Expectations and reality:
Primary school principals’ experiences of change leadership in the transition to digital learning environments

Aaron Kemp

A thesis submitted in partial fulfilment of the requirement for the degree of Master of Educational Leadership and Management
Unitec Institute of Technology New Zealand
2015
ABSTRACT

Principals in New Zealand primary schools are aware of the expectations placed on them in their role as educational leaders. These expectations include being leaders of change, leaders of learning and leaders who are able to manage the daily operational requirements of a school. Advances in digital technologies have led to changes in the way we communicate, learn, solve problems and consume content. As such, these changes have altered the way key stakeholders in education (students, parents, communities and governments) acquire information, judge teaching and learning, and communicate with schools. The digital landscape is a field that encompasses change and new learning through a rapidly increasing school of thought, and as such, generates experiences that are worthy of investigation.

This research critically examined primary school principals’ experiences with identifying and meeting expectations from a variety of stakeholders in regard to the transition of their schools from ‘traditional’ learning environments to digital learning environments (DLEs). It also examined the successes and challenges faced and how principals were best supported to manage challenges when transitioning to digital learning environments.

A qualitative methodology was employed for this research using the method of semi-structured interviews. The information gathered from these interviews in relation to the expectations, successes and challenges placed on primary school principals served as the major indicators for the study. Eight Auckland primary school principals from schools with rolls between 200-700 students were interviewed using a semi-structured interview format.

The literature review identified a number of key factors that impact on the effective implementation of digital learning environments. The findings of the research revealed that the expectations prioritised by the principals in leading the change were the need for them to ensure effective professional development in both pedagogical and practical understanding for themselves and staff, and to ensure that effective planning was implemented to meet the infrastructural challenges. This aligned with recent research reviewed in the literature.
Due to the rate of change, context of change and speed by which the change occurs because of digital technology, principals believed that the skills of a change leader, which included a clear vision, planning, communicating and managing the change, were essential when transitioning to digital learning environments (DLEs). Lack of personal professional development support for the participants emerged through the course of the interviews. The findings led to the recommendation that principals require greater support from the Ministry of Education and professional development providers to develop their personal understanding of change leadership when transitioning to digital learning environments (DLEs).
ACKNOWLEDGEMENTS

I would like to acknowledge the cooperation of the school principals who took part in the interviews and to thank them for willingly sharing their time. It was a privilege to participate in professional dialogue with them.

I greatly appreciate the support and guidance that I received from my principal research supervisor, Alison Smith and my associate research supervisor, Professor Carol Cardno. I am very grateful to my fiancée, Lorna and numerous colleagues, who provided support and encouragement throughout the study.

I am especially indebted to the Board of Trustees of my school for supporting my application for study leave to carry out this research and for their support throughout the time taken to complete the degree and to the Ministry of Education for granting the leave to undertake the research.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>i</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td>CHAPTER ONE</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Rationale</td>
<td>4</td>
</tr>
<tr>
<td>Research aims and questions</td>
<td>6</td>
</tr>
<tr>
<td>Thesis organisation</td>
<td>9</td>
</tr>
<tr>
<td>CHAPTER TWO: LITERATURE REVIEW</td>
<td>10</td>
</tr>
<tr>
<td>Introduction</td>
<td>10</td>
</tr>
<tr>
<td>Educational leadership</td>
<td>10</td>
</tr>
<tr>
<td>Educational leadership of change</td>
<td>11</td>
</tr>
<tr>
<td>Educational leadership in the digital age</td>
<td>13</td>
</tr>
<tr>
<td>Technology leadership</td>
<td>14</td>
</tr>
<tr>
<td>Staff professional development and the introduction of new knowledge and pedagogies</td>
<td>18</td>
</tr>
<tr>
<td>New knowledge and pedagogies and the New Zealand context</td>
<td>20</td>
</tr>
<tr>
<td>Operational factors - systems and structures</td>
<td>23</td>
</tr>
<tr>
<td>CHAPTER THREE: RESEARCH METHODOLOGY AND METHOD</td>
<td>29</td>
</tr>
<tr>
<td>Introduction</td>
<td>29</td>
</tr>
<tr>
<td>Ontological and epistemological questions</td>
<td>29</td>
</tr>
<tr>
<td>Research methodology</td>
<td>30</td>
</tr>
<tr>
<td>Participants</td>
<td>31</td>
</tr>
<tr>
<td>Research design</td>
<td>32</td>
</tr>
<tr>
<td>Qualitative analysis</td>
<td>33</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 4.1 (a) Factors involved in principals’ experiences of the transition to DLEs........43
Table 4.1 (b) Influences resulting in the transition to DLEs...........................................44
Table 4.2 Factors contributing to the success of the transition to DLEs..........................46
Table 4.3 Characteristics of an ideal DLE........................................................................47
Table 4.4 (a) Factors contributing to a positive transition to DLEs.................................49
Table 4.5 Challenging factors associated with the transition to DLEs............................51
Table 4.6 (a) Factors contributing to failures in the transition to DLEs............................52
Table 4.7 Future challenges with the transition to DLEs..................................................53
Table 4.8 (a) Internal expectations placed on leaders when transitioning to DLEs........55
Table 4.8 (b) External expectations placed on leaders when transitioning to DLEs........55
Table 4.9 Factors contributing to professional development...........................................56
Table 4.10 Knowledge, skills and values required to lead the transition to DLEs............57
Table 4.11 Factors that exist to provide personal development support........................59
Table 4.12 Research questions and corresponding identifier..........................................61
Table 4.13 Question sub-findings and their related themes............................................62-63
Table 4.14 Summary of findings linking research questions to themes and sub
findings..................................................................................................................................64
Table 5.1 Research questions and data themes .................................................................65
LIST OF FIGURES

Figure 2.1 Schools for 21st century learners.................................................................27

Figure 6.1 Five themes when leading the transition to DLEs ...........................................88
CHAPTER ONE
INTRODUCTION

Background

The use of digital technological resources and environments for children in education is becoming increasingly accepted as normal practice to assist with teaching and learning (Fullan & Langworthy, 2014; Papa, 2010; Sife, Lwoga, & Sanga, 2007). The past apprehensions and ignorance arising from the use of digital technology are being replaced by realistic solutions that are strongly evidence-based. Digital technology is now believed to help to provide rich learning environments that are part of a new 21st century pedagogy. This pedagogy is said to give effect to positive outcomes for students’ learning (Fullan & Langworthy, 2014; Hallinger & Heck, 1998; Hargreaves, 2003; Papa, 2010). In defining 21st century pedagogy the literature is wide and varied but generally consists of a focus on the use of digital technology to enhance higher order thinking skills (Fullan, 2013); the building of quality learning environments which foster creative engagements and collaboration both locally and globally (Amos et al., 2014); with a focus on real world problems that reinforce learning across multiple disciplines and curriculum subjects (Amos et al., 2014; Beetham & Sharpe, 2013; Fullan, 2013; Koehler & Mishra, 2009). Education is no longer about putting more digital technology into more classrooms; rather, it is concerned with changing approaches to teaching so that students acquire technological skills and knowledge to assist with their learning using this technology (Schleicher, 2015).

For forty years the relationship between digital (computer) learning and education has had its peaks and its valleys that have espoused changes to our models of teaching and learning in the classroom. There has been a shift in educational philosophies from passive learning to active learning, and to collaborative models of teaching and learning. In the last ten years the use of inquiry learning pathways with the assistance of online information has strengthened (Campo, Negro, & Nunez, 2012; Peters & Fitzsimons, 2012). History has shown that overall this pilgrimage, in relation to the way we teach and the way students learn, can be viewed as a process of significant innovation and change (Watson, 2006). The widespread use of digital technology in education is now
mainstream as is the research into the way digital technology supports teaching and learning.

Since 1993, the information technology industry has collected survey information from New Zealand schools in cooperation with the Ministry of Education and other government agencies. Since 2005, the 2020 Communications Trust has been responsible for coordinating this research (Johnson, Wood, & Sutton, 2014). The research is concerned with examining the role and function of digital learning in schools, the challenges for educators, the new pedagogies emerging, and the changing curriculum initiatives that help strengthen schools’ use of ICT and e-learning (Wylie & Bonne, 2014). It also aims to strengthen the capability of teachers and school leaders with their integration of digital technologies into effective teaching and leadership practices (Ministry of Education, 2014). The Ministry of Education’s Statement of Intent 2014-2018 (MoE, 2014) is clear. They reinforce the findings of these studies by stating that:

1. Learning with digital technologies helps equip children and students with the range of skills they need to participate in a modern, future-focused economy;
2. Digital technologies have the potential to make the current education system more cost effective and accessible;
3. Online learning environments and digital technologies are viewed as integral to providing high-quality teaching and learning. They are believed to engage children and their parents; and
4. An investment in digital infrastructure is important to ensure this quality teaching and learning by providing upgraded internal networks and connections to ultra fast broadband and networks for learning (N4L) (MoE, 2014).

As a result of these intentions, the Ministry of Education is focused on ensuring that digital technologies and the supporting infrastructure are in the hands of both teachers and students. They believe that digital learning creates potential benefits for education, particularly in helping to enhance student-learning outcomes and in time, helping to strengthen the New Zealand economy (Amos et al., 2014).

Looking back we have seen a huge shift in the advancements of digital technology. This is now becoming more closely aligned with shifts in current educational thinking concerned with how to best use this technology to benefit learning outcomes. These shifts have given rise to government and policy writers seeing the potential benefits for
education across the world and also in New Zealand (Amos et al., 2014). The Ministry of Education is firm in their intentions and have delegated these expectations to school leaders to help implement these strategic changes (Amos et al., 2014). In particular, educational leaders are being challenged to increasingly work towards changing curriculum implementation to incorporate digital environments. These changes are impacting on the very nature of curriculum design and teaching and learning (Robinson, 2011). The regrouping of teachers and learners, the rescheduling of learning, and the changing environment that incorporates digital tools, is an expectation of the New Zealand government (Amos et al., 2014; MoE, 2014; Wylie & Bonne, 2014).

To say that education is concerned with the future may be obvious, but addressing the factors that are concealed in this statement introduces some interesting questions for us as leaders and educators. The understanding of how learning is maintained and transferred to other areas of our lives has long been debated, as are the links to the role of schooling in the future. The advent of new and ever-present technologies is one of the many factors that are now challenging the traditional constructs of the classroom from the old ‘tell and test’ model, to a model where teachers treat their students as learning partners (Fullan, 2013; Lieberman & Pointer Mace, 2010). Learners have evolved in an information age while many schools continue to operate in the constructs, ideas and assumptions of the industrial age (Kelly, McCain, & Jukes, 2008). The need for manufacturing skills of the past has evolved into the need for workers who possess specialised skills and who can connect, communicate and create as part of a global community (Sheninger, 2014). For educational leaders to prepare students for their future lives and the possible employment that they are likely to encounter, we need a schooling system that embraces new learning styles, new pedagogies and new environments, not one that mirrors the ‘traditional’ learning of the past.

However, true transformational change within the education system has been a slow and spasmodic process. Often when failure occurs and some systems and processes crash, the organisation will resume its regular behaviour continuing with the ‘trusted and true’ traditions and known pathways of the past (Bolstad, 2011). The ever evolving and fast-paced digital environment places new challenges on educational leaders - how to be personally technologically aware, how to support teachers with their pedagogical professional practice, and how to meet the operational demands for the latest
infrastructure and the technical support required. There will be intermittent failures, and working within the change management framework is challenging; however, the key for any change leader is to prepare for these challenges, work through them and learn from them. The digital learning environment (DLE) is like building a plane while flying it. This is an almost impossible task that requires skilled pilots who are heading in the right direction, a well-trained flight crew who believe in the flight path, and the best technological equipment to get safely to the destination. This must be an all-round educational trip that helps to make the journey for the passengers - our students - more engaging, stimulating, efficient, supportive and one that gives them the tools to enable them to successfully navigate to unknown and unfamiliar destinations.

**Rationale**

This thesis sits within a background of research that investigated the perceptions of change in the transition to digital learning environments (DLEs) by eight primary school principals. In the establishment of digital learning environments, leaders in these schools understood it to be a contestable idea but believed digital learning environments generally consisted of instruction that was learner-centred (Siemens & Tittenberger, 2009); the application of heuristic methods (Amos et al., 2014); a ‘blurring’ of the teacher/student role and relationship where the teacher was viewed as a mentor/coach and the student was leading their learning (Bolstad, 2011); with access to digital, mobile and web based tools that support an open access to knowledge (Fullan, 2014; Lee, 2007; Peters, 2007; Siegel & Kirkley, 1997).

In the context of education, the transition to digital learning environments (DLEs) offers new and exciting challenges for leaders. In New Zealand, principalship is not currently dependent on a specific skill set, training or leadership experience that incorporates skills and knowledge in digital competencies and pedagogies. The skills and knowledge which principals use to make decisions to transition to digital learning environments (DLEs) are often not acquired through intensive training with digital technology, digital pedagogy, digital competencies and the new understandings that support the 21st century learner. Most learning is acquired through the daily transactions that occur as a leader of a modern schooling system (Degenhardt & Duignan, 2010). New expectations are being placed on principals in the school environment from a wide range of stakeholders that include the government, teachers, parents and, more increasingly, students as they demand to have digital learning tools in their environments (Amos et al., 2014). The digital landscape is
now not merely a way to teach; it is a highly debated field of research and rapidly expanding school of thought (Degenhardt & Duignan, 2010; Fullan, 2013; Sheninger, 2014). For leaders to survive in this rapidly changing environment, they need to be aware of the expectations placed on them by internal and external stakeholders and prepare for the changes that these expectations may bring. These internal and external pressures call for radical change if schools are to meet the changing needs of young people and support their learning in the 21st century.

These challenges are evident in the Ministry of Education report *Future-focused learning in connected communities* (Amos et al., 2014), where strategic priorities have been recommended to provide the conditions that are needed to overcome these challenges. The future-focused strategic priorities suggest ways in which leaders can manage and lead change, including such actions as establishing clear visions and strategic plans and actively supporting staff development that helps to improve the overall effectiveness of DLEs (Bates & Sangra, 2011; Fullan & Langworthy, 2014; Price, 2005). When the expectation is there for leaders, teachers and students to utilise digital technology tools often, and to teach using pedagogical understandings, then they will do so (Kapler-Hewitt, Mullen, Davis, & Lashley, 2012). However, there is also the need for leaders, teachers and students to feel supported and encouraged to take risks as they learn with and through digital technology (Scott, 1999). Appropriate support for leaders and teachers is also evidenced in the research completed by the Organisation for Economic Cooperation and Development (OECD), when they acknowledge the need to invest in leadership by building capacity, change-management skills, and supporting leaders with sound evidence based practice (OECD, 2015). Leaders need to be supported with the appropriate skills and tools to make change decisions that create a teaching and learning culture where both students and teachers learn the essential skills required to be digitally and technologically proficient.

In the digital world, evidence encourages innovation and adds to the improvement of resources and tools. In the educational world, evidence is what divides the useful from the useless. An evidence base helps us make sound decisions arising from what enhances learning, reduces risk and failures of learning not occurring, and makes the best use of the limited resources that we have (Demski, 2012). The evidence that DLEs improve student learning outcomes is currently limited (Cordes & Miller, 2000; Gosmire & Grady, 2007;
OECD, 2015), and further exploration is required by educational decision makers to acquire the quality and quantity of evidence to show that transition to DLEs helps to improve student learning outcomes and optimise student engagement.

My research presents a case for why the transition to DLEs warrants examination as to its perceived benefits for student learning outcomes. In the first instance, my study aimed to explore the approaches that principals adopt in relation to change in their schools when transitioning to DLEs, and the conditions that exist within schools that enhance or challenge this transitioning. Secondly, it examined Government and Ministry of Education expectations for providing strategies for learning with digital technologies (Amos et al., 2014); the expectations for improved technological structures and systems for equal access from educational leaders, communities and politicians (Fullan & Langworthy, 2014; Sincar, 2013); and the expectations of schools from parents and the wider community in relation to teaching and learning in the 21st century (Degenhardt & Duignan, 2010). Thirdly, the research critically examined the personal capabilities and professional knowledge changes for leaders that have occurred as a result of leading the transition to DLEs.

