in adverse circumstances”.

As has been identified in this study, participating teachers described strategies and attitudes of persistence that supported them to trial and persist with new technology resources⁷. This, then, suggests that socio-cultural, external factors have impacted on teachers’ choices to use Web 2.0 in this study. A positive self-concept, informed by

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⁷ Further discussion on the persistence of teachers when using Web 2.0 can be found in section 5.6.5.
others, may constitute a significant factor in teachers’ abilities to use Web 2.0 and also to persist in the face of challenges.

Teachers’ self-concept about their work was, however, never directly expressed by participants, rather, they told stories that others told of them. Victoria shared a positive opinion of her work as a teacher in commenting that her friends working at other schools were “just blown away by some of the things that we talk about doing in here” (Victoria, Royal Park Primary School, Interview 1).

This research positions teachers’ positive self-concept as developed, supported and reinforced by those around them, including colleagues, leaders, parents and students. The role of others in increasing an individual’s positive self-concept was identified in Dumas’ (1969) research. Focused on pre-service teachers, Dumas (1969) concluded that the, “presence of cooperating teachers a majority of the time during student teaching tends to be associated with an improving self-concept by student teachers” (Dumas, 1969, p. 278).

This current study adds to, and seeks to broaden, Dumas’ (1969) research findings by including in-service teachers and leaders as necessary participants in the development of teachers’ positive self-concept. School and system leaders should seek to create opportunities for shared technology teaching experiences, within and across schools. This could support teachers to develop a positive self-concept around their teaching. In so doing, teachers may also be positioned as innovative practitioners who feel supported to learn and trial new technologies. This study found that being perceived by others as an innovative teacher impacted on teachers’ choices to use Web 2.0.

5.7 Minor Question Three: Do any school structures support teachers to use Web 2.0 in the classroom? Is there evidence for this?

5.7.1 Leadership as a Support Structure for Digital Technology Integration
The findings from this research have identified certain leadership strategies and approaches that appeared to support teachers’ choices to use technology. The analysis suggests that an instructional approach to leadership (Hattie, 2015) can support teachers to integrate Web 2.0 technologies in the classroom. The language used to describe a school’s leadership varied across sites and included principals, assistant
principals, heads of departments, leading teachers and coaches. The term ‘leadership’ is, therefore, used to encompass these different definitions.

5.7.2 Instructional Leadership

School leaders in this research appear to have taken up an instructional leadership approach. This research has used Hattie’s (2015) description of instructional leadership to compare and investigate the leadership strategies reported by teachers in this study:

... instructional leaders focus more on students. They’re concerned with the teachers’ and the school’s impact on student learning and instructional issues, conducting classroom observations, ensuring professional development that enhances student learning, communicating high academic standards, and ensuring that all school environments are conducive to learning (Hattie, 2015).

This approach to leadership appears to have supported, and underpinned, teachers’ choices to use Web 2.0 in the classroom.

Leaders who encourage technology use are demonstrated, in other studies, to impact on teachers’ use of technology (Hramiak & Boulton, 2013). Several aspects of instructional leadership have emerged from this research as particularly significant to teachers’ choices to use Web 2.0. These are connected to Hattie’s (2015) definition in Table 6, supporting the claim that instructional leadership practices were at work in the participating schools.

<table>
<thead>
<tr>
<th>This Research Project</th>
<th>Hattie’s Definition of Instructional Leadership (Hattie, 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintaining a focus on student learning</td>
<td>Instructional leaders focus more on students</td>
</tr>
<tr>
<td>Consistent and widely understood school values</td>
<td>Communicating high academic standards</td>
</tr>
<tr>
<td>Developing and modelling trust in the judgement and choices of teachers</td>
<td>Ensuring that all school environments are conducive to learning</td>
</tr>
</tbody>
</table>
Leaders support teachers to take risks to try new skills and enact a ‘growth mindset’

Ensuring professional development that enhances student learning

Table 6: Instructional Leadership Strategies Compared to Hattie’s Definition (2015)

These four aspects of instructional leadership, listed in Table 6 and defined by Hattie (2015), are next discussed.

5.7.3 Maintaining a Focus on Student Learning

Teachers in this research spoke about the focus on student learning at their school. School leaders were often seen working in teaching spaces with the teachers.

The literature review for this research highlighted a gap between the ways teachers learn to use digital technologies and how they are supported in their school (Jimoyiannis & Komis, 2007, p. 249). This research suggests that teachers’ “active learning” and “authentic professional learning”, that Jimoyannis & Komis (2007, p. 249) claimed as necessary for increased technology use, has indeed led to an increase in teachers’ uptake of technology in their classroom.

O’Connor, Goldberg, Russell, Bebell & O’Dwyer (2004), Fu (2013) and Merdzan (2016) identified a lack of models of best practice from which teachers might learn to use technologies. However, teachers in phase one of this research appeared able to develop their own models of practice, based on their understanding of pedagogy and informed by their students’ learning needs.

This research suggests that leaders who seek to promote the use of digital technologies should be closely connected to the teaching and learning that occurs in their school, as identified by Dinham (2016). In this way, leaders may be better able to provide the necessary support, encouragement and feedback to each teacher, based on their knowledge of the students in their school.

5.7.4 Consistent and Widely Understood School Values

School leaders in this research were seen by their teachers as having a clear vision for the use of technologies for learning. The development of shared, school-wide values has been highlighted as significant to effective school leadership across a range of
literature (Boyatzis, Rochford, & Taylor, 2015; Day, Sammons, Hopkins, Leithwood, Gu, et al., 2009; DuFour, 2004; Fink, 2010; Senge et al., 2011).

In this study, teachers at the four participating schools reported that their leaders were seen to be enacting their vision through their decisions and actions. They saw their principal’s vision for teaching and learning at their schools as evident in the provision of infrastructure support, in-classroom support, high-level classroom resourcing, and open-plan learning spaces.

This finding reinforces Day et al.’s (2009) criteria for successful instructional leaders. Day et al.'s (2009) work did not focus on digital technologies, rather, the study sought to identify the leadership factors that contributed to improved learning outcomes for students. A school leader’s vision for teaching and learning was described by Day et al. (2009) as a physical practice enacted by school leaders:

... for many staff, the head [principal] epitomised the vision for the school and daily demonstrated how that vision could be realised and fulfilled (Day et al., 2009, p. 112).

Of note for this research is that school leaders in this project were seen to hold a strong vision for teachers’ use of digital technology. This thesis validates Day et al.’s (2009) research and demonstrates the need for a clear, well-communicated vision from school leaders. Furthermore, this research takes Day et al.’s (2009) work and describes a connection between Day et. al.’s findings (2009) and the use of digital technologies in primary schools. This research offers a demonstration of the impact of a clear and enacted school vision on teachers’ choices to use technology. In this study, teachers reported that their school leaders acted on a shared vision of technology use and their decisions were informed by that vision. This appears to have had a significant impact on teachers’ choices to use technology in the classroom.

5.7.5 Developing and Modelling trust in the Choices of Teachers

Trusting their leaders and feeling trusted by those leaders emerged as significant to teachers’ choices to use Web 2.0. Other research has indicated the significance of trust in effective leadership (Wahlstrom & Louis, 2008; Dinham, 2007), and their findings appear to have been validated by this research. Two types of trust were demonstrated
in teachers’ discussion of their leaders as influencing their technology choices, these appeared to be related. Figure 22 represents the interactions of these two distinct types of trust in, and by, leadership:

![Figure 22: Interactions of Trust in and by School Leaders](image)

Dinham (2007, p. 74) has stated that, when leaders place trust in some teachers, they apply subtle pressure and an “implicit expectation that other staff can and will perform professionally”. This appears to have been the case in this research. Phase one teachers highlighted that they felt trusted to explore and trial new technologies in their classrooms, without judgment or criticism for failure.

Despite reservations about using technology, two participants demonstrated high levels of digital technology use and learning in their classrooms. This may be attributed to an “implicit expectation” (Dinham, 2007, p. 74) engendered by their leaders’ trust in them. These two participants, Rachel and Victoria, perhaps felt driven to use technology in their teaching because of the trust given by their leaders to make appropriate decisions about how to teach in their classrooms.

The trust placed in teachers by their school leaders appeared to emerge from the reciprocal trust of the school leadership team. A major finding from Day et al.’s (2009) research states that:
Trust and improvement develop in a reciprocal way over time and are reinforced by evidence of improvements (Day et al., 2009, emphasis added).

It was therefore notable that trust was, in this research, connected by participants to their perception of the success of digital technology use in the classroom.

As teachers tried new strategies, pedagogies and resources, they shared with the researcher the types of support they received from their leaders to take risks and to deal with potential failure. This led teachers to continue to try new technologies, which, in turn, seemed to lead to eventual feelings of success within a cycle of ongoing learning and risk-taking. Teachers’ choices to use Web 2.0 technologies took place within the framework of their leader’s trust of them and their professional decisions. Figure 23 represents this cycle of trialling, trust and support from leaders:
Leaders’ engagement in classroom practice can be seen to be connected to the level of trust that teachers in this research felt they received. Teachers recognised that their leaders understood their teaching practice, their students and the challenges of teaching. Teachers also expressed that leaders demonstrated trust in them in concrete ways, such as allocating money to buy requested resources despite budgetary constraints or unpredictable outcomes for students. They were positioned as professionals and trusted to be financially responsible with the school’s budget by purchasing devices or software that would enhance student outcomes.

At Homedale Primary School, with only a single participant in this study, the principal appeared to maintain overall control of the school, while simultaneously trusting the teachers to make appropriate technology choices. Matt was less vocal than other participants about his interactions with the school leaders. His comment below, however, suggested that while the power to “allow us to explore” (emphasis added) rested with the principal, there was some flexibility and perhaps trust as well:

... the principal has been really good at allowing us to explore different types of technology (Matt, Homedale Primary School, Interview 1).

In feeling enabled, trusted and supported by the school leadership team, participants suggested that they, in turn, trusted their leaders to make appropriate decisions, even if these might not be comfortable or welcome, as in the case of Rachel’s and Victoria’s hesitancy to use technology. When new technologies or digital resources were introduced, teachers expressed a sense of duty to make the most of these new tools. A sense of duty appeared to have been developed by leaders trusting teachers to make choices in the best interests of their students. Leaders positioned teachers as capable users of technology; teachers accepted the positioning of themselves as capable professionals, even when hesitant about the use of technology.