**RESEARCH AIMS AND QUESTIONS**

The aim of this study was to investigate the transition to digital learning environments (DLEs) in New Zealand primary schools and the changes in leadership understandings that resulted due to this transition. I have led schools with traditional learning environments for over thirteen years and am now beginning to see learning environments being ‘transformed’ into digital landscapes. My study focused on primary school principals and their experiences with leading and managing change within the transition to DLEs. It explored their experiences as they strived to manage and meet the expectations from internal and external stakeholder influences. It also explored the successes achieved and the challenges encountered with leading change in the context of transitioning to DLEs. The research also critically examined the personal capabilities and professional knowledge changes for leaders that have occurred as a result of leading the transition to DLEs.

Although there is an identified link between DLEs and changed pedagogy evident in *Future-focused learning in connected communities* (Amos et al., 2014), there is limited
evidence to suggest a close interrelation among them. Despite the move towards DLEs in New Zealand schools the literature reveals gaps in the current research about DLEs, particularly pertaining to a New Zealand setting. Transitioning and changing to a DLE does not conveniently shift leadership practice and/or teaching practice to being more effective for student learning outcomes. Improved student learning outcomes are only likely to happen in a DLE when there is a shared vision led by a change leader, the provision of relevant staff development, and the provision and management of operational systems and structural conditions including infrastructure, technical support and related costs. My aim was to make this research relevant for leaders. Therefore, the research focused on primary school principals, which allowed me to examine the conditions of effective practice in primary schools where the context of DLEs are either transitioning or currently functioning.

The following three research aims guided my study:

1. To investigate principals’ perceptions of the internal and external expectations placed on them when leading and managing the transition to digital learning environments (DLEs) in their schools;
2. To identify and critically examine the successes that principals perceive they have achieved in their leadership and management of the transition to a DLE;
3. To identify and critically examine the challenges that principals perceive they have experienced in their leadership and management of the transition to a DLE; and
4. To explore the ways in which principals perceive that they have developed their personal capabilities and personal professional knowledge in order to lead and manage the transition to a DLE.

The research questions that guided this study were as follows:

1. What is expected of primary school principals as educational leaders in leading the transition to digital learning environments?
2. What successes have primary school principals achieved in leading the transition to digital learning environments?
3. What challenges and barriers have primary school principals faced in leading the transition to digital learning environments?
4. What conditions are available to support primary school principals’ personal capabilities and personal professional knowledge in order to lead the transition to digital learning environments?
THESIS ORGANISATION

This thesis is set out in six chapters. Chapter One provides an overview of the research project by way of an introduction, the rationale for conducting the research, the context of the research and the aims and questions which guided the research.

Chapter Two highlights three key themes that are prominent in the literature reviewed within the area of educational leadership in relation to the transition to digital learning environments. These are: technology leadership; the provision of relevant staff development; and the provision and management of operational systems and structural conditions, including infrastructure, technical support, and related costs.

Chapter Three examines the methodological framework and data collection method, which were applied to this research. The rationale for the selection of the methodological approach and the research method employed are explained. The chapter concludes by taking account of the importance of reliability, validity and ethical issues in research.

Chapter Four presents and analyses data collected through the use of semi-structured interviews from principals who participated in this research. The emerging findings are identified.

Chapter Five discusses the research data and links it with the literature presented in Chapter Two. The significant themes from the analysis are brought together to provide an overview of primary school principals’ experiences of leading change in the context of digital learning environments.

Chapter Six contains recommendations and concluding comments based on the research questions. The identified benefits of digital learning environments are presented and the implications are discussed. The limitations of this research are explored. The chapter concludes with final recommendations and suggestions for further research.

The following chapter reviews the literature from an educational context in regard to three themes: technology leadership; the provision of relevant staff development; and the provision and management of operational systems and structural conditions, including infrastructure, technical support, and related costs.
CHAPTER TWO
LITERATURE REVIEW

INTRODUCTION
This chapter reviews the literature that is concerned with the leadership of the transition to digital learning environments (DLEs) in schools. While this study takes place in New Zealand it is pertinent to explore the international considerations and impacts of digital learning environments before focusing on the New Zealand context. The digital landscape in education is ever changing and the literature explores many challenges associated with transitioning to DLEs in schools.

There are three main themes that emerge from the literature. The first theme is technology leadership. Technology leadership combines the strategies, techniques and leadership styles that apply directly to a technological focus. The second theme is the significance of staff professional development and the introduction of new knowledge and pedagogies. Professional development is the process of improving teacher approaches, beliefs and use of resources to increase participation in the technological learning process. Lastly, the importance of effective operational systems and structures, which includes the infrastructure, technical support, and costs, that need to be addressed to accommodate and support DLEs. These three themes and related sub themes help to form the headings for the second part of this chapter. The chapter is structured into the following sections: educational leadership; educational leadership of change; educational leadership in the digital age; and, lastly, the themes identified within the literature.

EDUCATIONAL LEADERSHIP
Introduction
Theories of educational leadership in the past have been linked to views on generic management (Robinson, 2006; Starratt, 2003), which highlight the managerial or operational day-to-day functions of schooling. Educational leadership has developed beyond this generic term to now include terms like ‘instructional leadership’, ‘cultural change leadership’ and what Papa (2010) calls ‘technological leadership’. In the broader sense, there has been a shift from the singular notion of leadership (e.g. the CEO), to a more shared and collaborative approach involving different forms of distributed
leadership. There are several writers who link the leadership of the principal to school effectiveness (Fullan, 2001; Hallinger & Heck, 1998; Robinson, 2006). Leadership in an educational setting is leadership that impacts on teachers, students and the community, has a direct effect on student achievement, and is concerned with the ‘heart’ of schooling - teaching and learning (Robinson, 2006). As Edwards (2008) writes, educational leadership is a type of leadership that “focuses on improving teaching and learning; leadership that facilitates real involvement of others; that shares opportunities for others to lead; thereby serving the interests of the school as it seeks to improve” (p. 15). In summary “Educational leadership is leadership that causes others to do things that can be expected to improve educational outcomes for students” (Robinson, Hohepa, & Lloyd, 2009, p. 68). Hence, the leadership of change is a significant aspect of educational leadership.

**Educational leadership of change**

Within this collaborative environment the skills, knowledge and understanding of change management are considered fundamental to ensuring the successful transition to something new. Change management is concerned with having the skills, knowledge and abilities to motivate people and to navigate the best pathway forward in a clearly communicated and collaborative manner (Fullan, 2013). Change in the educational context is an area of study that has been debated and discussed for many years and will continue to be discussed for many years to come. With the help of effective research into change management, leaders can fully understand the importance of leading and managing change effectively. In both his book, and a paper presented at the Australian Universities Quality Forum, Scott (1999, 2004) provides some key strategic change lessons that help gather the pieces of the educational change jigsaw into a workable picture. He suggests having a set strategic direction while ensuring that the change is as relevant, desirable, clear, distinctive and, most importantly, as feasible as possible.

Another fundamental factor is how well the senior management consistently model the desired behaviours over time. Change is also a team effort and it does not just happen; it has to be led (Scott, 2004). This notion of quality leadership leading the change process is also seen as a key factor in managing effective change (Schleicher, 2015). As Fullan (2014) identifies, the key to any large-scale reform is the school leader. Fullan believes that instructional leadership is the first step of an effective leader but that we need leaders
who can “create fundamental transformations in learning cultures and the teaching profession” (Fullan, 2002, p. 16), the ‘Cultural Change Leader’.

Change management is concerned with whole-school improvement involving all stakeholders in the planning and implementation process. Educational leaders need to be able to lead the change process, possess the necessary knowledge and skills, and be sensitive to people’s needs and motives by being aware of others’ feelings and reacting appropriately (Blase & Blase, 2000; Fullan, 2010). However, research also shows that high levels of knowledge and skill are no longer enough to lead effective change (Brewster & Railsback, 2003; Cardno, 2012; Fullan, 2014; Hanson, 2001; Scott, 2004). Henderson and Gomik (2007) support this notion when they discuss the need for core level change in educational beliefs and values. In adopting a ‘core level change’ in educational beliefs and values an educational change leader needs to be able to motivate and encourage greater levels of self-direction, autonomy and lifelong learning, helping to grow leadership from within and enabling a shared vision to emerge that is owned by everyone. A shared vision is a fundamental key to change management and successful transitions to DLEs (Fullan & Langworthy, 2014; Schleicher, 2015).

In other words, school improvement and change involves all stakeholders in the planning and implementation process. Leading and managing change therefore relates to the clear communication of teaching and learning goals. It encompasses school improvement and the maintenance of an orderly and supportive environment where strong school structures and systems are evident. Educational leaders need to be actively supporting the needs of their stakeholders by positively promoting professional discourse with a high moral purpose, in a respectful and trusting working environment. On one hand, they need to lead the change; on the other hand, they need to empower others to be leaders of learning in their own right, with the appropriate resources and support.

The literature reviewed in this section supported the use of the following research question:

• What is expected of primary school principals as educational leaders in leading the transition to digital learning environments?

The findings from the answers to this question will enable me to examine the expectations placed on leaders when leading the change to DLEs, and how the leaders interacted with stakeholders to support the transition.
Educational leadership in the digital age

The literature states that, in the digital age, educational leaders need to lead in such a way that teachers, and ultimately students, acquire and utilise the skills and knowledge required to enhance learning (Amos et al., 2014; Chang, 2012; Fullan, 2013; Rudnesky, 2004; Sheninger, 2014). The rise of connectivity, mobile digital technologies and the internet are providing challenges and new possibilities that our education system has never before encountered (Rudnesky, 2004). As the use of digital technology has increased, educational leaders are being encouraged to be digitally capable so that they can support teachers and students to contribute positively to this evolving local and global environment (Amos et al., 2014). The effectiveness of leaders and teachers who have the capacity to navigate these challenges and opportunities is viewed as paramount in providing learning environments that empower and continue to enhance future focused thinking (Fullan, 2013; Sheninger, 2012).

However, some literature states that many leaders do not possess the skills, aptitudes and abilities to lead in this ever-changing environment (Chin & Chang, 2006; Fullan, 2013). Many leaders feel underprepared, reluctant and even fearful of the challenge this new environment generates (Schachter, 2010). The literature also acknowledges issues relating to personal beliefs in that some principals do not believe that there is a benefit in improved student learning through the use of DLEs (Cordes & Miller, 2000; Gosmire & Grady, 2007). Furthermore, stakeholder expectations continue to demand more of leaders and teachers in the support of digital learning. Therefore, leaders will require support with the development of their personal knowledge and skills so that they become competent and confident in this new archetype of schooling, enabling them to manage and lead the change required (Degenhardt & Duignan, 2010).

Despite the shift in expectations from stakeholders, in relation to the effective integration of digital technology into classroom learning, and the large sums of money being attributed to this in our schools, little is known about the process through which leaders meet these expectations and implement them effectively to overcome the leadership challenges inherent in DLEs within schools. There are also few insights into how leaders meet these expectations. However, there is a plethora of empirical evidence that links the leadership of the principal to school effectiveness, and leaders’ knowledge and skills to support this development with staff (Beetham & Sharpe, 2013; Collins & Halverson,
2009; Demski, 2012; Schleicher, 2015; Sheninge, 2014). However, there are very few examples in this literature of how primary school principals actually build their personal capabilities and personal professional knowledge to enable them to lead change in the digital environment (Fullan & Langworthy, 2014; Hallinger & Heck, 1998; Hargreaves & Fink, 2012; Robinson et al., 2009; Robinson, 2011).

There appears to be an upsurge in the rate of change and the number of change initiatives in educational contexts associated with the introduction of DLEs. What is evident in the transition to DLEs is that the change is significant, and any transition requires a clear understanding of the culture of the school community to ensure that the change being proposed will be willingly accepted and supported (Scott, 2004). A transition to DLEs is an organisational change, a change in pedagogy, and a change in culture. It involves all the stakeholders collaborating and clearly communicating the change process.

The literature reviewed in this section supported the use of the following research question:

• What conditions are available to support primary school principals’ personal capabilities and personal professional knowledge in order to lead the transition to digital learning environments?

The answers to this question enabled me to examine the personal professional development undertaken by leaders, and question the support offered by both internal and external agencies to assist with the transition to DLEs. The next section explores the theme of technology leadership and the way in which leaders participate in and connect with digital learning, and manage change.

### Technology leadership

Digital technologies play a vital role in shaping and supporting a 21st century curriculum. The literature suggests that the ways in which leaders manage, participate in and connect with digital learning are seen as critical in the development of the vision, strategic plan, staff development and overall effectiveness of DLEs (Bates & Sangra, 2011; Fullan & Langworthy, 2014; Garland & Tadeja, 2013; Price, 2005). The first theme from the literature that is particularly relevant to my thesis research, is that of technology leadership (the leadership of digital learning environments). Technology leadership has been defined as a combination of strategies, techniques and leadership styles that apply
directly to a technological focus - a practical change-oriented leadership practice (Chang, 2012; Chin & Chang, 2006; Valdez, 2004). Technology leadership has specific application to aspects of digital technology, including providing an understanding of the new pedagogical shifts in education, managing and leading change in this ever-evolving environment, and supporting the technological infrastructure to enable teaching and learning with digital technology to occur (Papa, 2010).

Research on technological leadership began in the United States in the 1990s and has since gained importance (Chang, 2012). The introduction of digital environments in schools has added new opportunities and challenges for school leaders. Schools endeavouring to transition to, and excel in, the 21st century digital environment require leaders who have the capacity to identify both the potentials and the pitfalls of the information age. The call is for technology leaders who are able to move beyond the standards, beliefs and behaviours that have shaped our schooling history and who have the compulsion to drive sustainable change that transforms school culture (Fullan, 2014). The National Association of Secondary School Principals (NASSP) established guidelines to support educational leaders with the integration of digital technology into their schools and practice (Demski, 2012). These guidelines suggest that principals need to:

• communicate consistent, clear and reasonable expectations arising from the integration of digital technology into the school;
• provide professional development time and resources;
• give staff access to the same tools used by the students and consistently model the use of the same digital technology to their staff; and
• be an active and public champion for all students, staff members, and the school of implementing a vision of fully integrating learning digital technology for the second decade of the 21st century (Sheninger, 2014).

These guidelines suggest models of behaviour that leaders can use to support the successful integration of digital technology into the school environment. They also suggest that the technology leader is viewed as connected to the global community and is able to locate and provide expert advice and resources that support and enable stakeholders to teach and to learn (Demski, 2012). The technology leader focuses on a shared vision that embraces the essential 21st century tools of “creativity, problem
solving, critical thinking, technological proficiency, global awareness, media literacy, and communication and collaboration” (Sheninger, 2014, p. 36).

Technological leadership as stated by Anderson and Dexter (2005) is essential for effective use of digital technology in that “leadership, especially from the principal, was viewed as having an important influence on school improvement” (p. 57). The leadership that principals show to their teachers is considered a key factor that motivates the effective use of digital technology in classrooms (Jones, 2001). It is these technological leaders that offer the support and guidance that teachers are looking for (Valdez, 2004). It is an approach to leadership that has a strong focus on pedagogy and on relationships that shift teachers’ attitudes, feelings, thinking, behaviour and performance to embrace the many benefits that digital technology can bring to learning. The educational leader must see themselves as the technology leader and model to others what it means to be a connected learner. It is also awareness by the educational leader that they don’t have to know everything. As Demski (2012) explains, “What we need for principals to understand is, first, it's okay to admit that they don't know everything. What's important is that they commit to the learning of digital technology, and the sharing of that learning as widely as they can” (pp. 52-53).