5.7.6 **Leaders Support Teachers to Take Risks and Develop a ‘Growth Mindset’**

This research has identified that taking risks and accepting the possibility of failure with new pedagogies and technologies has positively underpinned teachers’ choices to use Web 2.0 technologies. Risk-taking and an acceptance of potential failure can be
brought together under the concept of a growth mindset, as proposed by Dweck (2012).

The concept of growth mindsets did not appear in the literature review for this research, and so, following CGT processes (Charmaz, 2014), this area will now be briefly discussed, including a disputed aspect of this theory.

Dweck (2012) has proposed that humans hold one of two mindsets, either a growth or fixed mindset. However, Dweck (2012) does not present these mindsets as dichotomous or inflexible, but rather sees individuals as holding both fixed and growth mindsets simultaneously, drawing on them depending on the context within which the individual finds themselves. These fixed and growth mindsets (Dweck, 2012), may determine the risks we will take, the way we understand our own abilities and the way we confront failure.

Dweck explains that:

> People with a fixed mindset believe that their traits are just givens. They have a certain amount of brains and talent and nothing can change that ... People with a growth mindset, on the other hand, see their qualities as things that can be developed through their dedication and effort. Sure they’re happy if they’re brainy or talented, but that’s just the starting point (Dweck, 2010).

A growth mindset appeared evident in this research through the ways that teachers in phase one demonstrated persistence and acceptance of failure as part of their learning process.

As Dweck writes, with a fixed mindset “failure is about having a setback ... It means you are not smart or talented”, whereas, with a growth mindset, failure “is about not growing ... not fulfilling your potential” (Dweck, 2012, p. 15).

In this study, teachers discussed and shared their strategies for coping when technology broke down or did not work as expected. At the beginning of this study it had been anticipated that technological break downs may limit the types and extent of technology that teachers used. Instead, these teachers talked about trying again, having alternate plans and seeking group support. Victoria and Rachel, who expressed
hesitancy in using technology, commented during interviews on the strategies they used to deal with technology challenges; they tried again and again, worked with their team members or sought technical support from outside their teaching team.

This persistence in the face of challenges appeared to be supported, and modelled, by the leaders at this school. Leaders offered advice and support to “be a risk-taker and try it all, ‘oh I haven’t done this before but I’m going to give this a go’…” (MB Simon, Gregstone Primary School, Interview 1).

This research frames school leaders as key supporters in maintaining teachers’ growth mindsets (Dweck, 2012). School leaders were seen to accept that failure was a part of learning with technology and leaders continued to support teachers’ efforts to use technology. They acknowledged both the successes and efforts that teachers made. Hattie (2015) reminds us, leaders need to:

... welcome errors, share what they’ve learned from their own errors, and create environments in which teachers and students can learn from errors without losing face (Hattie, 2015).

A fear of losing face, or being confronted by others for unsuccessful technology use, was not noted by participants in phase one of this research. Leaders in this research were seen by the participants as open-minded, supportive of new ideas and consoling when technology plans did not eventuate as anticipated.

Significant to this research is Dweck’s more recent position on growth and fixed mindsets. Dweck’s 2015 article expressed her concerns that a misrepresentation of mindsets as dichotomous had led teachers to use the concept of a fixed mindset to “justify why some students aren’t learning” (Dweck, 2015, p. 2). She calls on teachers, and herself as a researcher, to challenge this idea. Mindsets, Dweck contends, are not intended to box a child, or in this case a teacher, into a certain mindset, rather, individuals demonstrate a fluid mixture of fixed and growth mindsets as they move between contexts:

... we’re all a mixture of fixed and growth mindsets ... and we will probably always be (Dweck, 2015, p. 3).
This understanding of an individual’s mindset as fluid is reflected in this research through the language of hesitancy used by several participants. Their language suggested that, at times, teachers felt that learning new technology skills was insurmountable and at other times they felt that trialling new technology was challenging but achievable. As Liz commented: “It (using technology) didn’t come naturally to me, I had to work hard ...” (Liz, MacArthur Primary School, Interview 1).

Using technology was not an easy choice for all participants and at times they expressed challenges such as, “it (technology) can be confronting to start with, but just sort of ... you’ve just got to go with it really, and it’s not the end of the world” (David, Royal Park Primary School, Interview 2).

Participants in this research demonstrated through interviews and observations, that there were times at which they felt challenged by technology. Their ability to see their attempted use of technology as learning, however, appeared to support them to overcome the challenges of limited time and technical failures, further supporting the case that a growth mindset was being promoted within the school. The leaders’ roles in the development of a growth mindset appeared to underpin teachers’ trialling of new technologies in the classroom.

5.7.7 Positioning of Teachers as Trusted Experts

Seen through a positioning theory lens (Langenhove & Harré, 1994), leaders in this study appeared to have positioned their teachers in specific ways, evident in what teachers said and did, to support their decisions to use of digital technologies. Leaders positioned their teachers to develop a sense of duty (Langenhove & Harré, 1994) towards their classroom practice. Teachers’ sense of duty towards their students was shared through interviews, observations and focus groups. This sense was connected to teachers’ understandings of student learning needs within the context of global, technological changes and leaders’ expectations of, and trust in, their teaching practice.

These teachers appeared to demonstrate that they held a productive growth mindset towards technologies, influenced by the trust they received from their leaders. This growth mindset supported their choices to use Web 2.0. Reciprocally, the trust that
these teachers had in their leaders has been widely noted as a core component of successful leadership (Fink, 2010). The teachers in this research spoke of the trust they had in their leaders to make decisions in the best interests of the children in their care. Participants demonstrated a sense of duty to their leaders to engage with technologies and, notably, they also shared that they had a right to fail and try again when those technologies did not work as planned. Teachers’ appeared to have been positioned to maximise both their technology use and their ability to persist and cope with unanticipated outcomes.

This study has framed leaders as key influencers on teachers’ use of technology and suggests that leaders consider the positioning of teachers in their schools. To summarise, this research suggests that leaders should seek to position their teachers as:

- Pedagogical experts in their field;
- Leaders of their own classrooms;
- Both leaders and learners within their teaching teams;
- A team member with much to contribute to others;
- Responsible risk-takers; and,
- Financially responsible users of digital resources.

5.8 Teachers’ Choices and Pedagogical, Technological and Content Knowledge

A further finding of this study was that teachers made choices to use digital technologies through their understanding and application of pedagogy. As previously discussed in this study, a model of teacher knowledge called the Technological, Pedagogical and Content Knowledge Model (TPCK) (Mishra & Koehler, 2006) has sought to frame and label the types of knowledge that teachers may engage with when choosing to use digital technologies.
In this present study, teachers brought together their knowledge of students’ learning needs and their pedagogical skills to explore the affordances of the technology. To make sense of these choices, a redesigned TPCK Model (Mishra & Koehler, 2006) is now proposed as representing the types of knowledge, and patterns of access to this knowledge, that was demonstrated by teachers.

In other research literature, the TPCK model is suggested as simultaneously significant and, lately, as incomplete (Angeli, Valanides, Mavroudi, Christodoulou, & Georgiou, 2014; Kramarski & Michalsky, 2014). This study now offers adaptations and refinements to this model, incorporating a new theory of what teachers need to know and how that knowledge is accessed.

Significant to this newly revised model is Graham’s (2011, p.8) statement that the visual simplicity of the TPCK model, “... hides a deep underlying level of complexity, in part because all of the constructs being integrated are broad and ill-defined”. Graham (2011) therefore challenges researchers to continue to develop and work with the TPCK model and to move beyond a focus on technological knowledge (TK), as he suggests has been the case so far:

... it is clear that in order for the model to be viable long term, it must lead researchers and practitioners to understand the [technology, pedagogy, content knowledge] constructs in more depth without becoming so complicated that it is inaccessible to all but a few elite researchers (Graham, 2011, p. 9).

To this end, the refined TPCK model proposed in this study seeks to represent in detail the ways in which the constructs of technology, pedagogy and content knowledge have been drawn upon by teacher participants. This may support teachers and leaders to engage with these constructs, and therefore with technology, in useful, informative ways in the upper primary classroom.

Teachers’ pedagogical content knowledge has been shown to have an impact on student outcomes (Dinham, 2016). Dinham (2016) states that teachers are seen to take a position on either pedagogy or on content. This research indicates, however, that teachers who make choices to use Web 2.0 positioned themselves as pedagogues first, and content experts second. This may be linked to the context of this study. In
primary schools in Australia is it common to employ teaching staff who are generalist teachers to work in primary school settings. These teachers are required to demonstrate content knowledge across a range of curriculum areas, and must use their pedagogical expertise in each of these diverse fields. This means that they potentially have experience in the application of pedagogical knowledge to a range learning areas. This research proposes, then, that teachers in primary schools might be supported to engage further with Web 2.0 technologies by drawing on their pedagogical skills, rather than a focus on the content outcomes that might be achieved. This proposition is discussed further in this section; the TPCK model (Mishra & Koehler, 2006) is re-designed to represent the findings of this research.

5.8.1 TPCK and Findings from this Research

In the TPCK model, the original authors presented an equal overlap between the concepts of content, pedagogy and technology knowledge, shown in Figure 24 (Mishra & Koehler, 2006). In this research, however, the data analysis process has suggested that teachers in phase one did not articulate that the three areas of technology, pedagogy and content held equal weight in their decision-making.

![TPCK Model](image)

*Figure 23: Technological, Pedagogical and Content Knowledge Model (TPCK) (Mishra & Koehler, 2006)*
This research recommends considering a reframing of the TPCK model. This will better represent the interactions between the types of knowledge that have underpinned teachers’ choices to use Web 2.0.

A pattern of engagement with technologies, that differed from the TPCK model, was evident in the data analysis process. Analysis of phase one teacher interactions suggested that these teachers were motivated and driven, initially, by the pedagogical needs of their students asking, how will they learn? Next, they engaged with the technological skills that the pedagogy may require and asked, what can technology use offer students’ learning, if anything? Finally, teachers considered the specific learning content for individual students: what does each student need to know at the end of this learning experience?

5.8.2 Re-designing TPCK for Web 2.0 Technology Use

In interviews, observations and focus groups, teachers consistently highlighted the impact of their pedagogical knowledge on their use of Web 2.0, more so than their content knowledge. This was evident in phase one, as teachers discussed how they taught much more than what they taught.

It is acknowledged that this may have been due to the researcher’s presence, interest and reputation in how teaching was conducted with technology. However, classroom observations highlighted that teacher-to-teacher discussions were similarly focused around the pedagogical choices that teachers were making, rather than the content of the learning experience. This suggests that the TPCK model is perhaps not reflective of the changing, or changed, needs of the teaching profession. Teacher use of technology is perhaps not as complete or balanced as is represented or understood in the original TPCK diagram (Figure 23).

Figure 25, a re-structured model of technological, pedagogical and content knowledge model (TPCK) (Mishra & Koehler, 2006), is proposed as reflective of the ways that teachers in this research made decisions about their use of Web 2.0:
The following sections will report on the development of this re-designed TPCK model.

5.8.3 Increased Teacher Focus on How to Teach

Figure 24: Re-designing the TPCK Model

Figure 25: Content Knowledge Disconnected from Technological Knowledge
In this research, teachers demonstrated a clear focus on the purpose of teaching: learning specific educational content. While noting that content knowledge was a continuing focus, these teachers, however, highlighted that they drew on their pedagogical knowledge to inform both lesson planning and professional development.

Content knowledge has not appeared to have had a significant impact on teachers’ choices to use or not to use, technology for learning. Content knowledge is therefore not connected to technological knowledge in Figure 26. David’s comment below offers an example of the language participants used to talk about their teaching. They were focused on their pedagogical choices, rather than the content they were teaching:

Because I know if I was to stand at the front and lecture and basically teach the same thing, some students already know it, some students have a pretty good idea of it, some students have no idea what I’m talking about. So just being able to cater for pretty much everyone along the way (David, Royal Park Primary School, Interview 2).

5.8.4 Overlapping Concepts of Technological and Pedagogical Knowledge

Figure 26: Overlapping Concepts of Technological and Pedagogical Knowledge
This research is pointing to a relationship and a stronger connection between pedagogical and technological knowledge than is represented in the original TPCK model. This is represented in Figure 27 by the larger overlap between technological and pedagogical knowledge. As Rachel notes below, her use of technology has become strategically connected to her pedagogical choices:

I feel like I can do a lot more with IT. I can teach my lessons in a lot more ways using IT, whereas if I didn’t have it ... so I can use websites, I can use videos, I can use blogs, I can use ... whereas if I think about if I didn’t have that, my creativity would be limited (Rachel, Royal Park Primary School, Interview 2).

Rachel says, “I can teach my lessons in a lot more ways using IT”, highlighting her use of technology as a pedagogy, or way of teaching.

### 5.8.5 Technological Knowledge and Content Knowledge

![Figure 27: Technological Knowledge as a Separate Field of Knowledge](image)

Finally, comprehensive data analysis has positioned technology as a pedagogical tool, rather than a separate aspect of, or skill in, the practice of teaching. Teachers developed specific learning strategies to learn new skills, both technological and pedagogical. Teachers did, however, also learn technological skills in different ways, in
different spaces and separately to pedagogical skills. For this reason, Figure 28 represents technological knowledge as separate, yet connected to pedagogical knowledge. Teachers’ technological knowledge was mediated through their pedagogical knowledge and, as such, indirectly connected to teachers’ content knowledge.

This research proposes that there may have been a false assumption at play within the original TPCK model (Mishra & Koehler, 2006); teachers do not appear to access content, pedagogical and technological knowledge with an equal focus. This study indicates that technological knowledge was connected to a teachers’ pedagogical understanding and indirectly connected to a teachers’ content knowledge.

This study provides additional support for the relevance of the TPCK Model in understanding the types of knowledge that teachers engage with in the classroom. There is evidence to suggest, however, that the re-designed TPCK Model (Figure 25), may provide support for leaders and researchers to understand how teachers access, and might be supported to engage with, Web 2.0 technologies in the classroom.

5.9 Chapter Summary

This chapter has discussed this study’s findings and the results have been shown to present implications for teachers and leaders in schools.

In answering the major research question of ‘What factors underpin teachers’ choices to use, or not to use, Web 2.0 resources in the upper primary school classroom?’, this chapter highlighted three factors underpinning teachers’ choices to use Web 2.0 in their classrooms:

1. Professional Digital Pedagogies;
2. Leadership as a support structure for digital technology integration; and,
3. Awareness of Global Change.
A re-designed TPCK model (Mishra et al., 2010) has been described and is proposed to better reflect the unequal distribution of interactions that was demonstrated by participants, between content, pedagogical and technological knowledge areas.

By focusing on the factors that drive teachers’ use, or non-use, of Web 2.0 technologies, this research offers insights for teachers and leaders that may help to challenge the limited use of technology in primary school classrooms.

In 2010, Mishra, Koehler and Hendrickson reported that, “technology integration still finds disappointing levels of penetration and success” (Mishra et al., 2010, p. 23). This thesis has pointed to factors and conditions that seem likely to enhance teachers’ use of Web 2.0 resources. It therefore offers a comprehensive and informing approach to unravelling Mishra et al.’s (2010 p. 23) concern with the “disappointing levels” of technology penetration.

As previously discussed in this chapter, and modelled in Figure 18, teachers in this research connected their decisions to a keen awareness that the world beyond their classrooms was not as they had known it. The pervasive spread of technology was perceived as ongoing and unstoppable. With increased, and increasing, technology in the world today, teachers explained that students deserved access to learning with technologies. These experiences, teachers reported, may provide them with the necessary skills to function in the world of work, beyond the school.

The following chapter will summarise this research project and highlight areas considered pertinent for future research.
Chapter Six: Conclusions

6.1 Summarising the Study

This thesis sought to identify and investigate the factors impacting on teachers’ choices to use, or not to use, technology in their classroom. The research sought out teachers, through a nomination technique, who had experience in using a sub-set of technologies called Web 2.0, defined in this study as digital resources that afford collaboration, creation and communication. Web 2.0 resources have a growing body of evidence that indicates their effectiveness as learning resources, and, as such, increased usage can be seen to be desirable.

The major research question for this thesis asked:

What factors influence and underpin teachers’ choices when using Web 2.0 technologies in the upper primary school classroom?

The findings for this study indicate a complex and personalised interaction of factors. As was discussed in Chapter Four, five themes were validated across the two phases of the study. These themes are:

1. Seeking equity in learning for all students;
2. Teachers use multiple strategies for learning to use technologies;
3. Risk-taking and continual learning is embedded in the technology-using teacher’s Identity;
4. School leaders who develop a school culture of continual trialling and learning influence teachers’ decisions to use, or not to use, digital technologies; and,
5. Maintaining a focus on student learning is significant for teachers’ ongoing use of technology in the classroom.

These five factors were determined to be underpinning teachers’ choices to use Web 2.0 technologies in the participants’ upper primary school classrooms. Each factor was
connected to the others. Teacher participants in the study indicated that they drew upon these factors with different levels of focus, as they felt necessary. An example of which is a participant’s choice to, at one point, trust the school leader and go ahead to use resources they were unsure of, but later to be driven instead by their desire to improve student outcomes.

Teachers connected their choices to use Web 2.0 technologies to an internal understanding of the role of education and their desire to be seen to attend to their duty of providing effective, relevant teaching. Education was seen as contributing to the global society by preparing students to meet the perceived changed, and changing, needs of today’s learners and workers.

Underpinning the five themes presented here was a strong connection to the world beyond the classroom. This connection was linked to teachers’ out-of-school use and experiences of technologies. As teachers perceived a spread of technology into their personal lives, their drive to use technologies in their classrooms appeared to intensify. Seeking equity for their students and understanding that global and technological changes were impacting on their daily lives led teachers in this study to learn, fail, persist and, ultimately, to use Web 2.0 technologies in the classroom.

A further finding of this research was teachers’ positioning of technology in their classrooms. While simultaneously navigating curriculum documents, available pedagogies, and new technology resources, participants grounded their decisions to use technology in the pedagogical offerings they identified in the digital resource. These teachers categorised technology as a pedagogical tool. Web 2.0 technologies were chosen based on the pedagogical affordances of the resource, rather than its curriculum content.

6.2 Contributions of the Study

The conclusions from this research foreground several new insights into teachers’ choices to use Web 2.0 in the upper primary school classroom.
6.2.1 Leaders who Frame their Role as Focused on Learning, Teaching and Trialling New Strategies can Support Teacher Technology Use

That leaders can positively impact teacher actions, and indirectly influence student outcomes is not a new finding from this research. The novelty of this study, however, can be found in the impact school leaders have had on teachers’ choices to use technology in the classroom. This offers school leaders improved and useful insights into how they might support their teaching staff to move towards evidence-based use of Web 2.0 technologies. Leaders have the potential to provide personal and physical support to teachers that, based on this research, can support teachers to use technologies in more effective ways. This research offers a nuanced understanding of leaders’ roles in teachers’ choices to use technology, particularly with reference to modelling best practice teaching and learning. That the leaders in this study worked and learned alongside their teaching staff indicates this as a clear strategy for leaders seeking to engage teachers in Web 2.0 technology use.

6.2.2 Team Learning is Essential to Teacher Technology Use

The place of professional learning in the use of Web 2.0 technologies has been clarified by this research. Moving beyond traditional off-site, full-day learning events, this research suggests that teachers and leaders should engage with new types of professional learning: informal, formal and team learning. Informal learning, through online searching, reading blogs from other educators or finding teaching ideas on social networks, were identified as valid and crucial strategies for teachers’ learning. Each teacher offered different, and perhaps novel skills, to the team. The team relied alternatively on each other as both a teacher and learner. This dynamic shifting of positions within the team appears to have created an interdependent, cohesive team structure within which teachers stepped into and out of the expert role as their learning needs dictated.

6.2.3 Teachers Workspaces Impact on their Choices to Use Technology

Through the sampling nomination technique, there was no request for particular demographic, location or diversity criteria for participating schools. It is of note, therefore, that all four schools who participated in phase one of this research worked in open-plan, flexible learning spaces. While an in-depth investigation into this
synchronicity is beyond the scope of the current study, it should be noted that the open learning environment within which these teachers taught, did appear to impact on teachers’ willingness to learn new technology skills. Team learning was facilitated through daily, ongoing, in-situ observations of each other’s teaching practice. Team teaching and team mentoring occurred fluidly as each teacher took up the responsibility to support his or her colleagues. The impact of open-plan learning environments on teachers’ choices to use Web 2.0 technologies is offered as a novel finding of this study and an area for future research.

### 6.2.4 Understanding How Teachers Make Choices with Technology

This research has led to a re-designed TPCK model (Mishra & Koehler, 2006) that is offered as a contribution of this research. This revised model represents the unequal way teachers accessed different types of knowledge and made choices to use Web 2.0. Pedagogy was a mediator for these teachers’ choices, between the content that students needed to learn and the technology that was used for learning.