Future-focused learning in connected communities (2014) reference group suggests the need for a clear vision for the future to ensure that New Zealand has effective leadership that can “build future-focused learning capability and support the adopting digital technologies in their schools” (Amos et al., 2014, p. 14). They call for leaders who are able to manage change and innovate using 21st century skills and competencies. At the heart of what they call a “successful education system” is the need for strong leadership, effective pedagogical practice, and innovative approaches to education (Amos et al., 2014, p. 6). Responding to the professional need for teachers to have digital and technological skills, knowledge and understanding, is a long-term goal that requires a system wide approach to effective change management. School leaders need to possess not only instructional and change leadership skills, but also technology leadership skills.

This type of leadership change differs in relation to change that happens in other aspects of the school environment. Technological change is fast paced and consistently evolving (Schachter, 2010). When you are working with digital technology you are working in a
field of continual change. The moment a new digital technology is born it begins to influence our environment and our lives change as a result of the new technology - we can become healthier, more productive or, perhaps, more self-centred and anxious (Sheninger, 2012). For example the impact of social media applications like facebook and twitter can strongly influence the minds of young people creating both positive and negative relationships. The speed of change and the rate of change are uncontrollable and are limited only by the bounds of our thinking. The ability to manage and lead change in this environment takes a skilled leader, one who is a champion for digital technology, who has a clear shared vision, and is able to fully integrate the digital technology into the learning environment (Amos et al., 2014; Stuart, Mills, & Remus, 2009).

The literature also talks about the reluctance and fear of technological leadership, suggesting that digital technology alters strongly established work routines and career development, and adds to an already busy curriculum timetable (English, Papa, Mullen, & Creighton, 2012; Glover, Miller, Averis, & Door, 2002; Larson, Miller, & Ribble, 2010). Many leaders find themselves unprepared, under-skilled and unable to keep up with the fast-paced technological environment (Schachter, 2010). As digital technology becomes more user friendly and accessible, technology leadership is said to become “increasingly complex” (Larson et al., 2010, p. 13). This complexity can result in a failure to have a shared vision, poorly designed implementation plans, no strategy or systemic plan, lack of professional development, poor change management systems and poorly designed infrastructure (Banoglu, 2011; Diamante & London, 2002; Fullan, 2014; Tettegah & Hunter, 2006). Other literature also criticises the use of digital technology in schools. These arguments encompass whether digital technology actually helps improve student learning or is just used purely for entertainment and is not relevant or connected to the real world (Cordes & Miller, 2000; Cuban, 2001; Datnow, 1999; OECD, 2015; Oppenheimer, 2003).

Digital technology will always have its supporters and its naysayers. Some believe it will change the way we live our lives forever, others that it is purely for entertainment and is a distraction to learning. Whatever the values and perspectives are in relation to education, digital technology is ever-present and here to stay. We need technologically ‘savvy’ change leaders who are able to move past any uncertainties and discomforts. They need to be willing to change environments, curriculum and pedagogy so they align with the
futures that students seek. This will enable students to be competitive on a global level with the right tools, skills and knowledge.

The next section explores the second theme of staff professional development and the introduction of new knowledge and pedagogies. It examines the shifting attitudes, beliefs, values, knowledge and pedagogies inherent in the transition to digital learning environments (DLEs).

**Staff professional development and the introduction of new knowledge and pedagogies.**

One of the key challenges identified in the literature concerned with the introduction and sustaining of digital learning environments (DLEs) is staff professional development (Baylor & Ritchie, 2002; Cowan, 2013; Fullan, 2002; Jones, 2001). Fullan (2001) noted that for schools to make significant change teacher approaches, beliefs, and use of resources need to be addressed. A case study of high schools in the United States conducted by Schofield (1995) discovered that the barriers to computer use were identified as: “Teacher mistrust in the ‘value’ of computers in education; the disruption of “normal” classroom organisation; lack of familiarity and initial training of teachers; ongoing training needs; threat to teacher authority (via lack of competence); and computer anxiety” (p. 94). Although this research is over twenty years old common themes emerge in more current literature. Hew and Brush (2006) support these notions when they describe the three most frequently named barriers to technological integration as: resources; teachers’ knowledge and skills; and teachers’ attitudes and beliefs. Flanagan and Jacobsen (2003) also have a similar view stating that “inadequate staff development, lack of informed leadership and pedagogical issues are strong barriers for school principals while they aim to integrate digital technology” (p. 125). These common understandings about the need to support and challenge teacher beliefs, attitudes, values and knowledge are strongly evident in the literature (Fullan & Langworthy, 2014; Schleicher, 2015; Sheninger, 2014; Wylie & Bonne, 2014).

Furthermore, leadership attitudes, beliefs and values toward digital technology also contribute to the amount of use of digital technology by staff. Leadership attitudes, beliefs and values are also strong influencing factors on learning interest (Sheninger, 2014). If a leader's attitude towards digital learning is positive it influences the staff of a
school since leaders are major actors in the learning (Robinson et al., 2009; Robinson, 2011). This stance is further reinforced by Stuart et al. (2009), who take a somewhat firmer position stating that the leader should ‘champion’ digital innovations. Results from their research showed that if the leader uses digital technology and is a part of the professional development, it helps to both expand their competence and the competence of their teachers. Two aspects of digital competence emerge: ICT knowledge (what people know); and ICT experience (what people do). The more willing the leader is to actively engage in learning and become a co-creator with staff, the greater the engagement of staff (Stuart et al., 2009).

Two aspects of importance, therefore, that are evident in the literature and that encompass leadership and staff development are the engagement in the learning - a personal belief and motivation and, secondly, of individual participation in the technological learning process – an active participant in the pedagogy. (Fullan & Langworthy, 2014; McLoughlin & Lee, 2008; Meier, 2005; Sandholtz & Reilly, 2004; Stuart et al., 2009; Wright, 2010). These aspects are further reviewed in the next section.

**Engagement in the learning – personal beliefs and motivation**

Personal beliefs and motivation in relation to the benefits of educational technologies are a strong stimulus for adoption of digital pedagogies. Resistance to change is often associated with epistemological beliefs that surround learning. “Unspoken and sometimes unconscious beliefs about the nature of knowledge and learning play a critical role in guiding a person’s thinking” (Schommer-Aikins & Hutter, 2002, p. 13). Key factors in this development are, firstly, to support a change in beliefs and assumptions of staff (Perrotta, 2013) and, secondly, to build staff understanding of digital pedagogies and digital competencies (Amos et al, 2014). Research is clear on both fronts. It takes professional development that includes: one to one peer mentoring to bridge the digital technology gaps (Polly, Mims, Shepherd, & Inan, 2010; Rudnesky, 2004); mentoring through the development of learning cultures that are holistic and collaborative (Fullan & Langworthy, 2014); being linked to new pedagogies and content knowledge (Meier, 2005); and independent learning on the part of the teacher (Jones, 2001). Secondly, that the environment is supportive which includes the need to have a supportive leader who is a partner in the learning with staff (Robinson, 2011; Stuart et al., 2009).
Teachers are quick to follow leaders who ‘practice what they preach’, demonstrate their digital knowledge and skills in their everyday leadership and are supportive and patient. The need for beliefs and values to be aligned with the technological vision of the school is essential for reform and the effective implementation of DLEs. There is no guarantee that with professional development this will happen, but there is a key link to effective development that involves pedagogical knowledge of DLEs that will help to support change.

Digital technology learning process – an active participant in the pedagogy
If teachers are to be active participants in their professional development an essential component is building their understanding of digital pedagogies and digital competencies (Amos et al, 2014). Terms like ‘personalised learning’, ‘self-regulated learning’, ‘authentic contexts’, ‘globally connected’, ‘twenty first century knowledge’, ‘ubiquity’, ‘agency’ and ‘connectedness’ are all used to define a new model of learning. (Amos et al., 2014; Chin & Chang, 2006; Craig, 2013; Fullan, 2010). Degenhardt and Duignan (2010) discuss this new pedagogical relationship between the teacher and student as a “profound change in what is taught, how it is taught and how it is assessed” (p. 42). In summary this implies a shift from teacher-directed to student-directed learning with a focus on authentic and transformational learning. This is where the teacher regularly reflects on their teaching effectiveness, processes and strategies and seeks feedback on their teaching and their students’ progress.

Unless teacher professional development includes an emphasis on this pedagogical shift teaching practice will remain the same. When shifts happen, teachers become more actively involved in the learning process, and are more engaged and motivated, and in turn are better able to support their student learners to navigate the digital learning landscape (Glover et al., 2002). The next section explores what is meant by new knowledge and pedagogies linking it to a New Zealand context.

New knowledge and pedagogies and the New Zealand context
Educators are now being encouraged to provide professional development opportunities that include the new knowledge and pedagogies that surround the digital learning landscape (Amos et al., 2014). The ability to personalise learning experiences, learning at one's own pace and increased agency in regard to the learning contexts and content are
espoused as important components to this new pedagogy. The Ministry of Education in their report titled *Future focused learning in connected communities* (2014), define digital pedagogy as the “instructional theory that is specific to using digital technology in an educational setting” (Amos et al., 2014, p. 34). They include three key themes: “agency, ubiquity and connectedness,” which require leaders and teachers to rethink how teaching and learning is organised and managed (Amos et al., 2014, pp. 34–37).

**Agency**

Agency is the ability to make choices about the learning pathway. It encourages a student-centred approach to teaching and learning. Course content is negotiated with students follows their personal interests and is linked to community and global outcomes (McGuire & Gubbins, 2010). This is a shift away from teacher-directed learning to student-engaged and student-directed learning with an emphasis on both the teacher and student collaboratively co-creating the learning experiences (Degenhardt & Duignan, 2010).

**Ubiquity**

Ubiquity is concerned with the pervasiveness of digital technologies. They are everywhere and are seen by stakeholders as commonplace and as necessary tools to support learning. Learning can now happen anywhere and at any time (Fullan, 2014). The introduction of the internet, mobile devices, cloud-based computing and wireless devices means that knowledge is at our fingertips. Learning has shifted to an ‘as needed’ way of thinking (Degenhardt & Duignan, 2010). This pervasiveness of digital technology, and with it the ease with which we can access the internet and knowledge at any time and anywhere, shifts the very concept of knowledge-based teaching. Teaching now involves the use of interactive learning methods. Teachers are encouraged to be teachers of students, no longer teachers of subjects (Fullan, 2014).

**Connectedness**

Connectedness is concerned with having a connection with something bigger than ourselves. Fullan (2014) believes that the education system is mismatched with the needs of today’s society in that we are using new tools but still educating using old frameworks. The call is for us to be connected to the wider community of learners and explore new frameworks for teaching and learning that link with and support the learners of today. In being connected, knowledge is shared across social and technological networks and
learning grows and becomes evident as these networks are explored (Gualtieri, 2009). In being connected, learners have the opportunity to be networked with experts and participate in the building of knowledge through online communities. They are no longer alone but are a part of a wider body of learners and, as part of that body of learners, they need to understand their responsibilities and how their actions and contributions influence the online community. The Ministry of Education reinforce this notion when they state that:

“In a connected world, no individual person or organisation can ‘stand alone’. The success of one depends on others, and the failure of one impacts the others. In such a world, synergistic benefits of knowledge creation considerably outweigh the accumulated benefits of individual knowledge.” (Amos et al., 2014, p. 37)

**Links to student achievement**

The introduction of new pedagogies and the shift in thinking to ‘what teachers do’ to enhance the learning process poses a very obvious question: How does this contribute to improvements in student achievement? More recently, emphasis is being placed on the educational benefits for students who use digital tools. The literature is replete with benefits that include greater student independence, engagement and motivation (Fullan & Langworthy, 2014; Johnson et al., 2014; Schleicher, 2015; Sheninger, 2014; Tamim, Bernard, Borokhovski, Abrami, & Schmid, 2011; Ward & Parr, 2011; Wright, 2010). In their meta-analysis, Tamim et al. (2011) acknowledged the impact of digital technology on learning and that learning with digital technology can have a positive effect on student learning outcomes. However, the literature is also careful to state that there are strong methodological controls concerned with validity and statistical correlations between the use of digital technology and school achievement (Dexter, 2011; Lim, Zhao, Tondeur, Chai, & Tsai, 2013; McLeod, 2015; OECD, 2015; Richard & Postman, 2013; Rutkowski et al., 2011). The literature is also quick to point out that the use of digital technology is secondary to effective classroom instruction (English et al., 2012; Fullan, 2009; Lieberman & Pointer Mace, 2010; Paulette et al., 2012; Siemens & Tittenberger, 2009). In a recent report, the OECD (2015) state that countries which have invested heavily in information and communication technologies (ICT) for education have seen no noticeable improvement in their performances in the Programme for International Student Assessment (PISA) results for reading, mathematics or science. Andreas Schleicher, the Director for Education and Skills, believes that the pedagogy must drive the practice and
that “school systems need to find more effective ways to integrate digital technology into teaching and learning to provide educators with learning environments that support 21st century pedagogies and provide children with the 21st century skills they need to succeed in tomorrow’s world” (OECD, 2015, p. 4).

The creation of digital learning environments (DLEs) requires what can be a tenuous balance between the digital technology, the environment, and the pedagogy. The focus has often been on the use of the digital technology, the ‘bells and whistles’ and the ‘latest’ equipment and software, rather than the pedagogy behind its use that is, technologically-motivated rather than pedagogically-motivated (Richardson & Postman, 2013; Rutkowski et al., 2011). This is where the desire to have the technological devices is a priority rather than the way in which the pedagogy benefits student learning. When the focus shifts to ‘what the teachers do’ to enhance the learning process and a focus on pedagogy using digital technology, then learning is said to lead to higher levels of student engagement, student directed learning and the embracing of authentic and holistic learning tasks (Degenhardt & Duignan, 2010; Wright, 2010).

The next section explores the third theme of operational systems and structures. It examines the operational and infrastructural requirements inherent in the transition to digital learning environments (DLEs).

**Operational factors – systems and structures**

Another key theme evident in the literature is that of the issues associated with operational systems and structures (Amos et al., 2014; Campbell, Saltmarsh, Chapman, & Drew, 2013; Degenhardt & Duignan, 2010; English et al., 2012; Mama & Hennessy, 2013; Papa, 2010; Sheninger, 2012). The operational requirements involved in providing DLEs include infrastructure, cost, technical support, and equitable access. Leaders cannot hope to implement new pedagogical approaches if schools do not have the tools and systems to support the change (Fullan & Langworthy, 2014). Mama and Hennessy (2013) recognise this when they point out issues which need to be addressed that include:

“The unsuitability of environment and equipment; the constant changing of tools and the costs involved in those changes; the lack of technical support; lack of time made available to integrate digital technology into lessons; and poor communication from school leaders in the implementation of policy.” (p. 381)
Infrastructure

The relationships between learning environments and pedagogical practices are compelling. As the new archetype of schooling takes form, structures need to change to accommodate and support DLEs (Degenhardt & Duignan, 2010). This involves environmental and infrastructural changes consistent with vibrant, open-plan classrooms and flexible learning contexts, which include one-to-one, group and collaborative learning environments. The Ministry of Education in their report, *Future-focused Learning in Connected Communities* (2014), outlines a clear vision for this digital environment and infrastructural change. Their vision is to: “Design vibrant, technology-rich, cyber-safe learning environments. Make these environments flexible enough to serve multiple learning contexts including one-to-one, small groups, collaborative and community learning. Put learning at the heart of the system” (Amos et al., 2014, p. 5).

In such environments formal structured learning plays a secondary role to that of activity-based and digitally-based learning. The teacher is no longer the ‘oracle’ at the front of the room but a guide and mentor who partners in the learning (McGuire & Gubbins, 2010). The Ministry of Education’s *Statement of Intent* (2014-2018) includes strategic intentions in regard to creating ‘Innovative Learning Environments’. These environments are to be digitally rich, provide flexibility in the learning place, and be tailored to meet the individual needs of students helping to equip students with 21st century skills to function in a global economy (MoE, 2014). The Ministry of Education is investing in school infrastructure upgrades by supporting and managing internal network and internet upgrades. These include the School Network Upgrade Project (SNUP), and the free government funded ultrafast broadband connection, Network for Learning (N4L). These partly funded initiatives support the access to the world via the internet giving greater support, speed and infrastructure expertise to schools.

The infrastructural support for schools arising from new design and digital technology, in and of itself, does not guarantee successful student learning. As Konings et al. (2005) express in their paper, both teacher and student perceptions and conceptions need to be taken into consideration. This vision of innovative digital environments appeals to leadership but asks much of them. Policy makers need to provide adequate funding to support infrastructural plans and this funding should continue to enhance DLEs; however,
the funds are often limited and require much effort on the part of the school community to maintain (Mama & Hennessy, 2013).

Costs
The frequently changing digital technology that is evident in digital learning environments (DLEs) involves substantial costs in renewing equipment and infrastructure. Hardware, which includes networks, servers, and computers places considerable expense on school operational budgets. Software including site licensing adds to this expense. Suggested solutions to the cost factors are having a clear vision and strategic direction (McCampbell, 2001), a dependable ‘roadmap’ to provide direction and avoid money wasting (Greaves, Hayes, Wilson, Gieleniak, & Peterson, 2010), and seek strategies to funding through grants, sponsorship, partnerships and strategic use of operational funds (Gosmire & Grady, 2007).

Fullan and Langworthy (2014) explain that the learning benefits over time outweigh the costs. They believe that the actual cost for providing ubiquity for both students and teachers is less everyday and that the availability of online resources, bring your own devices (BYOD), cloud-based solutions and the natural shift to digital acquisition in our daily lives, helps to achieve this cost reduction. They argue for “twice the learning for the same price or less” (Fullan & Langworthy, 2014 p. 68). Although finance remains a concern in the literature, solutions are evident. With the adoption of a clear vision and the use of online resources and support this issue is not insurmountable.

Technical support
Additional costs are also evident in supporting these environments with hardware and software upgrades, along with the provision of technical expertise. There is strong evidence in the literature that, in the near future, schools that are implementing DLEs on a large scale will need to have access to technical advice and assistance (Fullan & Langworthy, 2014; Glover et al., 2002; Gosmire & Grady, 2007; McCampbell, 2001; Price, 2005). This is an area that should never be underestimated when planning for DLEs, as many technological education programs have been unsuccessful due to the absence of skilled technicians to keep equipment, infrastructure and the flow of information running. Fullan and Langworthy (2014) suggest solutions for supporting a technician by implementing ‘tech teams’ - students trained in providing solutions to
technical problems. Glover (2002) supports this notion when he proposes the training of teachers who are technically adept to support less experienced teachers and infrastructural issues. This can mean that teachers are withdrawn from their classes and primary jobs. However, spreading the load via recognition and remuneration may be a solution to this issue (Baylor & Ritchie, 2002).

**Equitable access**

Equitable access is concerned with students having the digital technology needed to learn and succeed available to them (Sincar, 2013). Funding is not always equally distributed amongst schools and often schools in lower socioeconomic communities are disadvantaged (Crump & McIlroy, 2003). A student having the same or similar levels of access to equipment and the internet is linked to issues in society and needs to be considered when exploring notions of online home learning or BYOD applications (Fullan & Langworthy, 2014).

A report, *Schools for 21st Century Learners: Strong Leaders, Confident Teachers, Innovative Approaches* (Schleicher, 2015), analyses evidence from the OECD Teaching and Learning International Survey (TALIS), the OECD Programme for International Student Assessment (PISA), and the OECD Innovative Learning Environments project to identify school and system-level policies that promote effective school leadership, teacher capability and innovative approaches to learning. This evidence corresponds with the themes outlined in this chapter (Schleicher, 2015). Promoting effective school leadership is one of the three cornerstones outlined in the report. These are: the need for the training of principals in instructional leadership; providing opportunities for professional development with digital technologies; and the building of effective change management skills to make evidence-informed decisions (Schleicher, 2015). The first cornerstone links closely to the theme of technological and change leadership and reinforces the need for a leader who ensures that school goals are well articulated, the environment is safe and conducive to learning, and the focus is on improving personal practice through leading innovation, improvement and change.

The second cornerstone was built from the strengthening of teachers’ confidence in their own abilities, allowing teachers time to participate in decision making and acquire the necessary skills and capabilities in a collaborative environment (Schleicher, 2015). This
cornerstone links closely with the identified theme of professional development. Professional development that is relevant, timely and supported with resources helps to strengthen both the principal and teachers’ confidence in their own abilities. The final cornerstone is concerned with the innovation to create 21st century learning environments that embrace collaborative teaching approaches and changing pedagogical approaches. These ‘learning environments’ utilise the best of the resources available, creating conditions for learning with digital tools that are continually developed and supported. This support encourages “coherence through a push to innovate, with the access to appropriate infrastructure, tools and learning networks” (Schleicher, 2015, p 10). This cornerstone, although it is focused on innovation through the use of the digital technology available, still links closely to both the themes of pedagogical change and operational systems and structures, in that, without schools and stakeholders investing in the organisational and systemic structures, which include technological infrastructure, technical support and resources, innovation is said to suffer (Schleicher, 2015). Figure 2.1 below outlines the key components of ‘Schools for 21st century learners’ as outlined above, which link closely to the themes evident in this chapter review.

![Figure 2.1 Schools for 21st century learners](adapted from Schleicher, 2015, p. 10).

The literature reviewed in the last three sections supported the use of the following research questions:

- What successes have primary school principals achieved in leading the transition to digital learning environments?
What challenges and barriers have primary school principals faced in leading the transition to digital learning environments?

The findings of these questions enabled me to examine both the successes and challenges inherent with the transition to DLEs for educational leaders. It also allowed me to examine if the perceptions of the participants in my research are similar to the successes and challenges evident in the literature.

**Summary**

Effective leadership is a fundamental and essential component for any organisation that is undergoing change. Educational leadership is no different, especially when it comes to change that is challenging the very constructs, conventions and conditions in which leaders lead, teachers teach and students learn. The outmoded model of education that prepared students for the industrialised workforce no longer fits, or meets the needs of today's society, let alone its learners (Sheninger, 2014). Technological leadership is concerned with being a proponent of change that transforms learning environments into dynamic hubs of learning. Technology leaders, in order to embrace this rapid change, need to reason over pedagogy, curriculum, environments, infrastructure and professional development opportunities, addressing each of these areas individually and collectively through carefully crafted planning.

The literature reviewed has summarised some key themes that will be explored further in chapter four and how they relate to the data analysed. This review will be used to highlight key themes from the data in relation to the literature themes of leadership, staffing, teaching and learning, infrastructure, and stakeholder expectations. These literature themes may not be the only factors contributing to the research problem, but there is widespread acknowledgement in the literature that these key themes have an impact on the digital landscape of schooling. Accordingly, the literature discussed in this review has attested to the importance of evaluating principal perceptions of their experiences with leading and managing change in the transition to digital learning environments (DLEs).
CHAPTER THREE
RESEARCH METHODOLOGY AND METHOD

INTRODUCTION
This chapter describes the methodology and methods used in this research. An explanation of the data collection method is provided along with the rationale for its use. Data collection and data analysis are explained, as well as the steps taken to ensure validity and trustworthiness of the research. Finally, ethical considerations related to this research are explored.

ONTIOLOGICAL AND EPISTEMOLOGICAL QUESTIONS
Research, as defined by Tolich and Davidson (1999), is carrying out the roles of exploring, describing, explaining and predicting. Research is further acknowledged by Burns (2000) to be a “systematic investigation to find answers to problems” (p. 3). Certain ontological and epistemological questions are examined when interviewing school leaders. The perceptions of their experiences with the implementation of digital learning environments (DLEs) will investigate these questions.

Ontological notions and beliefs arise from the “nature of reality” and the “nature of things” (Cohen, Manion, & Morrison, 2011, p. 3). Different cultures, groups of people with similar experiences and, to some extent, individuals, have different ontologies regarding what kinds of things exist. Ontology involves making a claim about “what is knowledge”; epistemology is concerned with “how we know that knowledge” (Creswell, 2002, p. 178). When making sense of research information and pursuing knowledge, researchers either directly or indirectly explore patterns and beliefs about how the world should be understood. These paradigms are a ‘net’ that contains the researcher’s ontological, epistemological and methodological premises (Cohen et al., 2011). For example, one of my ontological positions, based on my personal experience and knowledge, is that DLEs ignite engagement in learning for students through greater access to knowledge and meaning. The epistemology arising from this position involves asking questions about how we know that DLEs ignite engagement in learning and what engagement counts as valid. Bryman (2008) expresses a similar view when he says that, “An epistemological issue concerns the question of what is (or should be) regarded as
acceptable knowledge in a discipline” (p. 13). My research therefore makes some assumptions that include ontological statements of ‘what is’, epistemological statements of ‘how we know’, and what counts as valid knowledge when leading the transition to DLEs. These assumptions are based on the fact that I have been actively involved in education for eighteen years and I have been a strong advocate for digital learning in schools for the majority of that time. I also believe that a school principal has a very strong influence on implementing effective change in relation to the transition to DLEs.

I was therefore interested in the assumptions and perceptions held by principals that help to shape the transition to digital learning environments to help further enhance my understanding and advancement. Through the use of semi-structured interviews in my research I aimed to reveal what principals experienced while leading their schools in transitioning to DLEs. Following a subjectivist epistemological position, my research focuses on the beliefs and perceptions of principals when transitioning to DLEs, and the experiences of the successes and challenges that they faced when implementing this transition. The following section describes the research methodology adopted in this research.

RESEARCH METHODOLOGY

Methodology provides a process of scientific inquiry that enables researchers to conduct research in a logical way or, as Tolich and Davidson (1999) state, “an order of philosophical commitment” (pp. 25-26). The core of the research process is the methodology as it, to some extent, will dictate the path followed, the types of questions used, the people selected and the approaches taken. Two traditional approaches that largely shape educational research are the positivist, normative, scientific, quantitatively-oriented paradigm, and the post-positivist, humanistic, interpretive, qualitatively-oriented paradigm (Cohen et al., 2011; Tolich & Davidson, 1999; Yin, 2011). The key position for the researcher is to select the approach that best investigates the problem being explored and the questions being asked (Yin, 2011).

A qualitative research approach has been selected to drive this research process and determine how the data are to be collected, managed and analysed. Qualitative research uses inductive logic to aggregate and analyse data such as people’s stories, descriptions and opinions. As Cohen et al. (2011) state, qualitative research is involved with the
subjects in a “personal, subjective and unique way” (p. 6). Understandings of the world can be gained through conversations and observations in the natural setting instead of through scientific methods used by quantitative researchers. Qualitative research helps to assess, describe and explain phenomena from the participants’ perspectives (Anderson & Arsenault, 1998). The experiences of principals who have worked through the transition to DLEs and have managed the change will differ greatly from those currently going through the process. My research questions all aim to:

- investigate the perceptions held by principals of the expectations that shape DLE implementation;
- capture the voice of principals and their professional stories; and
- represent them and their experiences with the transition to DLEs as accurately as possible.

**Participants**

The type of research that I have undertaken is representative of the sample population and sample size. For example, sample size in qualitative studies is often smaller due to time and cost constraints, so the researcher needs to be “prudent and ensuring that the sample represents the wider features of the population with the minimum number of cases” (Cohen et al., 2011, p. 145). The important factor in qualitative research is that the sample is drawn from the total possible population - in this case, this population was that of eight Auckland primary school principals. The specific features necessary for this research other than the fact that they are principals of primary schools, was that they had experienced the transition to, or were in the process of transitioning to, DLEs; as this was the focus of my research. The choice of primary schools in the wider Auckland area was a matter of purposive sampling as my personal experiences have been mainly in the primary sector (Bryman, 2008), and because I personally live in the Auckland district. Cohen, Manion and Morrison (2011, p. 157) state that non-probability, purposive sampling is used to gather information from the “most knowledgeable people,” hence the choice of primary school principals. Within the purposive sampling design a set criteria was implemented to provide a sampling framework from which to work. This framework included eight principals who were primary school principals in the wider Auckland area and who had some experience with change management and the transition to DLEs. Principals were identified as suitable participants due to my understanding of their professional aptitude with DLEs after discussion with fellow colleagues, and discussions
with my supervisor on suitable candidates. Principals were initially contacted by phone and asked about their experience with transitioning to DLEs. If the criteria was met, then they were asked if they would be interested in being interviewed. Once acknowledging interest, more details were sent via email and a time to interview them was organised.

How this group of individuals represents the wider population was not a prime concern of this study as my aim was to explore this group of principals and not to draw conclusions about the wider population. If other individuals and groups view the conclusions and recommendations in this thesis as being valid for them, then this is a fortunate coincidence rather than an intended outcome (Cohen et al, 2011).

**RESEARCH DESIGN**

This research employed a qualitative approach underpinned by social constructivism (Cohen et al., 2011). Individuals, in this case principals, construct their reality by interactions that they have in social settings, like schools. As a researcher my aim is to understand the meanings behind the successes and challenges faced in the transition to digital learning environments and how this has influenced certain experiences and choices over others. These meanings will be interpreted in different ways by principals as they are constructed from their own personal experiences (Crotty, 1998). This underpinning of social constructivism is linked to revealing and analysing the meaning that these principals bring to their roles by interpreting their experiences with the transition to DLEs, how they constructed their words to explain their experiences, and how they made sense of their leadership and purpose through these experiences. As Merriam (2014) highlights, “All qualitative research is interested in how meaning is constructed and how people make sense of their lives and their worlds” (p. 24). The main goal of this research, therefore, was to reveal and analyse these meanings.

Although the aim of this research was to provide a precise description of what the participants said and did, there are some specific criticisms surrounding the ability to do this. Cohen et al. (2011) believes that interviews can be inaccurate and subjective reports may be undeveloped and misleading. Positivists further state that qualitative researchers write “fiction not science” and that they “cannot attest to their truth statements” (Denzin & Lincoln, 2005, p. 204). These often seemingly opposing views stem from different notions of social reality and of individual and social behaviour. The choice of approaches
is characterized by the data sought, the questions being asked, and the problem being answered (Cohen et al., 2011).

**Qualitative analysis**

As this research gathered data by interviewing principals, analysis was carried out in the first instance by utilising the themes identified in the literature review. The data collected from the research questions were analysed through the use of coding. The analysis involved a process of describing the experiences, classifying them into codes and examining how the codes interrelated with each other and the themes identified in the literature. This approach of coding was applied to see how the data was categorised within the context of the study (Basit, 2003).

This research utilised a qualitative coding software system called MAXQDA, which is designed for computer-assisted qualitative and mixed methods data, text and multimedia analysis to help analyse and code interview and focus group recordings and transcriptions (Verbi, 2015). This software offered a precise and efficient method of coding and categorising data. The coding helped to give a clear account of the data in terms of what the participants had defined as their perceptions of the situations they had experienced, noting any patterns, themes and recurrences obtained by categorising and classifying the data to help make connections (Basit, 2003). The coded interview data was then organised by placing commonly displayed and recurring codes into tables (Patton, 2002). After analysing each data source separately, the data were then compared to identify points of commonality and discrepancy. The goal of my analysis was to identify common themes across all participants from the individual data gathered by the interviews. Common themes were identified after each question had been analysed and coded. For example, a number of codes were evident in relation to the theme staff professional development. These included codes like common beliefs, pedagogy, support for, and trial groups. Associating and linking data codes through the corroborating of evidence produced connecting themes. Once the codes had been categorised into sub-findings and themes, they were analysed according to the original research questions with links back to the literature review.
Validity, trustworthiness and triangulation

Strategies for data analysis need to be clear and well selected (Anderson & Arsenault, 1998). For example, this research selected eight principals from various schools in the wider Auckland area to explore their perceptions arising from their expectations of transitioning to DLEs. In managing these perceptions, clear questions needed to be framed to focus on the unit under analysis so as to gather the most relevant information (Denzin & Lincoln, 2005).