That these teachers made decisions based, firstly, on their pedagogical knowledge explains that teachers saw technology as a learning resource. A resource that might open the door to a growing range of digital pedagogies to which their students had a right, and teachers held a duty, to explore.

This challenge to the original TPCK model (Mishra & Koehler, 2006) is presented as an emerging framework to understand the complex decisions that teachers make in the classroom.

Future researchers may find this re-designed model a useful starting point for conversations, interviews and investigations with teachers, as it offers insight into teachers’ decision-making processes as they choose to use, or not, digital technologies.

### 6.3 Recommendations for Teacher Practitioners

This research study offers three recommendations for teacher practitioners.
6.3.1 Seek Learning Opportunities that Meet Your Needs as a Teacher-Learner

This study re-positions learning as an ongoing responsibility of both the individual teacher and the teaching team. Learning is not a fixed event that occurs only offsite or at pre-determined intervals at the school. In seeking to make more, or more effective, use of digital technologies teachers need to reframe their understanding of professional learning. Emerging from this research, the concept of Professional Digital Pedagogies, (PDPs) calls for teachers to explore online learning resources, personal technology use, team teaching and mentoring alongside traditional professional development activities. In broadening their understanding of professional learning, teachers might position themselves as open to new ideas, resources and pedagogies as they appear. Technologies are rapidly changing and teachers cannot maintain currency without rethinking the ways that they learn and strategically developing technical and pedagogical skills.

6.3.2 Re-Position Technology Failures as Learning Experiences that Support Improved Teacher Practice

This thesis has highlighted a lack of research specifically targeted at primary school teachers’ use of Web 2.0 technologies. This lack of models of practice means that teachers must seek out failure through trialling new technologies and pedagogies. In so doing they can evaluate their own practices in their own contexts. When a technology resource or lesson does not meet expectations, teachers need to reframe the event as a learning experience that can help develop their skills and future abilities. This recommendation is also connected to the recommendation in section 6.4.2, which calls for school leaders to support teachers’ by framing failure as progress towards success.

6.3.3 Invite Collaboration and Co-Learning

Working alone, behind closed doors, may limit teachers’ learning opportunities. While teachers may already work, to some degree, in teams, this research has underlined team-work and team-teaching as essential to the use of Web 2.0 technologies. Teams can divide learning into manageable components that shares the responsibility of learning between team members. Teams can support others to trial new ideas and to commiserate and evaluate failures. Working and learning collaboratively has the
potential to develop the collective skills of the team, leading to expertise that is greater than the sum of its parts.

### 6.4 Recommendations for Educational Leaders

Five recommendations for school leaders are offered from this research. These recommendations are framed for school leaders but may also have relevance to system leaders in government departments.

#### 6.4.1 Develop Instructional Leadership Approaches to School Leadership

School leaders should seek to develop a connection with the students and their learning. In this way, leaders are positioned as knowledgeable about their teachers’ daily actions and the challenges and successes they experience. Instructional leadership (Hattie, 2015) asks leaders to be co-learners and co-teachers within the school. As a model of best practice, a school leader who seeks to support increased Web 2.0 technologies use should be seen to understand and experience the same challenges as the teachers. When leaders focused on student learning outcomes, rather than the technology itself, this research has suggested that leaders can support teachers to make informed pedagogical choices that include digital technologies. Framing technology as a pedagogical resource is a key area in which leaders can support teachers in the classroom.

This research has also indicated that leaders should develop and support risk-taking in their teachers. This may support teachers to teach and learn in new ways by reducing their fear of failure with new technology.

The development of a reciprocal trust between teachers and leaders is also seen as necessary for increased technology use. A clear vision for technology use in the school, when leaders’ actions in line with this vision, are presented as integral to teachers’ choices to use technology. Finally, leaders should model learning and personal autonomy in how to learn, where possible. This was seen by teachers in this research to increase their willingness to engage with challenging or changing pedagogies in the classroom.
6.4.2 Support Teachers to See Failure as Progress Towards Success
This study indicates that leaders who validate teachers’ trialling of new ideas or new technologies can support teachers to use more Web 2.0 resources. Leaders should seek to acknowledge the risks that teachers take to use new technologies and to applaud their efforts as both a learner and a teacher. When failures occur, whether in student learning or of the digital resource, the leader should support the teachers to reflect and evaluate their failure in a way that supports their ongoing risk-taking and learning. Leaders should also seek to model failure as a learning experience by sharing their own failures and their reflections on the experience.

6.4.3 Maintain a Focus on Students and their Learning, Not the Digital Device
Leaders in this research were reported as focusing less on the digital resources and more on the learning opportunities that might be provided. As leaders work with teachers to make pedagogically appropriate choices for technology use, the leader should reinforce teachers’ pedagogical expertise and the place of technology in the classroom.

6.4.4 Acknowledge the Informal Learning that Teachers Undertake
The strategies that teachers developed to learn new technology and pedagogy skills has been highlighted as significant to teachers’ choices to use Web 2.0 resources. Teacher learning was not constrained to formal contexts and was conducted in both the teachers’ personal and professional lives. Leaders should acknowledge the work that teachers do to make meaning from and with new digital technologies, beyond formal professional learning. In this research, informal learning was often undertaken in personal time, and built on previously developed personal technology skills. Leaders should consider re-framing professional learning in a way that supports teachers to see value in these less formal learning strategies.

6.4.5 Develop Teams of Teachers Who Can and Will Support Each Other
The significance of collaborative and effective teams of teachers has been previously explored and discussed in this thesis. School leaders can support teachers to use Web 2.0 resources by bringing together teams of teachers who demonstrate a willingness and ability to dynamically position and re-position themselves as both learners and
teachers. The development of effective teaching teams is a strategic responsibility, and anticipated duty, of school leaders. This research has suggested that co-developing clear expectations and goals with teachers for both team-work and team-learning may provide a framework within which highly collaborative teams can be developed.

6.5 Recommendations for Future Research

This research invites consideration of three areas for future investigation. These areas were beyond the scope of this research project but have emerged as potentially significant factors in teachers’ choices to use, or not to use, Web 2.0 technologies in the upper primary school classroom.

6.5.1 Open-plan Learning Spaces

As previously discussed, all four teams of teachers in phase one taught in large, open-plan learning environments. These non-traditional classroom spaces appeared to facilitate collegiate teaching and learning at teachers’ points-of-need. It was, unfortunately, beyond the scope of this research to investigate and compare data from traditional classrooms of one teacher and one group of students. Further research is therefore warranted into the impact and implications of open learning spaces on teachers’ technology choices. Teachers’ individual, collaborative tendencies need to be separated from any constraints created by the affordances of the teaching space itself. It would also be beneficial for future researchers to investigate and make sense of the choices that inform the practices of teams of teachers working in traditional classroom spaces, who also choose to use Web 2.0 technologies. Research needs to ask, “Do traditional, individual classroom spaces impact negatively on the use of Web 2.0 technologies?”.

6.5.2 Socio-Cultural Demographics

Phase one schools were located in similar socioeconomic locations with similarly mobile student populations and high levels of cultural diversity. Research that investigates teachers working in higher socioeconomic areas would be beneficial, as this variable was not addressed in the present study. Future research could explore the extent to which teachers’ choices in this study were impacted by their awareness of the lower socioeconomic status of their students. A question remains, therefore, for
future research: “How are teachers’ choices to use Web 2.0 technologies impacted by their perception that lower socioeconomic students are less able to access learning technologies at home?”

6.5.3 The Modified TPCK Model
Finally, it could benefit teachers, leaders and researchers to further investigate the proposed re-designed TPCK model (Mishra & Koehler, 2006). This model has been re-designed based on research with a small sample of teachers. A larger-scale investigation of the legitimacy of the model could provide further insight into how teachers position technology within their pedagogical and content-based knowledge. Research should question, “How do teachers position technology within the frame of their pedagogical and content knowledge?”

6.6 Concluding Thoughts
This research has identified that teachers positioned and re-positioned themselves as learners and teachers when choosing to use Web 2.0 technologies in their classrooms. They took up these positions in an iterative and dynamic way that enabled them to develop specific learning strategies, risk-taking habits and team support structures. These strategies enabled them to adapt to changing educational technologies and digital pedagogies.

In conclusion, this study has demonstrated that collaborative learning and teaching has informed participants’ decisions to use Web 2.0 technologies in their upper primary school classrooms. As global shifts continue in technology and expectations of the teaching profession continue to change, teachers may be best supported by working and learning collaboratively with other teachers, with their school leaders and with the wider world beyond the classroom.

This research has offered an investigation into the complex area of teacher support for digital technology use. More research is needed in this growing and challenging field. It is hoped that school teachers, school leaders and researchers might draw on this present research to inform their next steps, as our society, education and our students’ learning needs change beyond our imaginations in our students’ lifetimes.
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Appendices
8.1 Appendix 1: Sample Personal Meaning Making Map

![Sample Personal Meaning Making Map]

- ICT use in my classroom
- Personalised learning
- 1:1
- Open
- Accessible
- Balanced
- ICT vs hard copy
- Equity
- Growth
- Resources
- Engaging kids
- Teacher capacity
- NZ - Conferencing
- Professional learning
- Ulearn
- Support at all hours
- Lead their learning with established classroom parameters
- Integrated or replaced
- Neither
- Both negative and positive
- Influential teacher
- Clarity
- Back up plans when things go south
8.2 Appendix 2: Sample Interview Transcript

SECOND INTERVIEW – VICTORIA

JB This is just a follow-up, so it’s just a little bit shorter. So what I’ve done is I’ve gone across to nine different schools and spoken to people who have been recommended as using IT very well, like you were, and there’s some themes that are emerging, and I just kind of want to go back to everybody and see if those themes appear for you as well

VICTORIA Sure

JB So we’re talking about how come you use technology so well and so effectively and other teachers can’t. So that’s kind of the whole focus of the thesis. So one of the things that’s come out is that all the people I speak to are working in teams, so I wonder if you could just give me a bit about how your team works and how you feel that either supports or challenges the use of IT

VICTORIA Yeah I guess working in team means that we have a collaborative planner and we all plan on the same documents and so therefore IT is the sort of source we can do that through without having to write on a document and pass it around to everyone. So it means we can have a collaborative planning approach, which is really good. I think the thing for us that makes IT so easily usable though is our accessibility to IT that you know every teacher has some sort of device to display their work onto with an Apple TV attached to it that you know all the students obviously have iPads, there’s the one-to-one iPad. So yeah I think it’s just our accessibility to ICT that makes it easier for us to use yeah
JB So how do you make decisions in your team?