Rigour

Research is said to be rigorous when it meets a number of standards. These standards in qualitative research include: a clear justification of the worth of the research (a rationale); appropriateness of the research design (methodology and methods selected); a robust display of findings and results with claims clearly confirmed (data confirmed by literature); ethical considerations and methods of application; and reliability and validity demonstrated as applicable (Cohen et al., 2011; Denzin & Lincoln, 2005; Doody & Noonan, 2013; Yin, 2011). Rigour is essentially the best match between the research problem and the methodology and is concerned with confirming quality. For example, in this research the questions were framed around four key aims that clearly identified the purpose and scope of my research as being qualitative in nature.

Validity

Validity is about the tools and analysis being suitable and accurate in obtaining the data needed to answer the research questions. The validity of qualitative data is often resolved by reducing the amount of bias that is evident in the characteristics of the researcher, participant and content of the questions (Cohen et al., 2011). As an interviewer I needed to be aware of my own bias in relation to how I personally viewed the topic of study. Digital learning is an area in which I have had years of experience and one where I hold strong personal opinions. I needed to not influence the interview in a direction that I preferred due to my own beliefs, attitudes or values, or show support of the participants’ preconceived notions. Considerable effort was put into writing and rewriting the interview questions and I ensured that the questions were clear and left no room for misunderstandings arising from what was being asked. I also made sure that I was clear and concise and that my line of questioning did not stray from the aims of the study when asking further questions. I made sure that I did not place my own perceptions and biases onto the participants’ answers to the questions. This ‘transference’ of the researcher’s
feelings, apprehensions, attitudes and values onto that of the participant needs to be avoided (Cohen et al., 2011).

The issues of power, and who holds the power balance, were also important factors in the interview process (Cohen et al, 2011). Power imbalance was a consideration for my research; however, both the interviewer and interviewee were primary school principals. Therefore, I believed that there would be limited status imbalance and the strength of the relationship between the interviewer-participant would be stronger as principals generally have a mutual respect for each other (Fontana & Frey, 2005). There is, however, literature that states that more power exists with the interviewer (Cohen et al., 2011).

To establish validity it is important to ask the question, ‘Are we investigating what we claim to be investigating?’ This research is explorative, qualitative research and as such its aim is to interview principals to gather their perceptions arising from expectations and challenges in implementing DLEs. The aims and questions framed the investigation into these perceptions and my methods supported the paradigm under investigation. The question of validity is said to be both external, referring to the generalisation of findings collected, and internal, which refers to the design of the research (Davidson & Tolich, 2003). In relation to external validity it is difficult to generalise my research across all social settings pertaining to principals and DLEs, and the audience and readers must decide whether or not this research is transferable to their own contexts. Internal validity is illustrated through the research rigour of following a research pathway that includes triangulation, integrity through capturing my participants discussions as accurately as possible (i.e. recording), and verifying the data by allowing my participants the opportunity to check and verify the accuracy of the data that they have supplied. The strength of this research is therefore in its validity. Although the results may not be able to be transferred to other settings, the results will correctly reflect the perceptions of the principals studied (Anderson & Arsenault, 1998; Cohen et al., 2011; Keeves, 1997).

**Trustworthiness**

Trustworthiness in qualitative research is viewed as important to establish a study’s worth. It involves evaluating: credibility; transferability; dependability and confirmability (Lincoln & Guba, 1985). In terms of transferability and to establish trustworthiness we need to ask the question: ‘If we were to repeat this exercise, or if
someone else did it, would we/they get the same results and arrive at the same end?’ Trustworthiness therefore refers to the degree to which the findings of this study can be applied to another study with the same or similar situations (Merriam, 2014). Trustworthiness in qualitative research is concerned with being clear and transparent about the data, using the actual words of the participants and making overt the inferences that are drawn from the data (Shenton, 2004). Qualitative research is not about replicating the data because no context will ever be the same. If others want to transfer the methodology, methods and/or findings to their own context that is their choice, but this was not a goal of this research.

For this research to be trustworthy, I ensured that the transcripts recorded from the interviews were an accurate account of what transpired in the setting of the research. All interviews were recorded using a digital format so as to obtain a ‘word for word’ account of the interview. To ensure dependability and rigour as a researcher I followed a clear qualitative analysis process so that a similar research process could be repeated elsewhere.

**Triangulation**

Another process that aids in supporting rigour in research is triangulation. Triangulation is a technique that establishes the validity of data through analysing a research question from multiple perspectives. “In triangulation, confirmation is commonly sought through multiple observations and methods of investigation so that the different perspectives provide support for the findings and observed relationships” (Keeves, 1988, p. 281).

An example of triangulation, applicable to my research, was the practice of using the interview method multiple times. I employed one method, interviews, used multiple times with different principals in order to triangulate the data. If the data from the different sources of information, in this case principals, is considered comparable or similar, then the greater the confidence in the data being valid (Davidson & Tolich, 2003). In qualitative research the purpose is not to generalise the data to the whole populace; rather, it is to provide accurate and precise descriptions of what participants actually said. Triangulation assists in removing any bias and can help identify errors or inconsistencies in the research (Anderson & Arsenault, 1998).
DATA COLLECTION METHOD - INTERVIEWS

Interviewing is employed by researchers to gather data that cannot be directly observable due to time constraints. It is a research method for acquiring data about a topic by directly asking a series of questions of the participants (Robson, 1995). Interviews are viewed as the most common method used by qualitative researchers as they support the premise of understanding people’s lives as they are lived (Doody & Noonan, 2013). As interviews are widely used, this is suggested as one of its downfalls as they are often conducted poorly and without skill, due to their pervasiveness (Anderson & Arsenault, 1998). Interviews, therefore, need to be conducted with careful planning and skill.

The use of interviews as a data-gathering method has several advantages. Interviews are seen to be trustworthy and precise if they are recorded well, transcribed accurately, and are not missing any data (Aksu, 2009). In interviewing, the strength of the researcher is seen as the catalyst for the building of a relationship, where the collection of data is justified and participants have the freedom to share their perceptions and opinions openly to enable answers to be clarified and confirmed (Knox & Burkard, 2009).

There are various types of interviews, ranging from structured - where the interviewer never interjects and follows a strict regime of questions with the same wording and same order (Doody & Noonan, 2013), to unstructured - where a topic or problem is mentioned to the participant and the participant is left to raise all the points of interest. Unstructured interviews are highly subjective and time-consuming and are often debated as not entirely being without structure (Dicicco-Bloom & Crabtree, 2006). Due to the nature of my research questions, semi-structured interviews best met my data-gathering requirements. Semi-structured interviews allow for flexibility in the questions being asked and therefore encouraged greater vigour and depth of discussion, assisting new ideas to surface (Doody & Noonan, 2013). Semi-structured interviews encourage the use of open-ended questions with the intention of gathering additional information (Aksu, 2009; Anderson & Arsenault, 1998; Doody & Noonan, 2013). This allows for a flexible approach where issues can be explored in a conversational manner (Doody & Noonan, 2013).

Eight primary school principals were interviewed for my research. This sample size generated sufficient data to satisfy the requirements of my thesis. The sample size and method was determined by discussing the topic with my supervisor and recommendations.
from the relevant Research Proposal Approval Committee at Unitec, while also fitting within my time and budget constraints. Principals were identified as suitable participants due to their professional aptitude with DLEs. After discussion with fellow colleagues and discussions and with my supervisor on suitable candidates, principals who met the criteria of having transitioned, or currently transitioning, to DLEs in their schools, were selected. New Zealand educational leaders are aware of their expectations as leaders to “initiate learning opportunities to advance personal professional knowledge and skills” (NZEI, 2013). When selecting the participants for my research I ensured, through discussion by phone with each possible participant, that they had had some recent experience with DLEs. The principals were selected because of their knowledge about the research topic (Aksu, 2009), and because they shared a common social identity - principalship (Hopkins, 2007). Principals were then initially contacted by phone and asked if they had had experience with transitioning to DLEs. If identified as having been involved in this process then they were asked if they would be interested in being interviewed. Once acknowledging interest, more details were sent via email and an interview time organised. Information about the topic, the method of recording, the interview process and the time commitment involved was provided prior to the interviews taking place. The interview schedule used for each interview is provided in Appendix A. The information sheet presented to each participant is provided in Appendix B.

Each interview was conducted in an interruption-free area, agreed upon by each participant respectively, so as to make them feel comfortable (Fontana & Frey, 2005). The use of digital audio recording equipment was discussed in the initial communication with participants, and all participants consented in writing to being recorded. If a participant had not consented to their interview being recorded, then I would have opted to take detailed notes during the interview. I also ensured that my interview questions were relevant and appropriate by testing them with colleagues at my own school. Sources of errors common to interviews are those acknowledged by Fontana and Frey (2005) as being: the provision of “socially desirable” answers due to the participant wanting to please; the “wording of the questions” where questions are poorly formed and constructed; and the interviewer not being ‘skilled’ in conducting the interview (p. 344). As no interview situations are exactly the same, I was prepared and asked participants to be honest and unbiased with their answers before proceeding with each interview. A consent form (Appendix C) was also completed immediately before each interview began. All participants were made aware of their right to withdraw from the interview
and to rescind any information that was provided for this project up to a date 10 days following the receipt of the interview transcript. I also ensured that each participant had access to the interview transcript after the interview was transcribed so that they could verify the accuracy of the data that they had supplied. All participants acknowledged each transcript as written, some with minor spelling and grammatical changes. Then the data analysis commenced.

ETHICAL ISSUES

Ethics, defined in its simplest form, is concerned with doing good and avoiding harm to those whom you are researching (Denzin & Giardina, 2007). Ethical research approval is now an important component of research and needs to be officially sanctioned by a Research Ethics Board (REBs), in the case of this research the Unitec Research Ethics Committee (UREC). This involves a detailed application to show that the research meets certain conditions before proceeding. This research ensures that the principles of informed consent, minimising harm, confidentiality and anonymity and cultural sensitivity are employed (Cohen et al., 2011).

Informed consent

A major advancement in ensuring ethical research is the idea of informed consent. Firstly ‘informed’ means that participants fully understand the research and what it actually involves. There should be no manipulation on behalf of the researcher or misinformation in relation to what is being researched (Tolich, 2001). Participants must be aware of the nature and purpose of the research and its possible benefits as well as its risks (Anderson & Arsenault, 1998). Participants were given a detailed description of the research and written, informed consent was obtained before data gathering began. All the participants had opportunities to ask questions before, during and after the interviews, and were in no way coerced into participating. The participants could choose to stop the digital recording if they so desired and to stop the interview if they so desired, however, this did not happen. Informed and voluntary consent was obtained, ensuring that the principal participants were fully informed of the research aims, methods and presentation. They received a copy of the information sheet and had an opportunity to ask questions and clarify any concerns. Participants received a copy of the transcripts for checking and validation of accuracy. Participants could withdraw their involvement at any time.
However, after a reasonable period (ten working days after receiving their interview transcript to validate) their data became a part of the study.

**Confidentiality and Anonymity**

In this research all information was confidential to the interviewer and interviewee. Personal names and easily identified statements, like the name of the school, have been changed to protect the identity of the participants (Anderson & Arsenault, 1998). To keep the research confidential I ensured that the participants were not identifiable by name, gender, ethnicity or location. The use of identifiers and the removal of context helped in ensuring confidentiality. Responses were coded and recorded in a way that did not link participants to any individual or school. For example, P1, P2, P3, P4, P5, P6, P7, P8. No demographic or ethnic information was collected.

**Minimising harm**

The responsibility of the researcher to minimise harm involves being sensitive in regard to the type of questions asked and the way in which they are asked (Anderson & Arsenault, 1998). This research minimised harm by ensuring that the questions were clear, carefully worded and had been trialled on a group of people before proceeding. To limit the possibility of deception, all participants were given a copy of my contact details so they could clarify any concerns or questions regarding the research. There were no inducements made to the participants.

A potential conflict of interest was that of my own role as a principal and educational leader, and the possibility of researcher bias. If any conflicts of interest were identified, which for my research were not, I would have taken the following steps: I would have drawn on my personal experience as a professional and a researcher; sought guidance from my supervisors and/or Ethics Committee if any issues arose; and ensured that I avoided research settings and participants with which I had close personal ties, such as individuals from my own school.

**Cultural sensitivity**

A responsible researcher is respectful and sensitive in regard to cultural issues (Jahnke & Taiapa, 2003). To ensure cultural sensitivity I employed the support of a local Kaumatua to offer advice and guidance when interviewing (Jahnke & Taiapa, 2003). The use and support of a Kaumatua was not required for my research.
The wellbeing of my participants was of the highest importance. I ensured that they understood that the research was conducted in a confidential, culturally sensitive manner, that they were fully informed, made their own choice to participate and were made aware that there would be no risk of harm to them at any stage of the research.

**Conclusion**

Within this chapter a summary of how this research was carried out has been posited. This research has favoured a subjectivist epistemological position, consistent with an interpretive paradigm and corresponding qualitative methodological approach (Cohen et al., 2011). Research design, analysis and appropriate analytical tools have been presented. The choice of research method using semi-structured interviews for data collection has been explained. Validity, trustworthiness and the use of triangulation in relation to this research were explored. How ethical issues need care and attention has been considered. The next chapter will present and analyse data collected for this research.
CHAPTER FOUR
FINDINGS AND DATA ANALYSIS - Interviews

INTRODUCTION
This chapter presents a summary of the findings of the interviews conducted with eight New Zealand primary school principals. The interview data identifies the perceptions of each principal in relation to the leadership of their school’s transition from traditional learning environments to digital learning environments (DLEs). This chapter begins by presenting a brief overview of the interview participants from each school. The process used to analyse the data is then outlined. The data are then presented according to each interview question. Emerging themes are presented in tables. A commentary discussing the information collected from the principals follows.

The research participants
The identifiers “Principal 1 (P1)” through to “Principal 8 (P8)” have been used to protect the identity of the participants as well as feminising all principals as ‘she’. All the participants were experienced principals and had been in their respective schools for a sufficient period of time to be aware of the conditions experienced when transitioning from traditional learning environments to digital learning environments (DLEs).

Summary tables
Summary tables have been utilised to display the findings from the data. Column one lists the contributing factors or characteristics that were discussed by the participants relating to each interview question and column two, the frequency of responses to each of the contributing factors or characteristics. The purpose of the summary tables was to visually show the frequency of responses, and the number of times the participants mentioned each factor or characteristic. Often, the participants mentioned a key factor or characteristic more than once, and this is shown in the summary tables by the frequency of responses. The rationale for using the frequency of responses was to enable the researcher to establish which factor/characteristic was common to the participants.
INTERVIEW FINDINGS

Question 1 asked: Can you tell me about your experiences of being a principal in a school that has moved to DLEs? What about when your school was making the transition to DLEs?

The findings related to this question are outlined in Table 4.1(a), along with the number of participants’ responses for each finding. The participants noted that several factors positively supported the transition into DLEs. Four key factors emerged from the responses to this question which included: a clear plan linked to the strategic vision and values of the school; the early adoption of staff professional development to help remove barriers; the effective use of devices to support learning and the provision of devices that worked; effective consultation with all stakeholders in the school; and a principal who is able to lead change.

Certain ‘influences’ were discussed that led to the decisions to move to DLEs. I have outlined these in Table 4.1(b). The influence most commonly mentioned was the need for the principal to understand and implement the new pedagogical changes in education.