VICTORIA About..?

JB About planning, about student learning?

VICTORIA It’s been ... it’s sort of ... over the past few years people have used different programmes to them it’s sort of become a collaborative approach across the school

JB Yeah. So across the school? So how does that work?

VICTORIA So all of the school plan on Google Drive Documents so that all different people can be shared in, so it’s the same as the school-wide planners all on Google Drive, so it’s shared across to everyone in the school

JB Okay, interesting. So how do you get support for your planning? So do you small group things, you need a new resource, where do you get that support from?

VICTORIA So that sort of support comes from our own sandpit time I think, or just knowledge of colleagues. So all of us you know come from different teaching areas have different areas of expertise, so we use different things, and we plan together as a team ... so each week. So during that time can share those ideas across
Okay, can you tell me a bit more about sandpit time?

So just our own ... in our own time when we've looked into different programmes or done our own research into things online that could be beneficial to meet that, and that's something we do coming into ... it's sort of something that's done even before our weekly planning, because when we do our termly planners, you know what the topics are going to be. So a part of getting organised for your termly planning day is to go away and research different resources or programmes or apps that could be beneficial to that and bring them to planning, so they're already in your term planning documents before you get to the week to week planning.

Okay. So you do that kind of ... is that an organised thing, or is that just something that is naturally that you do?

It's just something that's naturally what we do here yeah.

Yeah, so did you do that at other schools you've worked at?

Not as much so. I've only been at one other school and we just had the IT room with the computers in it, and then as I was leaving, the Year 8 and 9s got Netbooks, but from here that's just what we've done from the beginning.

Okay, so it leads me to a question about your open plan learning space here. So your other experience in the school was that in a traditional classroom?
Okay, so how... obviously there’s more room in here, but how has that changed the way you actually teach?

I think it allows me to do more targeted teaching in that the way we group our kids it means that those children who are falling behind, I can do more targeted teaching towards them, or those students who are extending, I’m doing more targeted work with them.

In terms of the way I teach... I don’t know, I don’t think it really has. I think... I mean I guess it’s made me more respectful of those around me and being flexible and you know being aware about noise levels and things like that, but generally speaking I don’t think it affects my day-to-day operation.

What about access to technology?

If anything, it’s better here because you know when you were in your four walls, you might have had a room with a projector, and if not you’d have to book the room with the projector or go to the IT centre, whereas here, every space has, like I said, some sort of device to project, whether it be the TV, the Immergo, the interactive whiteboard with an Apple TV...
connected, so all of us can ... all of us have access to technology because every teaching space has technology within it

JB     Yeah okay. So do you think you would be planning and teaching the same way if you were in a traditional classroom?

VICTORIA     No

JB     No?

VICTORIA     No

JB     So it has kind of changed the way you plan?

VICTORIA     Oh definitely. Every lesson I teach has ICT in it. So every lesson I have I rarely you know... the traditional whiteboard has sort of become my second whiteboard, whereas the interactive whiteboard, whichever one it may be is sort of my main whiteboard

JB     Okay, interesting. So I want to talk a little bit ... one of the things that's come out in several schools, and it kind of came out here too is the demographic of the kids that you’re serving here is ... you can’t say generally, but the majority would be lower SES this way

VICTORIA     Yeah, yeah
JB What do you think ICT does for kids from that background?

VICTORIA I mean for them it’s opened them up to a lot of opportunity in that they don’t have a lot of life experience, and through being able to research things online they’re being opened up to a world that perhaps they wouldn’t of otherwise

JB Right

VICTORIA In some ways though, due to ... I mean this isn’t things that we do at school, but due to you know perhaps lack of family support, or lack of education in family, it does have some negatives in you know students jumping onboard social media in the wrong ways

JB Okay, so that’s a barrier?

VICTORIA Yeah that’s a barrier but that’s.. something we’ve spoken about is you know not being acceptable and yeah, that you know something that we would work with the kids with, but yeah, I mean like I said, I think it opens up their eyes to a world that they sort of didn’t know existed. It means that you know things like homework or completing some tasks at home for them becomes an exciting thing because they want to do it

JB Because of ICT?
Yeah definitely. Like over the past two days we’ve done our enquiry presentations, and the students had to do some sort of oral presentation. And you know I think we had maybe three students across the year level just give a speech, whereas the rest had incorporated ICT in some way

Right

and some of our naughtiest boys who we sort of struggle to keep engaged had recorded this fantastic i-Movie where they were 7 News, and they made this background at home, and I just feel as if that makes it more exciting for them and more keen to do their learning

Okay. So what do you see your role as with that socioeconomic background being lower, does that impact on how you see what you need to get them doing or to experience or ... ?

Yeah, I think it means for me personally, I mean I’m somebody who’s come from a life where I sort of got every opportunity growing up, and saw a lot of the world, and so I feel as though for me, especially now that I’m in the older years, I really like the opportunity to show them a world outside of Truganina and outside of perhaps what their culture or family have told them about, and really challenge their view of the world

Yeah okay, that’s interesting. So what does ICT do for you as a teacher, like beyond the planning, what does it offer you personally, not just what you can achieve?
VICTORIA: Well I mean for me it’s almost like my teacher as well because you know for example working in Prep for the last four years, and then being in 5/6, working with one of the top groups in 5/6 in maths, and we’re doing some sort of Year 8 and 9 stuff, and there’s just so many amazing apps or websites out there where I don’t even need to worry about whether I can teach the strategy, you know we can pull it up, and it’s all there for me. So it’s teaching me things as well, or re-teaching me things that you know in the past I would have had to go and find a textbook and look it up. You know we were saying yesterday, at the moment we’re doing area and volume, and we’re teaching the students how to work out area and volume, different rules to follow, and now on Google if you just type in area of a square, a thing comes up at the top of Google where you just put in the two side lengths and it calculates it for you. So you know we were sort of saying with ICT, all these rules that we put in place are becoming null and void because things can do it for you.

JB: Yeah. So what kind of rules would you mean by that?

VICTORIA: Oh I just mean like you know equations to work out area or volume, things like that ... that’s going to become a thing of the past because there’s something there that can do it for you, you know you don’t need to know necessarily that it’s length times width because you just type it in. I think the thing the kids are really big on at the moment in my writing group is ... I work with the students who are working well below level in writing.

JB: Okay

VICTORIA: and we’ve been looking at you know correcting our own work and using dictionaries, and I got them all to download a dictionary app, and they have to type in the word and look it up on the dictionary app, and they all...
say, we don’t need to do that Victoria. And I say, why not? And they just say to Seri spell you know dog, and Seri tells them how to spell it. So I think it’s hard for us in that we know that they want to move forward, and that technology is moving forward, but also we’re still trying to teach them skills without technology doing it all for them, but whether.. I guess we can’t say at this point whether they’re going to be beneficial, or whether it will just become a thing of the past you know.

**JB** Yeah, so there’s a sense of the unknown?

**VICTORIA** Yeah definitely, and I think technology is moving that quickly that they’re in some ways a little bit more fearless than we are, that we’re thinking you know you still need to learn this skill, but do they really? I mean I don’t know

**JB** Yeah, and is there a way that we can know?

**VICTORIA** I don’t think at this point, I think because it’s changing all the time and we don’t know the way of the world how it will change

**JB** So what’s your approach in that situation? What do you think to yourself?

**VICTORIA** Well sometimes I think ... I sort of mix it up. I’ve taught them the skill to use a dictionary, but if they want to go to Seri, they can go to Seri because I just think that’s how the world is now you know. So I think I’m pretty casual in moving with the way of the world, and that’s going to be reality for them moving forward, that everything they want’s at their fingertips. So you know yeah
Yeah. So I guess my last question to kind of wrap up is ... well you’ve kind of answered this, but just to go a little bit different – what is the role of a teacher, like what is your role in the classroom?

For me, I don’t think, and I don’t know if it’s just working with the older kids, but for me, yes, I’m still teaching new skills, but it’s also just facilitating that self-directed learning ... facilitating them as they move through life, and giving them suggestions as to how to do that or what is best, but I think one of the great things about having the ICT here is that it really allows for that self-directed learning, and it’s not about me, and giving them the information. You know at our school they can go out and seek that information themselves and find the information that’s important to them, and I think that’s just about me facilitating that.

Okay. So some teachers, I’m sure you’ve met people with these personalities, would find that really threatening.

Yeah

So what do you think you do or think that allows you to be so open?

I mean it might help... I mean I’m not young, but 27 I feel as though perhaps I did get a bit of a seed of the ICT world before leaving school myself. So I do see the benefits.

Yeah
VICTORIA  But I don’t know. Like I feel like sometimes with those teachers ... I think the hard thing for education is there is such a long period of time perhaps where education didn’t have a lot of change, and then maybe ICTs came in and changed it a lot, and I understand that’s overwhelming, and even I say to my parents – it’s the way of the world you know. If you apply for any job in the world right now, I guarantee you wouldn’t have to do it... you know write out an application, you know tell when the last thing was you wrote something down you know other than a grocery list

JB  Or posted a letter even

VICTORIA  Yeah, so I you know say to the parents who sort of have those feelings that it’s the way of the world, and I just think it’s important to support that moving forward so that they have the most success they can

JB  Yeah, so you’re an advocate as well?

VICTORIA  Yeah I think so yeah

JB  Yeah, cool. Is there anything else you wanted to tell me?

VICTORIA  No, I think that’s about it

JB  That’s been great.  ------------------------end of interview
8.3 Appendix 3: Professional Learning Workshop Presentation

Unlocking the Potential of Digital Learning

How can we apply this in our classroom?

International Driverless Cars Conference

http://www.idc2017.com

The autonomous car - now legal to drive in 4 US States. What does this mean for the future of the car industry and what are the social, financial, environmental impacts?

WHAT DOES THEIR EMPLOYMENT WORLD LOOK LIKE?
Personal Characteristics for Employee Success

- Communication: 30%
- Collaboration: 25%
- Creativity: 20%
- Flexibility: 15%
- Proactiveness: 10%
- Opportunity seeking: 5%
- Analysis/quantitative: 10%
- Technical skills: 20%
- Self-management: 15%
- Teamwork: 10%
- Entrepreneur: 5%

Source: IBM CEO Study 2013: Leading Through Connections.

THE JOBS OF THE FUTURE

FASTEST GROWING JOBS
- Cybersecurity engineers
- Computer support workers
- Software engineers-
- Systems architects
- Network administrators
- Network systems analysts
- Database administrators
- Web developers
- Systems engineers
- Medical and home care aides
- Computer systems analysts

VULNERABLE JOBS
- Secretaries and stenographers
- Food servers
- Cashiers
- Teachers
- Chiropractors
- Pharmacists

Did you know?

https://youtu.be/DEMYZTV

Debrief:
What does this mean for our students?

WHAT DO THEY NEED?
Self-Efficacy: How we think impacts on what our students learn

Teachers are individuals...

Albert Bandura

Self-Efficacy
- Key to everything we do (and don’t do)
- Informs your decisions
- But also informs your actions

  ➢ I don’t think I can = I can’t
  ➢ I think I can = I will try

Four areas that impact on our Self-Belief
1. Mastery Experiences
2. Vicarious Experiences
3. Verbal Persuasion
4. Emotional State
Hear it, See it, Do it, Feel it

- I’ve got this great thing I want to show you that will help your kids learn. It’s easy once you know how.
- It’s awesome & they can learn it on their own!

See it!

- [https://www.youtube.com/watch?v=GcAmfzbGI](https://www.youtube.com/watch?v=GcAmfzbGI)

Do it!

Feel it!

- Positive emotions can be created by working through self-efficacy.
- If we feel positive we are more likely to try again when things go wrong.

Activity

Think of an ICT resource you feel confident in using (could be email) - using the template can you map:

- Where you saw the technology in action
- Where or when did you have a go
- Where or from whom did you hear about it
- How you feel about it now

Access this document: [https://www.example.com](https://www.example.com)
Thinking about how we see ICT can

- Effect what we will attempt to use
- Influence our persistence levels
- Can help develop a growth mindset...
  - Persistence, QI, & Growing Potential
  - Higher achievement

Growth and Fixed Mindsets

Fixed vs Growth Mindset

What about IQ?

- Binet - French creator of the IQ test
  - Actually created to show that intelligence isn’t fixed at all...
    - A few modern philosophers assert that an individual's intelligence is not constant, but changes and can be increased with effort and practice.
    - The current view is that our intelligence is not fixed but can be improved with training and practice.

Graffiti Wall

- Growth is possible with effort
- Change itself can be rewarding
- It’s NOT fixed QI growth – it’s flexible
- Controlling Technology is important for our students
Digital Technologies Curriculum

- ICT as an interdisciplinary domain
- Effective USERS of ICT across all learning areas

1. Programming is a basic literacy in the digital age
2. Programming can change the world
3. You can bring ideas to life
4. Develops problem-solving skills
5. Supports understanding algorithms
6. It is creativity in action
7. It is cross-curricular

www.code.org
Other resources for coding...
http://publications.bbc.co.uk/education

- Who will support you
- Who will you support?

"There's nothing magical about any tech tool. Real magic rests in the minds and hearts of teachers using digital tools to introduce students to new individuals, ideas and opportunities."
8.4 Appendix 4: Online Questionnaire

Post Professional Learning Workshop - Online Questionnaire


This questionnaire is designed to help us better understand the kind of things that teachers think and believe about using technology, in particular the types of technology we call “Web 2.0 tools”.

A few examples of Web 2.0 tools are Google Apps for Education, Edmodo, Weebly, Blogs, Wikis or iPad apps like EduCreations. There are many kinds of Web 2.0 tools and they are constantly changing. You might use different types of Web 2.0 tools than those listed above. For this research project, any online-based tool, app or website that allows students to create, collaborate and communicate around their learning is considered a Web 2.0 tool.
<table>
<thead>
<tr>
<th>Your thoughts about Web 2.0 in education</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that using Web 2.0 tools in the classroom offers learning opportunities for students</td>
<td></td>
<td></td>
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<tr>
<td>I believe that properly designed learning activities with Web 2.0 tools can enhance learning by extending learning beyond the boundaries of school</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I think that using Web 2.0 tools in teaching restricts the role of the teacher</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I believe that in using Web 2.0 tools in the classroom the students can acquire more knowledge</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I believe that using Web 2.0 tools for learning enhances the role of the teacher</td>
<td></td>
<td></td>
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<tr>
<td>I believe that integrating Web 2.0 into the classroom requires substantial changes to teaching approach</td>
<td></td>
<td></td>
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<tr>
<td>I think that teaching with Web 2.0 tools helps me meet the learning needs of all my students</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I believe that using Web 2.0 tools in primary school is vital for my students’ future</td>
<td></td>
<td></td>
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<tr>
<td>I think that using Web 2.0 tools in the classroom will have a negative impact on students’ development</td>
<td></td>
<td></td>
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<tr>
<td>I believe that using Web 2.0 tools can help narrow the gap between students from lower and higher socio-economic backgrounds</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I need more reasons to be convinced about the learning value of Web 2.0 tools in practice</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I believe that using Web 2.0 tools helps students to learn skills that will be useful after they finish school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When Web 2.0 tools go wrong or break in your classroom, how do you deal with the problem? Please explain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your feelings about Web 2.0</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neither agree nor disagree</td>
<td>Agree</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>I have enough knowledge about the pedagogical use of Web 2.0 tools to use them in my classroom</td>
<td></td>
<td></td>
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<tr>
<td>I feel overwhelmed when I use Web 2.0 tools in my classroom</td>
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</tr>
<tr>
<td>I am well prepared to manage the educational changes that Web 2.0 tools bring to teaching</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I choose to use Web 2.0 tools in my personal life outside of school</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I find learning to use Web 2.0 tools takes more effort than I’m willing to give</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I like to find and experiment with new Web 2.0 tools on my own</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I find using Web 2.0 tools in the classroom very challenging</td>
<td></td>
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</tr>
<tr>
<td>I prefer to learn to use Web 2.0 tools by watching other teachers</td>
<td></td>
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</tr>
<tr>
<td>S. No.</td>
<td>Question</td>
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<td>-------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I find it helpful to collaborate with students to learn new Web 2.0 skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>If something goes wrong when I’m using Web 2.0 tools in my classroom I will try again soon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I am willing to try out new Web 2.0 tools to use in my classroom, even if I don’t know exactly how they work</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I prefer to learn to use Web 2.0 tools by practicing on my own first</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Did the PL session you attended with the researcher make you more, or less, likely to use Web 2.0 tools in your classroom? Please explain. |

<table>
<thead>
<tr>
<th>Did the PL session you attended with the researcher meet your needs for learning about a new Web 2.0 tool?</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, please explain. If no, please offer any suggestions for improving the session</td>
</tr>
<tr>
<td>Your feelings about teaching at your school</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
<tr>
<td>I feel supported by my team members to use Web 2.0 tools in my classroom</td>
</tr>
<tr>
<td>The school’s leadership is supportive of my learning about Web 2.0 tools</td>
</tr>
<tr>
<td>I can express my views about Web 2.0 tools at my school</td>
</tr>
<tr>
<td>My school expects me to use Web 2.0 tools for learning</td>
</tr>
<tr>
<td>I can influence leadership decisions about the Web 2.0 tools used at my school</td>
</tr>
<tr>
<td>I feel supported by the school’s leaders to use Web 2.0 tools in my classroom</td>
</tr>
<tr>
<td>I understand my school’s vision for using Web 2.0 tools for learning</td>
</tr>
<tr>
<td>At my school, I can make my own decisions about how I use Web 2.0 tools</td>
</tr>
<tr>
<td>for learning</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The computer devices at my school are reliable</td>
</tr>
<tr>
<td>The computer infrastructure at my school is reliable</td>
</tr>
<tr>
<td>If I have questions I know where I can find the answers online</td>
</tr>
<tr>
<td>If I have questions I am happy to ask my colleagues</td>
</tr>
<tr>
<td>I can help other teachers to learn to use Web 2.0 tools</td>
</tr>
<tr>
<td>At my school, I team teach with my colleague/s when using Web 2.0 tools</td>
</tr>
<tr>
<td>Using Web 2.0 tools in my classroom is hard work</td>
</tr>
</tbody>
</table>

How would you describe your role as a teacher within your school:

How would you describe your role as a teacher in the wider community:
In the coming year, do you have any plans to use Web 2.0 tools in your classroom? If so, tell us about them...
8.5 Appendix 5: Department of Education – Consent to Conduct Research in Schools – Approval Letter

Department of Education and Early Childhood Development

Strategy and Review Group

2 Treasury Place
East Melbourne, Victoria 3002
Telephone: +61 3 9617 2000
DIX 210883
GPO Box 4367
Melbourne, Victoria 3001

2014_002466

Ms Joanne Blannin
85 Edinburgh Road
LILYDALE 3140

Dear Ms Blannin

Thank you for your application of 14 August 2014 in which you request permission to conduct research in Victorian government schools and/or early childhood settings titled Accounting for teachers’ pedagogical choices for using Web 2.0 in the upper primary school classroom.

I am pleased to advise that on the basis of the information you have provided your research proposal is approved in principle subject to the conditions detailed below.

1. The research is conducted in accordance with the final documentation you provided to the Department of Education and Early Childhood Development.

2. Separate approval for the research needs to be sought from school principals and/or centre directors. This is to be supported by the DEECD approved documentation and, if applicable, the letter of approval from a relevant and formally constituted Human Research Ethics Committee.

3. The project is commenced within 12 months of this approval letter and any extensions or variations to your study, including those requested by an ethics committee must be submitted to the Department of Education and Early Childhood Development for its consideration before you proceed.

4. As a matter of courtesy, you advise the relevant Regional Director of the schools or governing body of the early childhood settings that you intend to approach. An outline of your research and a copy of this letter should be provided to the Regional Director or governing body.

5. You acknowledge the support of the Department of Education and Early Childhood Development in any publications arising from the research.

6. The Research Agreement conditions, which include the reporting requirements at the conclusion of your study, are upheld. A reminder will be sent for reports not submitted by the study’s indicative completion date.

7. If DEECD has commissioned you to undertake this research, the responsible Branch/Division will need to approve any material you provide for publication on the Department’s Research Register.

I wish you well with your research study. Should you have further enquires on this matter, please contact Youla Michaels, Project Support Officer, Research, Evaluation and Analytics Branch, by telephone on (03) 9637 2707 or by email at michaels.youla.y@edumail.vic.gov.au.

Yours sincerely

Joyce Cleary
Director
Research, Evaluation and Analytics Branch

25/09/2014

enc
8.6 Appendix 6: University of Melbourne Human Ethics Research - Approval Letter

29 August 2014

Prof. Stephen Dinham
Melbourne Graduate School of Education
The University of Melbourne

Dear Prof. Dinham,

I am pleased to advise that the Melbourne Graduate School of Education Human Ethics Advisory Group (MGSE HEAG) has approved the following Minimal Risk application:

Project title: Accounting for teachers’ pedagogical choices to use or not to use Web 2.0 in the upper primary school classroom.