Table 4.1(a) Q1: Factors involved in principals’ experiences of the transition to DLEs

<table>
<thead>
<tr>
<th>Key factors in successful transition</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Effective planning - linked to the strategic vision and values of the school</td>
<td>2</td>
</tr>
<tr>
<td>Professional development - to remove pedagogical barriers</td>
<td>3</td>
</tr>
<tr>
<td>Effective consultation with all stakeholders</td>
<td></td>
</tr>
<tr>
<td>A principal who is able to lead change</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 4.1 (b) Q1: Factors that led to the decision to move to DLEs

<table>
<thead>
<tr>
<th>Factors that led to the decision</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Research concerned with engagement and motivational factors with the use of digital technology</td>
<td>1</td>
</tr>
<tr>
<td>Staff understanding and implementation of pedagogy concerned with 21st century learning</td>
<td>5</td>
</tr>
</tbody>
</table>

All eight principals perceived their experiences to be positive due to their awareness of the need to strategically plan the transition to DLEs. One principal outlined this process in a clear manner when he referred to the environment:

(P1) *In terms of the leadership of the environment when we introduce a new technology, or we introduce a new tool, we sit down and ask ourselves, what skills are required? What knowledge do we need to be able to teach to use it? We strategically plan everything we use that is digital in our school. It must have a purpose. It’s not about the technology it is about the learning process.*

Further data supported the need for the transition to be strategically driven with clear thinking relating to the rationale and purpose behind the implementation of the DLE. Similar views were held in regard to the experiences with the transition as the following quotes demonstrate:

(P4) *It has been a good path. It has being effectively planned; it is part of our strategic development and has been for a number of years. Technology in schools is one of our main focuses that we have had since 2010. Technology helps school partnership, technology helps all aspects of our strategic plan. It is strategically driven.*

(P5) *There was a lot of background thinking. The transition for us was well planned and based on a very firm philosophy and research base.*

The early adoption of professional development that supported the teachers’ understanding of the pedagogy, tools, and how to best support student learning, was also a commonly reported factor in principals’ descriptions of their early experience.
Professional development also helped to make the transition to digital environments smoother as the staff began to embrace and understand the benefits of the new technology for both teaching and student learning. For example:

(P2) I gave the staff, first of all, laptops that worked and then I gave them visualisers that worked and then a wifi system that worked. I had to remove the frustration for the teacher. I needed to get the teachers to have a better experience with computers, and not be worried about the computer not working or breaking down. I needed the teachers on board before I started to engage the kids because they had had a real negative experience with ineffective equipment.

(P6) The facilitator did some whole staff meetings; she modelled in classrooms and set goals with teachers. She had practical tools to show teachers some simple things that they could do in the classrooms.

The data also identified the importance of clear consultation such as meetings and workshops with all stakeholders before and during the transition to DLEs. This is shown in the following example:

(P1) You bring in support for the proposal. Then you present that proposal to all your different stakeholders. That includes your leadership team, your board, your staff and your community. Then you are dealing with all that comes back from that.

Seven out of eight principals recognised the importance of understanding change management and being an effective change leader. The participants used various change management strategies to engage staff, ranging from instilling motivation about the initiative through to clear communication in relation to the vision. Values and belief changes were viewed as important to effective transition:

(P7) I don't know about you but as an adult I am not going to professional development that is a waste of time. I want to know why I am here. How is this going to benefit my class? How would this be any good for my kids? And if you can't define why you are here, and why you want digital learning environments, then as a leader you are stuffed.
The data identified two key factors as influencing the transition from traditional learning environments to digital learning environments. Firstly, every stakeholder involved in the transition needed to be aware of the understandings around digital pedagogy. Stakeholders were informed of the current research and beliefs surrounding 21st century pedagogy and how this pedagogy was influencing teaching and learning. Secondly, all stakeholders were informed about the ways in which digital pedagogy was influencing student engagement and motivation. A strong contribution to the success for the participants was the current espoused understandings concerned with outcomes resulting from positive engagement and motivation by students in their learning. The participants often referred to this as relating to positive student achievement. However, given that there is no current researched position on this, this link was somewhat tenuous.

**Question 2 asked: What factors do you think contributed to the success of Digital Learning Environments (DLEs) in your school?**

This question referred to the success of DLEs in each participant's school. The most frequently mentioned factor was that of staffing, including shared professional development, beliefs and attitudes and the provision of expert help, as shown in Table 4.2. Leadership was also mentioned by nearly all principals, including the leading of effective change, wide consultation and effective planning as factors also contributing to the success.

**Table 4.2 Q2: Factors contributing to the success of the transition to DLEs**

<table>
<thead>
<tr>
<th>Contributing factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Shared professional development, shared beliefs and expert help</td>
<td>2</td>
</tr>
<tr>
<td>Effectively leading change, consultation and planning</td>
<td>2</td>
</tr>
<tr>
<td>Systems that work and networking upgrade</td>
<td>1</td>
</tr>
<tr>
<td>Improved student achievement and engagement in learning</td>
<td></td>
</tr>
<tr>
<td>Community and Board of Trustees acceptance</td>
<td></td>
</tr>
</tbody>
</table>
All the principals, in their assessment of the factors relating to successful transition to DLEs, identified staff professional development as contributing to this success. This is evident in the following responses:

(P2) *I was 100% committed in making sure my staff had a positive experience. This started with professional development.*

(P4) *I am offering professional development that is inspiring my teachers to step out of their comfort zone and I offer this to everyone. We do a lot of professional development and the staff embraces it. The teachers have become more comfortable with the technology, and they are risk takers, so they are becoming lifelong learners along with the students.*

**Question 3 asked: How would you describe the ideal DLEs?**

One theme, ‘blended learning environment’, was the most common response from the eight participants when describing the ideal learning environment in their schools. A ‘blended’ learning environment was described by the participants as the need to use digital tools to support learning, as well as traditional tools like pen and paper, books and other mediums. Three other participants felt that engagement was important in that the environment was seen to be more engaging and the motivational factors were greater for students with the use of technology. These findings are shown below in Table 4.3.

**Table 4.3 Q3: Characteristics of an ideal DLE.**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>A ‘blended environment’ - A learning environment that embraces both digital and traditional learning tools</td>
<td>2</td>
</tr>
<tr>
<td>An engaging environment - A learning environment that is motivating and engaging for students</td>
<td></td>
</tr>
<tr>
<td>The staff understand and implement appropriate pedagogies</td>
<td>1</td>
</tr>
</tbody>
</table>
Participants believed that digital tools should not replace aspects of traditional learning that included, oral language and the foundational skills of reading, writing and mathematics:

(P3) *So it is still making sure that you still have good oral language, a collaboration component and computers are just a pickup, putdown, use for an hour and put away for the rest of the day. It is not just ICT for ICT's sake.*

(P4) *So how would I describe a DLE? An ideal one has a high functioning teacher, with students who are engaged in learning using any form of device to help them, whether it is digital or non-digital.*

The provision of professional development, arising from the understanding of digital pedagogy, was seen as essential for the successful transition to DLEs:

(P1) *So in a perfect world we would all have some core understandings of the learning process, the place of technologies in that, the purpose, the assessment is clear, that we can assess in a variety of ways, and that the learning is transparent to anyone.*

One principal had a very strong opinion on the belief that the Ministry of Education should be providing the support, advice and a clear pathway for leaders to follow when transitioning to DLEs:

(P8) *There are multiple student management systems, why not just have one? These are Ministry level issues. Why have multiple options in terms of digital platforms? Why can't the nation decide this? Then we are all trained on how they are used we are all resourced to provide it. Because at the moment we hire some, fire some, break some, and the money is an issue. So perhaps the ideal model for a modern learning environment, that incorporates digital is better funded, more centrally managed, with community involvement.*

**Question 4 asked:** What has been your positive experience with DLEs in your school setting? **a. What successful things have you introduced to your school?**

There were two main responses from participants as shown in Table 4.4(a). Six principals identified that their schools’ approach to providing effective staff professional
support and development; and effectively leading the change positively impacted on the transition to DLEs. Another positive course of action was providing devices that worked well for both staff and students.

Table 4.4(a) Q4: Factors contributing to a positive transition to DLEs.

<table>
<thead>
<tr>
<th>Positive factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Effective staff professional development and support</td>
<td>1</td>
</tr>
<tr>
<td>Effective change leadership</td>
<td>1</td>
</tr>
<tr>
<td>Providing devices that worked well</td>
<td>3</td>
</tr>
</tbody>
</table>

The professional development included the provision of support for learning and the removing of obstacles to learning for teachers:

(P2) In relation to staff development, there is not one staff member who could say that they had not been on or attended a really good professional development course on digital learning. I am one of those principals who believe that teachers need to get the professional development as they are at the frontline of the learning.

Creating a culture that embraced change and driving the positive change within the school was also recognised as adding to a successful experience:

(P4) The culture I have created within the school allows staff to try something new without feeling threatened, we have a take risk culture.

This was aided by the realisation that equipment and devices needed to work:

(P2) I have been able to get things implemented into the school and into teaching and learning so much faster due to having these excellent support systems for both staff and infrastructure.
Question 4 asked: What has been your positive experience with DLEs in your school setting? b. What other positive initiatives are planned for your school?

Seven out of eight principals identified ongoing staff professional development in both pedagogical understanding and practice as initiatives planned for their schools. They viewed this development as ongoing due to the constant change that occurs in both the digital environment and within the school system, for example the employment of new staff who may not have the training.

Question Four asked: What has been your positive experience with DLEs in your school setting? c. If you could rank your top three most significant successes what would they be?

As indicated earlier the main success for principals was the effective development and support of staff, the expertise arising from how the transition was led and the need to ensure quality infrastructural support:

(P8) Good professional learning along the way for staff. I believe all staff would say that they are digitally more competent. They integrate teaching and learning into everyday classroom practice more than they used to, it is not a stand-alone subject any more.

(P5) I want teachers to still be feeling like they can have that ownership and try something new, and not being afraid to have a go. As a leader, I am here to support them.

Question 5 asked: What challenges have you experienced with the transition to DLEs? a. What have been your top three most significant challenges?

Principals identified a number of major challenges associated with the transition to DLEs, namely infrastructural issues around networking problems, costs involved in repairing and replacing networks and other equipment, and the loss of trained staff. These are shown in Table 4.5. The third challenge, which was identified by four principals, was that of parental perceptions and concerns with the introduction and use of digital devices to support learning.
Table 4.5 Q5: Challenging factors associated with the transition to DLEs

<table>
<thead>
<tr>
<th>Challenging factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Network issues, costs, reliability and sustaining</td>
<td>4</td>
</tr>
<tr>
<td>Loss of trained staff, pedagogical understanding and implementation and general professional development</td>
<td>1</td>
</tr>
<tr>
<td>Parental perceptions and concerns with the introduction of digital devices</td>
<td>1</td>
</tr>
</tbody>
</table>

All principals stated that issues and concerns arising from infrastructure were their greatest challenge. To ensure all staff met a certain standard in their professional knowledge and providing the professional support was an ongoing responsibility and challenge for seven principals. Parental perceptions arising from the possible dangers of wifi, screen time and online bullying were also identified as a challenge for leaders to manage:

(P1) **Infrastructure, building the staff capacity and funding.** You head down a pathway and you can't turn back, and every time you change something in the environment and you get it wrong you have to undo that. And that can cost a lot of money.

(P6) **I suppose the third thing is learning the pedagogy behind digital learning environments.** So that they understand that it is about the learning. It’s not keeping kids quiet, the children need to understand and be able to articulate their learning.

(P2) **The challenge was around issues with Wi-Fi.** They maintained that the more devices you have in a class on Wi-Fi the higher the intensity of radiation.
Question 6 asked: Have you had any failures in transitioning to DLEs? a. If so in your view, what contributed to these?

When discussing the failures in transitioning to DLEs in their schools, the participants identified two key findings. They are shown in Table 4.6(a).

Table 4.6(a) Q6: Factors contributing to failures in the transition to DLEs

<table>
<thead>
<tr>
<th>Contributing factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Being overly cautious</td>
<td></td>
</tr>
<tr>
<td>Investing in poor equipment</td>
<td>1</td>
</tr>
</tbody>
</table>

The principals had similar views on the cautious aspects of their leadership. One principal noted that:

(P8) One of the offshoots of being deliberate and careful and planned is that you can take too long. Because if you are anxious and you are out of your depth you want another opinion, before you make your decision, and you have two opinions but you want a third one and in the time it takes to get more opinions, it's time wasted.

An additional issue identified by four principals were the costs arising from investing in equipment that was substandard. Often devices that were first seen as effective ended up being defective and costly to replace. As one leader indicated:

(P2) The HP little notebooks didn't work. I went to a local school and looked at them being used and they said they were brilliant. They were a disaster. The batteries keep failing, they kept falling over and they were no good.

Question 6 asked: Have you had any failures in transitioning to DLEs? b. How did you overcome these failures?

The overly cautious stance, although identified by the participants as a failure, was also considered by the participants as part of the learning pathway followed due to careful planning. Reading and keeping up to date with the latest research and thinking related to the use of technology and DLEs, and asking questions of professionals, helped to reduce
the issues arising from investing in poor equipment. This is evident in the following statement:

(P2) Generally I'm very careful and I don't dive into the latest and greatest things. I tend to have a good look, I do a lot of reading but I don't spend my life on it. I just need to know that it is going to work and work well for my teachers and students.

**Question 7 asked: What do you think will be the future challenges with transitioning to DLEs?**

Participants identified several future challenges with transitioning to DLEs. These are shown in Table 4.7.

*Table 4.7 Q7: Future challenges with the transition to DLEs*

<table>
<thead>
<tr>
<th>Future contributing factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustaining the environment</td>
<td>P1</td>
</tr>
<tr>
<td>Professional development costs and loss of trained staff</td>
<td>2</td>
</tr>
<tr>
<td>Finding a balance between digital and non-digital use to support learning</td>
<td></td>
</tr>
</tbody>
</table>

Keeping up to date with the latest infrastructure that included cloud-based systems, devices and networking was a major consideration for six principals. One principal noted that:

(P5) I would hate to think that this is where we stop. I guess the biggest challenge is to keep up-to-date, with where to next, because it is moving faster than we can all move.

Another principal had a similar view stating that:

(P6) Things change so quickly and how you keep up with it will be a future challenge. How do we ensure that we get the balance right of using devices and not using the device? In a few years time it may not even be a question because it
may all be devices or something else, but it is the change and as soon as you buy something it is outdated.

The need for ongoing professional development was also emphasised by principals, who stated that the loss of trained staff; and the ongoing costs associated with professional development were foreseeable future challenges. Four principals indicated that professional development was essential for DLEs to be successful and would remain a future challenge. One participant expressed the following comment:

(P2) There will always be challenges, staff - we lose good staff who we have trained and they need to be replaced. It's about finding those people who are confident enough to teach with digital technology. New people, who haven't been in our professional development training, are going to have to pick up the learning fast- this is a challenge.

The challenge of keeping a balanced learning environment was also identified. This was ‘keeping a balance’ between the digital learning and the more traditional learning related to oral language and pen and paper learning. Three participants saw this as a future challenge in that they believed that digital learning should not replace the traditional elements of good effective practice. This was highlighted by a participant who expressed that:

(P7) These kids of today are actually coming to us with very limited skills and they are coming to us with so many things that they haven’t got, that I think that the future has massive challenges for us and I’m loathed to say, great, bring your iPad and plug it in. I would be staggered to see year one and two children loaded up like that. So I think the future challenges are assessing where we are as a society, and addressing those things rather than putting your head in the sand.

**Question 8 asked:** As a professional leader involved in change, a. What internal expectations are placed on you as a leader to implement DLEs?

Responses to this question are shown in Table 4.8(a).
Table 4.8(a) Q8: Internal expectations placed on leaders when transitioning to DLEs

<table>
<thead>
<tr>
<th>Internal expectations</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Personal expectations - leading the change well, keeping up to date and leading by example</td>
<td>5</td>
</tr>
</tbody>
</table>

Principal responses

As shown in Table 4.8(a) above, seven principals explained that they didn’t feel any internal expectations from staff, parents or students but that, instead, the expectations were personal expectations. These included leading the change well, keeping up to date and leading by example, as stated in the following participant quotes:

(P8) I probably place more expectations on myself than what comes from staff, students and the Board of Trustees.

(P1) It is kind of the way we do things here. I have personal expectations, I like to live on the edge, and I thrive on the edge.

Question 8 asked: As a professional leader involved in change, b. What external expectations are placed on you as a leader to implement DLEs?

Responses to this question are shown in Table 4.8(b).

Table 4.8(b) Q8: External expectations placed on leaders when transitioning to DLEs

<table>
<thead>
<tr>
<th>External expectations</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Parent expectations</td>
<td>2</td>
</tr>
</tbody>
</table>

Five principals indicated parental expectations as a strong influence on the expectations placed on leading the transition to DLEs. Parental influences ranged from health and safety concerns, to ensuring that the information they were being provided with was up-to-date, well researched and accurate. Principals’ comments here included:
We have parent expectations but they are cautious as well. As well as wanting everything, they need to know that you have researched it well and you know what you are talking about. They just don't want the school to choose something that is just a fad. They want to see sound educational evidence.

Definitely community expectations. Different groups demand different things. I have parents who have been dead against us having Wi-Fi and parents who strongly want us to have digital learning environments. In fact one parent said to me, “If you do not implement this I will be taking my children out of your school. That is how serious I am about you implementing this.”

**Question 9 asked:** What have you done personally to raise your own knowledge, understanding and skill in this area?

The participants identified a number of key ways of raising their personal knowledge, understanding and skill in the area of DLEs. These are presented in Table 4.9.

<table>
<thead>
<tr>
<th>Contributing factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Personal professional development</td>
<td>1</td>
</tr>
<tr>
<td>Conversations with like minded professionals</td>
<td>1</td>
</tr>
<tr>
<td>Membership of a professional support group or network</td>
<td>1</td>
</tr>
</tbody>
</table>

All the principals identified themselves as leaders who develop themselves professionally. Two sub findings came out of the data on personal professional development and they were: school based professional development - which involved the principal as part of the learning process with staff; and personal reading - where the principal allocated time to research and read information to add to their personal knowledge. The notion of personal professional development was reflected in comments such as:

(P2) *I have made sure that I attend, not to the negative detriment of my staff, as many professional development opportunities as I can.*
(P3) Have a lot of conversations really. I do some reading as well, and go to conferences and am part of a professional leadership group (PLG) that discusses these things. I have lots of discussions, and discussions around my school context.

(P7) Reading, talking to teachers, being in classrooms, watching what teachers are doing with children, talking to students, being a learner alongside teachers is really important.

Question 10 asked: What specific knowledge, skills and values do you think leaders need to support the transition to DLEs?

The participants identified their perceptions as a balance between a number of leadership styles and attributes. These are represented in Table 4.10.

<table>
<thead>
<tr>
<th>Contributing factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building trusting relationships through open discussion</td>
<td>P1</td>
</tr>
<tr>
<td>Instructionally aware - having personal knowledge of the pedagogy and practice</td>
<td>1</td>
</tr>
<tr>
<td>Able to manage change</td>
<td>1</td>
</tr>
<tr>
<td>Generationally aware - ability to effectively communicate and lead all members of a team from different generations</td>
<td>2</td>
</tr>
</tbody>
</table>

**Principal responses**

When analysing the principal comments relating to the specific knowledge, skills and values, several keywords were identified: change; relationships; learning; visionary; digitally aware; shared and reflective. All of the participants identified with at least three of the four major findings. Participants’ comments relating to change and being digitally aware included:

(P5) You have to keep up-to-date. You don't have to be the forerunner all the time. You certainly have to be open to ideas and open to change.
(P6) I think you need an attitude that embraces change, but evaluates the change to see whether the change is good, necessary, cost-effective and not just change for change sake.

The notion of building trusting relationships was reflected in these comments:

(P5) A lot of it is around relationships and communication. It's about people.

(P3) So it's not good enough to just have a couple of IT people, you have to have that shared vision and collaborative culture where people feel safe to say, “I am stuck.”

The notion of being instructionally aware and focusing on the learning was evident in this comment:

(P4) The attitude that says, I'm prepared to look into new initiatives, new ideas, new technology and new ways of doing things. Evaluate those and bring it back to general learning and student achievement, and engagement and learning rationales are required. The basis of all decisions should be around the question, Is this benefiting our children?

Examples of other knowledge, skills and attitudes by participants that support the transition to DLEs included:

(P7) (vision): You need to know why you are doing it. You need to be confident that you are doing it for the right reasons that are going to make a difference to kids learning.

(P2) (digitally aware): You have to be generationally savvy. You have to understand the difference between your 20-year-old teacher and your 60-year-old teacher. You absolutely have to know how to get the best out of both of them.

(P1) (shared): I think you need to realise that you can't do it all yourself. You need to bring in people who have the expertise to support you.
(P4) (reflective): Reflective - it is like double loop learning. You are actually going back to that all the time and adding to it.

Question 11 asked: As a leader involved in many preparation and professional development opportunities, what factors, opportunities and so on exist to provide support for your personal development to meet these challenges?

Participant responses to this question are shown in Table 4.11

Table 4.11 Q11: Factors that exist to provide personal development support

<table>
<thead>
<tr>
<th>Contributing factors</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personally acquired support through conferences, professional learning groups, personal reading and the like</td>
<td>P1 P2 P3 P4 P5 P6 P7 P8</td>
</tr>
<tr>
<td>Support from other staff</td>
<td>1 1 1 1 1 1 1 1</td>
</tr>
<tr>
<td>No support from MoE</td>
<td>1 1 1 1 1 1 1 1</td>
</tr>
</tbody>
</table>

Principal responses

All the principals identified that their personal development was self acquired and happened within day-to-day operations. Three participants acknowledged the support of staff to assist with personal development. Six participants acknowledged that no personal support or learning had come from the Ministry of Education. This is reflected in these comments:

(P3) The Ministry of Education really doesn't offer me anything. To be honest even if they did I probably wouldn't listen. I usually prefer to pay for things, or pay for good advice because then it is on my terms.

(P6) But you see in the context that, if I need support in terms of budget there are people in the Ministry I can go to. If I need support around staffing there are people in the Ministry I can go to; same applies for employment relations. I am unsure who I could go to at the same level in the Ministry about IT. Is there? I wouldn't have a clue.
Two participants shared their perceptions arising from personal development as a question worth reflecting on. Again we see the participants sourcing the professional learning for themselves. It was evident in their comments, which stated that:

(P1) There is not a lot actually. Who leads the leaders? That is a good question. I think we don't have the advisers now; we use to have advisers that supported us. You really have to source this yourself.

(P2) I like to be involved in robust discussion around digital learning. To me I don't see a lot of learning opportunities for that. What I find is we generally leave it to the techno person in our school, rather than as leaders exploring what is happening out there. I have watched and heard many technical discussions, but what about leadership discussions. I have struggled to find this type of discussion. So I find it for myself.
SUMMARY OF FINDINGS

In all, fifty-one sub-findings were identified in the interview data. These sub-findings have been grouped into five data themes derived from the literature review according to the way each sub-finding related to the transition to digital learning environments (DLEs). For example the sub-finding of removal of pedagogical barriers linked to the literature review section on staff professional development and the introduction of new knowledge and pedagogies (Staffing). This linking was achieved in the following ways: first, by identifying the key words within each sub-finding; and, second, by considering the sub-findings in relation to the actual research question being asked. Table 4.12 outlines the actual research questions and their corresponding identifier.

Table 4.12 Research questions and corresponding identifier.

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is expected of primary school principals as educational leaders in leading the transition to digital learning environments?</td>
<td>Expectation</td>
</tr>
<tr>
<td>2. What successes have primary school principals achieved in leading the transition to digital learning environments?</td>
<td>Success</td>
</tr>
<tr>
<td>3. What challenges and barriers have primary school principals faced in leading the transition to digital learning environments?</td>
<td>Challenges</td>
</tr>
<tr>
<td>4. What conditions are available to support primary school principals’ personal capabilities and personal professional knowledge in order to lead the transition to digital learning environments?</td>
<td>PC/PPK</td>
</tr>
</tbody>
</table>

For example interview question one identified ‘Strategic vision and values of the school’ as a sub-finding. This was categorised as ‘Leadership’ and identified as belonging to the research question identifier ‘Success’.

Table 4.13 outlines the sub-findings in the order of the questions asked. The table is divided into four columns: column one outlines the interview question; column two the interview sub-findings; column three the data themes derived from the literature review; and column four shows how the sub-finding links to the original research questions in relation to their corresponding identifier: expectation; success; challenge; and personal capabilities and personal professional knowledge (PC/PPK) when transitioning to DLEs. Table 4.13 has been split over two pages in the interests of clarity.
## Table 4.13 Question sub-findings and their related themes

<table>
<thead>
<tr>
<th>Q</th>
<th>Interview sub-findings</th>
<th>Data Themes</th>
<th>Research Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strategic vision and values of the school</td>
<td>Leadership</td>
<td>Success/Expectation</td>
</tr>
<tr>
<td></td>
<td>Removal of pedagogical barriers</td>
<td>Staffing</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Consultation with all stakeholders</td>
<td>Leadership</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>A principal who is able to lead change</td>
<td>Leadership</td>
<td>Success/Expectation</td>
</tr>
<tr>
<td></td>
<td>Links to student achievement</td>
<td>Teaching and Learning</td>
<td>Expectation</td>
</tr>
<tr>
<td></td>
<td>Understanding and implementation of pedagogy</td>
<td>Staffing</td>
<td>Expectation</td>
</tr>
<tr>
<td>2</td>
<td>Professional development of pedagogy and practice</td>
<td>Staffing</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Beliefs and attitude shift</td>
<td>Staffing</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Expert help</td>
<td>Staffing</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Effectively leading change</td>
<td>Leadership</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Consultation</td>
<td>Leadership</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Planning</td>
<td>Leadership</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Networking upgrade</td>
<td>Infrastructure</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Systems that work</td>
<td>Infrastructure</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Student achievement and engagement</td>
<td>Teaching and Learning</td>
<td>Expectation</td>
</tr>
<tr>
<td></td>
<td>Community and board acceptance</td>
<td>Stakeholders</td>
<td>Success</td>
</tr>
<tr>
<td>3</td>
<td>Blended learning environment</td>
<td>Teaching and Learning</td>
<td>Expectation</td>
</tr>
<tr>
<td></td>
<td>Engaging environment</td>
<td>Teaching and Learning</td>
<td>Expectation</td>
</tr>
<tr>
<td></td>
<td>Understanding and implementation of pedagogy</td>
<td>Staffing</td>
<td>Success</td>
</tr>
<tr>
<td>4</td>
<td>Effective staff professional development and support</td>
<td>Staffing</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Effective change leadership</td>
<td>Leadership</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>Providing systems that work</td>
<td>Infrastructure</td>
<td>Success</td>
</tr>
<tr>
<td>5</td>
<td>Network issues</td>
<td>Infrastructure</td>
<td>Challenge</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
<td>Infrastructure</td>
<td>Challenge</td>
</tr>
<tr>
<td></td>
<td>Reliability of systems</td>
<td>Infrastructure</td>
<td>Challenge</td>
</tr>
<tr>
<td></td>
<td>Sustaining equipment</td>
<td>Infrastructure</td>
<td>Challenge</td>
</tr>
<tr>
<td></td>
<td>Loss of trained staff</td>
<td>Staffing</td>
<td>Challenge</td>
</tr>
<tr>
<td></td>
<td>Pedagogical understanding and implementation</td>
<td>Staffing</td>
<td>Challenge</td>
</tr>
<tr>
<td>General professional development</td>
<td>Staffing</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Parent perceptions and concerns with the introduction of digital devices</td>
<td>Stakeholder</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>Acceptance of the need for digital environments</td>
<td>Stakeholder</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>6 Being overly cautious</td>
<td>Leadership</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>Investing in poor equipment</td>
<td>Infrastructure</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>7 Sustaining the environment</td>
<td>Infrastructure</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>Professional development costs</td>
<td>Staffing</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>Loss of trained staff</td>
<td>Staffing</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>Finding a balance between the use of digital/non digital</td>
<td>Teaching and Learning</td>
<td>Expectation</td>
<td></td>
</tr>
<tr>
<td>8a Leading the change well</td>
<td>Leadership</td>
<td>Expectation</td>
<td></td>
</tr>
<tr>
<td>Keeping up to date</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>Leading by example</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>8b Parent expectations</td>
<td>Stakeholder</td>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>9 Personal professional development</td>
<td>Leadership</td>
<td>Success</td>
<td></td>
</tr>
<tr>
<td>Conversations with like minded professionals</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>Membership to a support group or network</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>10 Building trusting relationships</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>Instructionally aware</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>Able to manage change</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>Generationally aware</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>11 Personally acquired</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>Support from other staff</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
<tr>
<td>No support from MoE</td>
<td>Leadership</td>
<td>PC/PPK</td>
<td></td>
</tr>
</tbody>
</table>

The formation of the sub-findings by themes is outlined in Table 4.14 on the following page. Where any sub-findings are duplicated they are only recorded once. The table is an account of the data sub-findings and themes, and is organised into four main sections that are synonymous with the research questions. Table 4.14 will be employed as the underpinning source for discussion in the following chapter.
Table 4.14 Summary of findings linking research questions to themes and sub-findings

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Data themes</th>
<th>Specific sub-findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) What is expected of primary school principals as educational leaders in leading the transition to digital learning environments?</td>
<td>Teaching and Learning Staffing Leadership</td>
<td>Students achievement and engagement; the understanding and implementation of pedagogy; finding a balance between the use of digital/non-digital; strategic vision and values of the school; and a principal who is able to lead change.</td>
</tr>
<tr>
<td>(2) What successes have primary school principals achieved in leading the transition to digital learning environments?</td>
<td>Leadership Staffing Infrastructure Stakeholders</td>
<td>Strategic vision and values of the school; removal of pedagogical barriers; consultation with all stakeholders; a principal who is able to lead change; effective professional development; belief and attitude shift; expert help; network upgrade; systems that work; community and board acceptance; and personal professional development.</td>
</tr>
<tr>
<td>(3) What challenges and barriers have primary school principals faced in leading the transition to digital learning environments?</td>
<td>Infrastructure Staffing Stakeholders Leadership</td>
<td>Network issues; costs; reliability of systems; sustaining equipment and environment; loss of trained staff; pedagogical understanding and implementation; parent perceptions and concerns with the introduction of digital devices; being overly cautious; PD costs; and parental expectations.</td>
</tr>
<tr>
<td>(4) What conditions are available to support primary school principals’ personal capabilities and personal professional knowledge in order to lead the transition to digital learning environments?</td>
<td>Leadership</td>
<td>Ability to lead and manage change; personal professional development; member of professional group; building trusting relationships; instructionally aware; generationally aware; and no support from MoE.</td>
</tr>
</tbody>
</table>

Conclusion

As evident in Table 4.14 many of the themes are interconnected. For example the theme ‘Staffing’, is an expectation, a success and a challenge. Both Tables 4.13 and 4.14, although they look fairly self-explanatory, do not show the true complexity of the data analysis.

Leadership of the transition to digital learning environments is complex. The eight principals interviewed outlined their perceptions of what is involved in a successful transition as well as what factors are most challenging. They indicated the expectations both internally and externally, as well as how they have personally developed their capabilities and knowledge. It is clear that these themes are intertwined and this accurately depicts the complex nature of transitioning to digital learning environments (DLEs).
CHAPTER FIVE
DISCUSSION OF FINDINGS

INTRODUCTION

This chapter discusses the findings from the semi-structured interviews as presented in the previous chapter and is organised according to the research questions. The discussion is presented under specific subheadings based on the themes that emerged from the data analysis. These themes are displayed in Table 5.1 where they are organised according to the research questions.

Table 5.1 Research questions and data themes

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Data Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) What is expected of primary school principals as educational leaders in leading the transition to digital learning environments?</td>
<td>Expectations related to: Leadership, Teaching and Learning, Staffing</td>
</tr>
<tr>
<td>(2) What successes have primary school principals achieved in leading the transition to digital learning environments?</td>
<td>Successes related to: Leadership, Staffing, Infrastructure, Stakeholders</td>
</tr>
<tr>
<td>(3) What challenges and barriers have primary school principals faced in leading the transition to digital learning environments?</td>
<td>Challenges and barriers related to: Infrastructure, Staffing, Stakeholders, Leadership</td>
</tr>
<tr>
<td>(4) What conditions are available to support primary school principals’ personal capabilities and personal professional knowledge in order to lead the transition to digital learning environments?</td>
<td>Conditions related to: Leadership</td>
</tr>
</tbody>
</table>

DISCUSSION OF FINDINGS

Research Question One asked: What is expected of primary school principals as educational leaders in leading the transition to digital learning environments?