Researchers: Stephen Dinham, Joanne Blannin and Christine Redman.

Ethics ID: 1442188

MGSE HEAG ID: 139/14

The project has been approved for the period: 29 August 2014 to 31 December 2014.

It is your responsibility to ensure that all people associated with the Project are made aware of what has actually been approved.

Research projects are normally approved to 31 December of the year of approval. Projects may be renewed yearly for up to a total of five years upon receipt of a satisfactory annual report. If a project is to continue beyond five years a new application will normally need to be submitted.

Please note that the following conditions apply to your approval. Failure to abide by these conditions may result in suspension or discontinuation of approval and/or disciplinary action.

(a) Limit of Approval: Approval is limited strictly to the research as submitted in your Project application.

(b) Amendments to Project: Any subsequent variations or modifications you might wish to make to the Project must be notified formally to the Human Ethics Advisory Group for further consideration and approval before the revised Project can commence. If the Human Ethics Advisory Group considers that the proposed amendments are significant, you may be required to submit a new application for approval of the revised Project.

(c) Incidents or adverse affects: Researchers must report immediately to the Advisory Group and the relevant Sub-Committee anything which might affect the ethical acceptance of the protocol including adverse effects on participants or unforeseen events that might affect continued ethical acceptability of the Project. Failure to do so may result in suspension or cancellation of approval.

(d) Monitoring: All projects are subject to monitoring at any time by the Human Research Ethics Committee.

(e) Annual Report: Please be aware that the Human Research Ethics Committee requires that researchers submit an annual report on each of their projects at the end of the year, or at the conclusion of a project if it continues for less than this time. Failure to submit an annual report will mean that ethics approval will lapse.

(f) Auditing: All projects may be subject to audit by members of the Sub-Committee.

Please quote the ethics registration number and the name of the Project in any future correspondence.

On behalf of the Ethics Committee I wish you well in your research.

Yours sincerely

[Signature]

Associate Professor Dianne Vella-Brodrick
Chairperson, Melbourne Graduate School of Education Human Ethics Advisory Group
Phone: 83440254, Email: dianne.vella-brodrick@unimelb.edu.au

cc: Joanne Blannin, Christine Redman and Human Research Ethics Committee, Melbourne Research Office.

Melbourne Education Research Institute (MERI)
Melbourne Graduate School of Education
Level 9 | 100 Leicester Street | The University of Melbourne Victoria 3010 | Australia
Appendix 7: Consent Form – Principals

Phase A Principals

Melbourne Graduate School of Education

Consent form for persons participating in a research project

PROJECT TITLE: Accounting for teachers’ pedagogical choices to use or not to use Web 2.0 in the upper primary school classroom

Name of Principal:

Name of School:

Name of investigator(s): Prof. S Dinham (Supervisor), Dr. C Redman (Supervisor), Joanne Blannin (D. Ed Student)

1. I consent for my school to voluntarily participate in this project, the details of this involvement have been explained to me, and I have been provided with a written plain language statement to keep.

2. I understand that after I sign and return this consent form it will be retained by the researcher.

3. I understand that my school’s participation will involve 2 or 3 teachers in Grades five and/or six and 25 students from across those teachers’ classes.

4. I understand that teachers who provide consent will participate in two 20 minute interviews, a focus group discussion and two observations of their classrooms and I agree that the researcher may use the results as described in the plain language statement.

5. I acknowledge that:

(a) The possible effects of teachers in my school participating in two interviews, a focus group discussion and two observations of their classrooms have been explained to my satisfaction;

(b) I have been informed that I am free to withdraw my school from the project at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;

(c) The project is for the purpose of research;

(d) I have been informed that the confidentiality of any information provided will be safeguarded, subject to any legal requirements;

(e) I have been informed that with teachers’ consent interviews will be audio-recorded and that audio-recordings and transcripts will be stored in a password-protected computer folder and will be destroyed after five years;

(f) My school, teachers and students will be referred to by pseudonyms in any publications arising from the research.

(h) I understand that this research is part of a small sample and that measures are in place to protect the identity of my school and students. I acknowledge that it may still be possible to identify the school, due to the small sample size.

Principal’s signature: __________________________ Date: ________________

HREC: 1442193; Date: 9/03/16; Version: 1.0

Melbourne Graduate School of Education
The University of Melbourne Victoria 3010 Australia
T: +61 3 8344 8285  F: +61 3 8344 8529  W: www.edfac.unimelb.edu.au
8.8 Appendix 8: Plain Language Statement – Principals

February 2015

Professor Stephen Dinham (Supervisor)
Ph: 8344 823
Dr Christine Redman (Supervisor)
Melbourne Graduate School of Education
Ph: 8344 8555
Ms Joanne Blannin (D.Ed student)
Ph: 0403 810 377

"Accounting for teachers’ pedagogical choices to use or not to use Web 2.0 in the upper primary school classroom"

Your school is invited to participate in the above research project, which is being conducted by Joanne Blannin (D.Ed student) of the Melbourne Graduate School of Education, at the University of Melbourne. You are welcome to ask questions about any information in this document by contacting the researcher at the email address provided at the end of this letter. The Human Research Ethics Committee at the University of Melbourne and the Department of Education and Early Childhood Development (insert code here) have approved this project.

The aim of this study is to investigate what factors impact on teachers’ use of Web 2.0 tools in the classroom. Web 2.0 tools mean any Internet based resources that allow you to communicate, collaborate or create materials online. Blogs, wikis, virtual classrooms and social networks are examples of Web 2.0 tools.

School Involvement

Should you agree for your school to participate in this research, your school would be asked to contribute to this research in the following ways:

- You would nominate classroom teachers that have used Web 2.0 in the upper primary school (Grades five and six). I am hoping to gain 2 or 3 participants at your school.
- I would then approach these teachers via email to invite them to a short meeting, at your school, to tell them more about the project.
- At this meeting I would distribute, and later collect, Plain Language Statements (these are letters of invitation to participate) and Consent Forms to the teachers of these classes, and speak with teachers about the focus and purpose of the research.
- Participating teachers would attend a 20-minute audio-recorded interview with myself at a time of their choosing. This would involve sharing their thoughts and beliefs about Web 2.0 use in their classrooms.
- Teachers would then participate in a 20-minute focus group meeting with the other participating teachers from your school, at a pre-arranged time convenient to the group.
- After the focus group, teachers would meet with the interviewer to talk further about their reactions and thoughts about the use of Web 2.0 in the classroom (20 minutes).
- Both interviews will be audio-recorded (with permission) and transcribed. Teachers would be able to request a copy of the transcript and ask for any amendments or deletions be made.
- I would then spend two sessions observing in teachers’ classrooms, so that I can get a more detailed picture of your school and classroom context (25 minutes and 60 minutes).
- You would agree for me to approach the students in the classes of the participating teachers through a letter. This would be delivered by their teachers, and would explain my research project (in student-friendly language) and invite them to participate in one 20 minute activity.
- I would then randomly select 25 students from your school (from those who have given consent).
- I would withdraw a total of 24 students for 20 minutes, at a time convenient to your school.

Students would be asked to think about how they use ICT at home and at school and to draw one
picture, with labels, representing each situation. Their work will be identified only by their initials and will be referred to by pseudonym in any written documents.

It is not anticipated that this research will cause you, or your teachers any discomfort or distress as a result of participating in this research project. If any participant does feel uncomfortable they will be able to discuss this with the researcher using the email address in this letter or in person. Should any participant experience any discomfort or distress due to participation in this research, they may suspend or end their participation in the project at any time.

I intend to protect participants’ anonymity and the confidentiality of all responses to the fullest possible extent, within the limits of the law. Teacher and school names and contact details will be kept in separate (password-protected) computer folders from any data that is supplied. This will only be able to be linked to their responses by me, for example, in order to know where to send a requested interview transcript. You should note that these measures are only able to guarantee confidentiality within the limits of the law. Hard copies of the data will be kept securely in the Melbourne Graduate School of Education, at the University of Melbourne, for five years from the date of publication, before being destroyed.

In the final research report, your school and teachers will be referred to by pseudonyms. I will remove any references to personal information that might allow someone to guess identities of teachers or your school, however, you should note that as the number of people I seek for participation in this study is small, there is a very small possibility that someone may still be able to identify you.

Once the thesis arising from this research has been completed, a brief summary of the findings will be made available to you. I will also provide a copy of the summary report to participants (if they request it) and to the DEECD. This report will not contain identifiable data but will summarise the general findings. It is also possible that the results will be presented at academic conferences or shared in academic papers.

Please be advised that your participation in this study is completely voluntary. Should you wish to withdraw at any stage, or to withdraw any unprocessed data you have supplied, you are free to do so without prejudice at any time.

Should you wish for your school to participate in this research, please indicate that you have read and understood this information by signing the accompanying consent form and returning it in the envelope provided. I will then contact you via email to discuss your nominations of participants for my study.

Should you require any further information, or have any concerns, please do not hesitate to contact my supervisors or myself:

<table>
<thead>
<tr>
<th>Prof. Dinhart</th>
<th>Dr. Redman</th>
<th>Ms. Blannin</th>
</tr>
</thead>
<tbody>
<tr>
<td>6546 4564</td>
<td>8344 8555</td>
<td>0403 810 377</td>
</tr>
</tbody>
</table>

Should you have any concerns about the conduct of the project, you are welcome to contact:

Executive Officer, Human Research Ethics
The University of Melbourne
Ph: 8344 2073, Fax: 9347 6739

Thank you for reading this information and for considering participating in this study,
Regards,

Joanne Blannin

jblannin@student.unimelb.edu.au
8.9 Appendix 9: Consent Form – Teachers

Melbourne Graduate School of Education

Consent form for persons participating in a research project

PROJECT TITLE: “Accounting for teachers’ pedagogical choices to use or not to use Web 2.0 in the upper primary school classroom”

Name of participant (teacher):

Name of investigator(s): Prof. S Dinhm (Supervisor), Dr. C Redman (Supervisor), Joanne Blannin (Ed Student)

1. I consent to participate in this project, the details of which have been explained to me, and I have been provided with a written plain language statement to keep.

2. I understand that after I sign and return this consent form it will be retained by the researcher.

3. I understand that my participation will involve two 20 minute interviews, a focus group discussion and two observations of my classroom and I agree that the researcher may use the results as described in the plain language statement.

4. I acknowledge that:
   (a) the possible effects of participating in two interviews, a focus group discussion and two observations of me in my classroom have been explained to my satisfaction;
   (b) I have been informed that I am free to withdraw from the project at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;
   (c) the project is for the purpose of research;
   (d) I have been informed that the confidentiality of the information I provide will be safeguarded subject to any legal requirements;
   (e) I have been informed that with my consent the interviews will be audio-recorded and I understand that audio-recordings will be stored in a password-protected computer folder and will be destroyed after five years;
   (f) I will be referred to by a pseudonym in any publications arising from the research;
   (g) I understand that this research is part of a small sample and that measures are in place to protect the identity of me, my school and my students. I acknowledge that it may still be possible to identify the school, due to the small sample size.

I consent to the interviews being audio-taped □ yes □ no (please tick)

I wish to receive a copy of the summary project report on research findings □ yes □ no (please tick)

Participant signature: ______________________ Date: ______________________

HREC: 1442193.1; Date: 3/03/18; Version: 1.0
Appendix 10: Plain Language Statement – Teachers

February 2015

Professor Stephen Dinham (Supervisor)
Ph: 8344 8237

Dr Christine Redman (Supervisor)
Melbourne Graduate School of Education
Ph: 8344 8555

Ms Joanne Blannin (D. Ed student)
Ph: 0403 810 377

"Accounting for teachers’ pedagogical choices to use or not to use Web 2.0 in the upper primary school classroom"

You are invited to participate in the above research project, which is being conducted by Joanne Blannin (D. Ed student) of the Melbourne Graduate School of Education, at the University of Melbourne. You are welcome to ask questions about any information in this document by contacting the researcher at the email address provided. You may also wish to discuss the project with a relative, friend or colleagues.

Your name and contact details have been provided by your school Principal. Your Principal has provided consent for me to approach you about this project, although participation is entirely your choice. The Human Research Ethics Committee at the University of Melbourne and the Department of Education and Early Childhood Development (insert code here) have approved this project.

The aim of this study is to investigate what factors impact on teachers’ use of Web 2.0 tools in the classroom. Web 2.0 tools mean any Internet-based resources that allow you to communicate, collaborate or create material online. Blogs, wikis, virtual classrooms and social networks are examples of Web 2.0 tools.

Should you agree to participate, you would be asked to contribute in several ways. First, you would attend a 20-minute interview with the researcher at a time of your choosing. This would involve sharing your thoughts and beliefs about ICT and Web 2.0 use in your classroom. Second, you would be asked to participate in a 20-minute focus group meeting with other teachers from your school, at a pre-arranged time convenient to the group. Third, you would meet with the interviewer to talk further about your reactions and thoughts about the use of Web 2.0 in the classroom (20 minutes). I would then spend two sessions observing in your classroom, so that I can get a more detailed picture of your school and classroom context (25 minutes and 60 minutes).

With your permission, the interviews (but not the focus group or classroom observations) would be audio-recorded so that I can ensure I make an accurate record of what you say. When the audio recording has been transcribed, you will be able to request a copy of the transcription. You would then be able to request amendments or deletions be made.

It is not anticipated that this research will cause you any discomfort or distress as a result of participating in this research project. If you do feel uncomfortable you will be able to discuss this with the researcher using the email address in this letter or in person. Should you experience any discomfort or distress due to participation in this research, you may suspend or end your participation in the project at any time.
I intend to protect your anonymity and the confidentiality of your responses to the fullest possible extent, within the limits of the law. Your name and contact details will be kept in separate (password-protected) computer folders from any data that you supply. This will only be able to be linked to your responses by me, for example, in order to know where to send to a requested interview transcript. You should note that these measures are only able to guarantee confidentiality within the limits of the law. Hard copies of the data will be kept securely in the Melbourne Graduate School of Education, at the University of Melbourne, for five years from the date of publication, before being destroyed. In the final report, you will be referred to by a pseudonym. I will remove any references to personal information that might allow someone to guess your identity, however, you should note that as the number of people I seek to interview for this study is small, there is a very small possibility that someone may still be able to identify you.

Once the thesis arising from this research has been completed, a brief summary of the findings will be available, if you request it. I will also provide a copy of the summary report to the school Principals involved and to the DEECD; this is a requirement of the DEECD approval to conduct research in your school. This report will not contain identifiable data but will summarise the general findings. It is also possible that the results will be presented at academic conferences or shared in academic papers.

Please be advised that your participation in this study is completely voluntary. Should you wish to withdraw at any stage, or to withdraw any unprocessed data you have supplied, you are free to do so without prejudice at any time.

If you would like to participate, please indicate that you have read and understood this information by signing the accompanying consent form and returning it in the envelope provided. I will then contact you to arrange a mutually convenient time for the initial interview.

Should you require any further information, or have any concerns, please do not hesitate to contact my supervisors or myself:

- Prof. Dinham: 8546 4564
- Dr. Redman: 8344 8555
- Ms. Blannin: 0403 810 377

Should you have any concerns about the conduct of the project, you are welcome to contact:

Executive Officer
Human Research Ethics
The University of Melbourne
Ph: 8344 2073, Fax: 9347 6739.

Thank you for reading this information and for considering participating in this study,

Regards,

Joanne Blannin
jbiannin@student.unimelb.edu.au
D.Ed. Student
Melbourne Graduate School of Education
University of Melbourne
Appendix 11: Consent Form – Students and Parents

Student Consent Form

Melbourne Graduate School of Education
Consent form for persons participating in a research project

PROJECT TITLE: “How do teachers use the Internet at school?”
Accounting for teachers’ pedagogical choices to use or not to use Web 2.0 in the upper primary school classroom

Name of participant (student):

Name of investigator(s): Prof. S Dinham (Supervisor), Dr. C Redman (Supervisor), Joanne Blannin (PhD Student)

1. I agree to participate in this project, the details of this project have been explained to me, and I have been given a letter to keep.

2. I understand that after I sign and return this consent form the researcher will keep it.

3. I understand that agreeing to join in this research will mean I will do two drawings about the Internet.

4. I agree that the researcher can use my drawings as described in the letter I was given.

5. I accept that:

   (a) Any possible bad effects of me joining in this research project (by doing two drawings about using the Internet) have been explained to my satisfaction;

   (b) My parents also need to give me permission to participate before I can join in this project;

   (c) I am free to stop participating in the research project at any time without any explanation or bad effects. If I want to, I can ask for my drawings back, as long as it is before the researcher has used it for the research project;

   (d) This project is about doing research;

   (e) I will only write my initials on my drawings, not my full name or class;

   (f) My drawings will be kept private and confidential and will be kept safe at the University of Melbourne for five years (after which it will get destroyed) unless there is a legal reason it has to be shared;

   (g) A photo of the whole, or parts, of my drawings may be used in the research project, if so, no-one will be able to tell that it is my drawing as it will be anonymous.

I wish to receive a copy of the summary project report on research findings

☐ yes  ☐ no
(please tick)

Student signature: ______________________ Date: ______________________

Parent/Guardian signature: ______________________ Date: ______________________

Melbourne Graduate School of Education
The University of Melbourne Victoria 3010 Australia
Tel: +61 3 8344 8285  Fax: +61 3 8344 8529  Website: www.edfac.unimelb.edu.au
8.12 Appendix 12: Plain Language Statement – Students and Parents

Phase A Students

August 2015

Professor Stephen Dinham (Supervisor)
Ph: 8344 8237

Dr Christine Redman (Supervisor)
Melbourne Graduate School of Education
Ph: 8344 8555

Ms Joanne Blannin (D.Ed student)
Ph. 0403 810 377

"How do teachers use the Internet at school?"

Hello! My name is Joanne Blannin. I am a student at the University of Melbourne. I am doing a project to find out how primary school teachers use the Internet at school. When I finish my project it will be part of my degree, called a "D.Ed". My teachers, Dr Christine Redman and Professor Stephen Dinham, help me with my project. They are called my "supervisors". We all work at the "Melbourne Graduate School of Education".

Your school principal has given me permission to send you this letter to tell you a bit about my project. Once you have read the letter you can decide if you would like to take part. You should talk to your parents about the project before you sign and return the form.

If you decide to be part of the project, I would ask you to think about how you use the Internet at home and at school and draw some pictures with labels on them. If you don’t use the Internet much, that’s ok, you can still join in my study.

Joining this project would mean that you and a group of other students from Grade 5 and Grade 6 would go into a spare room at your school for about 20 minutes. I would give you a sentence to read about the Internet. Then you would draw what you think about that sentence. After about 10 minutes I’ll ask you to stop that drawing and begin a new one about a slightly different sentence. Don’t worry this isn’t a drawing test but a way for me to learn about your thinking. I will be there to explain what to do and to collect your drawings at the end. If you want to stop drawing, you can tell me and go back to the classroom any time you like. If you don’t know what to draw or you don’t want to draw, that’s fine too. The rest of your class will be working back in your classroom with your teacher.

I will collect your drawing and take it back to the university with me. You don’t have to write your name on the drawing, but I will ask you to write your initials on it so I can tell which two drawings belong together. When I finish my research I will write a big essay called a ‘thesis’, in this thesis I might use a photo of your whole drawings or parts of your drawings. If I use your drawings they will be anonymous so no one will be able to tell that it’s your work. If you want to, you can ask for your drawings back, as long as it is before I have used it for the research project.

After the project is over, I will lock all the drawings away safely in the Melbourne Graduate School of Education for 5 years. I have to do this because it is a university rule. After 5 years my supervisors will destroy them.
I don’t believe that joining in this project will make you feel uncomfortable or upset
in any way. But if you did feel uncomfortable or upset you will be able to talk to me,
your teacher or your parents about it at any time. And remember, you can leave
the project whenever you want, without having to explain why.

Remember, you don’t have to take part unless you want to. If you have any questions you can talk
to your parent/s or teacher. They can contact me, my supervisors, or the Research Ethics Office at
the university. You can contact us with the details below:

- Prof. Dinham: 6546 4564
- Dr. Redman: 8344 8555
- Ms. Blannin: 0403 810 377
- Executive Officer - Human Research Ethics
  The University of Melbourne
  Ph: 8344 2073, Fax: 9347 6739.

If you decide you’d like to be part of my project you should sign your name on the next page where
it says “student signature”. To be a part of the project your parents must also sign the form. You
should then return the form to your teacher in the envelope provided.

Thanks for reading this letter and for thinking about joining in my study,

Regards,

Joanne Blannin
jblannin@student.unimelb.edu.au

D.Ed Student
Melbourne Graduate School of Education
University of Melbourne

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