This section will identify the key expectations of both internal and external groups on principals when leading the transition to digital learning environments (DLEs) as well as the factors that lead to this transition. It will also examine how these expectations relate to the literature. The expectations included: the ability to effectively lead and manage change; the development of staff understanding of digital pedagogy and 21st century
thinking; and finding a balance between the use of digital technology and other traditional tools to support learning. The key factor that led to the transition was the goal of improving student achievement.

**Expectations and leadership**

The ability to lead change and link this change clearly into the overall strategic vision and values of the school was an expectation placed on the participants by both the internal and external stakeholders. There was a common understanding by the participants that the transition had to be well led to ensure its overall success and effectiveness. The literature acknowledges the importance of the leadership of the principal to school effectiveness (Fullan, 2014; Garland & Tadeja, 2013; Robinson et al., 2009; Sheninger, 2014). As stated by Robinson et al. (2009), leadership practices have a strong influence on student learning outcomes which include: “The ability to set goals; strategically resource; plan, coordinate and evaluate teaching and learning; and ensure an orderly and supportive working environment” (p. 8).

The participants espoused this ability to plan, strategically resource and lead change in a calm, consistent, well-structured manner as a fundamental skill required to lead the transition to DLEs. A set strategic direction is reinforced in the literature as helping to make change relevant, desirable, clear and feasible (Amos et al., 2014; Bates & Sangra, 2011; Fullan & Langworthy, 2014; Scott, 2004). The strategic direction set out in the report *Future focused learning in connected communities* (Amos et al., 2014) provides a clear pathway for New Zealand school principals to follow to equip learners with 21st century skills and competencies. Participants were aware of this strategic direction and had an expectation that the digital learning environment needed to be purposeful (supportive of learning); directional (strategically driven); engaging (staff-driven); and researched (evidence-based). Effective change leadership was viewed as a necessary competency from all participants when transitioning to DLEs.

The findings suggest that the leadership of DLEs is different to the leadership of any other change initiative in education. The literature explains that the change in digital technology far exceeds change in any other aspects of schooling and this is viewed as important because it alters strongly held views around curriculum, infrastructure and the way teachers teach and learners learn (Fullan & Langworthy, 2014; Larson et al., 2010;
As Larson et al. (2010) state, digital technology increases exponentially as new information and new literacies are added daily. For example, a recent addition to information and new literacies is the introduction of electronic and online books. The goal of the digital change leader is to carve a clear pathway through the complex daily changes that influence every aspect of schooling, assisting with supporting teachers to create a responsive curriculum that meets the learning needs of students. This theme is reinforced by Larson et al. (2010) who state that: “Technology has forever altered the way we learn and teach, and the pace of change is only accelerating” (p. 12). Similarly, Fullan and Langworthy (2014) emphasise the need for a technological change leader who understands the change process, has a focused vision allowing staff to attempt new things, and reflects on what is learned. Participants in this research acknowledged the skills of change leadership as being essential to control what is often otherwise uncontrollable. Therefore, the leadership of DLEs is different from other change initiatives in the school setting because of the ‘rate of change’. Digital technology rapidly changes and the rate of change outside the school environment can quickly exceed the rate of change inside the school environment if left unchecked and an effective leader needs to understand this and plan how to best manage this rapid change.

Digital technology is now pervasive in every aspect of our students’ lives. Children are connected, engaged, self-directed and empowered through the use of digital technology. As Sheninger (2014) emphasises, the use of digital technology influences teaching, infrastructure, resources, societal values, stakeholder relationships and the way in which students learn and teachers teach. The changing educational landscape is increasingly controlled by individual learners and adapted by them to support learning whenever and wherever. Learners are engaged in digital worlds and are learning without schools. Technological change is consistently evolving, fast paced and controlled by the student. This environment requires a skilled change leader to navigate the environment: a leader who can relinquish control, encourage risk-taking, model expectations, provide support through quality professional development in the understanding and implementation of effective pedagogy, as well as deal with the constant, often relentless change.

**Expectations and staffing**

One of the factors linked to the theme of staffing was the ‘understanding and implementation of pedagogy’. Participants viewed their understanding of what is meant
by digital pedagogy and how to implement the practice into the classroom as one of the drivers for transitioning to DLEs. An expectation from the principals was to ensure that staff had a clear understanding of digital pedagogy and the way in which this pedagogy drove the implementation process. Principals called this the ‘why’ of digital learning. The reason to engage with DLEs was to prepare students with the 21st century skills of creativity, communication, critical thinking and collaboration to equip them for their future (Sheninger, 2014). Principals recognised that an expectation from staff was the need to provide professional development opportunities that aligned the use of digital technology with curriculum and pedagogy. Teachers wanted to know why they were changing from a traditional environment to a digital environment. Therefore, the personal expectation of the principals was to understand and model the pedagogy personally. The literature reinforces this notion that a strong focus on pedagogy helps to shift teachers’ attitudes, feelings, thinking, behaviour and performance to embrace the benefits of digital technology (Beetham & Sharpe, 2013; Fullan & Langworthy, 2014; Robinson et al., 2009; Sheninger, 2014). As acknowledged by Fullan and Langworthy (2014) a collaborative environment that allows teachers the freedom to try new things, take risks with the digital technology and see the benefits that the new pedagogies bring, results in teachers being more willing to try something new and learn from it. This thought also applies to leaders.

Principals were clear in stating that they did not know everything concerning digital pedagogy, but they also acknowledged that getting the right support and professional development for themselves and their staff was necessary when leading the transition. Participants noted that being actively involved in the professional learning with their staff and talking openly about their mistakes with digital technology helped to build a climate of openness, trust and collaboration. As acknowledged by Robinson et al. (2009), leadership that not only promotes, but also directly engages in professional learning with teachers and staff has the highest effect size on student learning outcomes. All participants acknowledged the need to develop themselves personally and professionally and to be seen as another source of instructional advice and that this could be achieved through attending staff meetings and professional learning opportunities with their staff. As the pedagogical position was evolving the principals all needed to understand how to lead the changes inherent in the transition to DLEs.
The participants all acknowledged that their starting point for their schools’ transition was firstly focused on teaching the pedagogy to their staff. This is a shift from the literature that mentions the ‘bells and whistles’ and purchasing of devices just because the school down the road has them or delivering the same content through a different medium (Rutkowski, Rutkowski, & Sparks, 2011). As noted by Richardson and Postman (2013), it is not about the “layering of expensive technology on top of the traditional curriculum” (p. 2), it is about the shift - from technology driven to pedagogy driven, from the bells and whistles to a focus on 21st century knowledge and skills - that represents a significant change. This is not to say that educational leaders have not focused on pedagogy in the past or in someway linked technology to existing models of learning, but it is questioning that now, either because of a greater awareness or understanding of the educational benefits of teaching with technology, that pedagogy and the teaching of 21st century skills, knowledge and competencies has become the rule, not the exception. The focus by the participants of this study was on the teaching of digital pedagogy through robust, collaborative and effective leadership, not purely on the technology for technology's sake.

**Expectations and teaching and learning**

Other factors linked to the theme of teaching and learning were ‘student achievement’ and ‘finding a balance’. Firstly, participants viewed improved student achievement as an anticipated outcome for transitioning to DLEs. Although principals espoused this belief as the purpose and a driver for implementing DLEs, they were often unable to clarify this with any substantial evidence other than their belief in the digital technology’s potential to improve learning. The tenuous links acknowledged by the principals related to student engagement in the learning, the excitement in the use of digital technology, the ability to extend thinking, understanding of how to use a device or a program, and the ability to customise and structure content for the learner. As Wright (2010) reinforces, eLearning has the potential to increase student engagement, which can lead to positive attitudes towards learning and improved student learning outcomes. In her report, Wright (2010) also acknowledges that the use of digital technology can lead to greater satisfaction and engagement for the teacher, and improve the design and implementation of instructional and pedagogical practices. The literature is still inconclusive on whether or not DLEs improve student achievement (English et al., 2012; Lim et al., 2013; OECD, 2015; Paulette et al., 2012), and, as outlined in a recent report from the OECD (2015) results in
student achievement in literacy, numeracy and science indicate “no appreciable improvements” (p. 3).

This being the case, leaders still persist with the introduction of change to DLEs even though there is no empirical evidence to state that it improves student achievement. Participants acknowledged several key drivers that included: 21st century pedagogical understanding; developing skills and competencies; acquiring knowledge for the future; and expectations from parents, the government and students. This is reinforced by the literature that acknowledges the importance of the leaders’ role in developing a curriculum that aligns with the skills students need to succeed in the 21st century (Amos et al., 2014; Dexter, 2011; McLeod, 2015; MoE, 2014; Richardson & Postman, 2013; Rutkowski et al., 2011). As outlined in the report by Amos et al. (2014), technology has a critical role in shaping and supporting an effective 21st century curriculum and requires a commitment from leadership to implement a responsive curriculum that helps to enhance the learning with digital technology for students. Research acknowledges that to enhance student achievement requires: effective leadership (Robinson et al., 2009); a clearly articulated curriculum (Richardson & Postman, 2013); and effective teaching (OECD, 2015; Paulette et al., 2012); which all help to assist in creating an environment that enables learning success for students. To understand the degree to which digital technology and DLEs actually impact on student learning outcomes requires the factors of effective leadership, an articulated curriculum and an effective teacher, first and foremost. Once these known factors are in play then we can truly evaluate the added effect of digital technology on student achievement. It is not about the tools or about camouflaging costly digital technology on top of out-dated curriculum and pedagogy. As McLeod (2015) states, education is about learning and allowing students to connect with the curriculum in authentic ways using tools that are available to them now and in their future.

Secondly, participants believed that they needed to create a balance between the use of digital tools and traditional tools because they did not want the digital technology to become the focus rather than the learning. Principals used the term ‘blended environment’ to clarify the meaning of balance. For example, participants spoke of the need to use digital tools as well as using traditional tools like pen and paper, books and other mediums to support learning. Principals believed that digital learning devices were
still just a tool and that access to a strong oral language programme, a collaboration component and a ‘no-screen’ time component were important. One principal wanted to ensure that there was a clear balance between the amount of time spent on and off a device. The literature I reviewed did not directly attest to the need for a balanced learning environment when utilising digital tools; however, it did acknowledge the beliefs, values and attitudes of leaders and teachers. Research suggests that leaders and teachers will enact policy when it is consistent with their values and beliefs (English, 2012; Fullan, 2001; Gosmire & Grady, 2007). Whether classrooms fully embraced digital learning with no exercise books and everything being digital, or whether they were more ‘blended’ and had a more balanced non-digital component, was conditional on the leaders’ beliefs and personal values of learning with digital technology. The option of non-digital learning environments may have been due to the leaders not fully believing the benefits of digital technology to enhance student-learning outcomes (Lim et al., 2013; McLeod, 2011; Richard & Postman, 2013). Or, it may have been linked to strongly established norms around work routines (English, 2012), and the fact that the leaders themselves felt under skilled (Schachter, 2010) to manage the change.

Whatever the reason, it was clear from this study that all the participants wanted a balanced/blended learning environment that included both digital and non-digital learning time. Participants still believed that the transition to digital learning environments was important to teach digital skills and access content knowledge. Although some of the participants’ values and beliefs may not have fully embraced DLEs, with the adoption of a more ‘balanced’ approach, the participants’ schools were still heading in a clear direction - towards increased technology use.

The beliefs and attitudes around a ‘balanced’ approach raises further questions as to whether the focus was on learning goals and the new pedagogies, or just the use of new technologies to support existing goals and pedagogies. The challenge of linking improved student achievement to the use of digital technology has been noted by Gosmire and Grady (2007) as “…too complex to show a correlative relationship” (p. 18). These authors also acknowledge that the key to the success of digital technology in the classroom is firmly displayed in the beliefs and the values that leaders model to their staff. It is the culture that the principal creates that will either motivate or demotivate staff in regard to the use of digital technology to assist with teaching and learning. As
time progresses the research into the links to student achievement and the outcomes that the new pedagogy provides will become more evident. The key for the participants in this research was that they did not have to know everything but they needed to ask the right questions, engage in learning with their staff, and keep the focus on ensuring that student outcomes were always the focus for any technological change.

In summary, the findings related to this research question have established the need for leaders to have clarity and understanding of the following conditions when transitioning to digital learning environments:

1. Having the ability to lead change;
2. Linking this change to the vision and values of the school;
3. Having an understanding of, and an ability to, implement the pedagogy;
4. Linking the transition to student achievement; and
5. Finding a balance between the use and non-use of digital technology.

Research Question Two asked: What successes have primary school principals achieved in leading the transition to digital learning environments?

The findings related to this question indicate four elements that are necessary for a successful transition to DLEs. These are: effective leadership; support of staff development; effective infrastructure; and the inclusion of input from stakeholders. Despite the fact that these elements will be examined separately, the notion of ‘effective leadership’ subsumes the other three elements because of the principals’ direct and immediate impact on staffing, infrastructure and stakeholder input into digital learning environments (Amos et al., 2014; Fullan, 2014; Sheninger, 2014).

Effective leadership
The main element to arise from the semi-structured interview data, and for the transition to DLEs to be successful, is to have effective leaders. This thinking is in keeping with the literature (Fullan, 2014; Garland & Tadeja, 2013; Robinson et al., 2009; Sheninger, 2014), in that leading change, strategic planning, effective consultation and engaging in personal professional development were all viewed as components for effective leadership. As Fullan (2014) expresses in his book *The Principal: Three keys to*
maximizing impact, the leader needs to firstly lead the learning; secondly, to have all the strategic systems in place; and, thirdly, to be a ‘change agent’. These conditions will be considered in light of the specific sub-findings identified. The conditions identified from the analysis of the data constitute the headings for this section in relation to the successful leadership of the transition to DLEs. In discussing ‘effective leadership’ I will briefly explore the sub-findings of leading change and planning that are both linked to the strategic vision and values of the school, as these are similar to the sub-findings identified in Research Question One. I will explore in more depth the other sub-findings of consultation and personal professional development.

Leading change
The first sub-finding identified by principals in regard to effective leadership was the ability to lead and manage technological change. This is consistent with the literature concerned with change management (Chang, 2012; Papa, 2010), which states that the change process should be well communicated, collaborative and well led. It is what Chang (2012) called a practical change-orientated practice that includes the ability to identify challenges and pitfalls; move beyond the trusted and true; and focus on 21st century skills that lead to improvement in student achievement. The participants acknowledged that the ability to understand how to manage the change helped to identify the challenges and pitfalls before they became a sizeable issue. This is similar to the findings of Papa (2010) who states that, as a leader, you “need to find a way to remain on the cutting edge without falling off the cliff” (p. 47). Once again, change in relation to the transition to DLEs was viewed by the participants as continually evolving, regularly impacting curriculum and design, and creating unique learning pathways on a daily basis. The impact on content, the speed of the change and the continual shifting of the ‘sand’ in relation to teaching and learning knowledge and skills was viewed by the participants as a constantly changing environment that needed carefully planned management. In other words the leader must understand the change process, surround themselves with the right people who are knowledgeable and focused on the same outcomes, and have a clear sense of purpose (a vision) and a plan to implement the vision (Papa, 2010).

Planning
The second sub-finding identified by principals concerning effective leadership was having a well thought out and structured purpose which linked to the strategic direction
and values of the school. This is in keeping with the literature and the need for effective leaders to establish clear visions and strategic plans as a pathway forward by firstly, championing the cause and secondly, by creating teams of teachers and staff that together build their competences and experiences with digital technology (Amos et al., 2014; Bates & Sangra, 2011; Price, 2005; Sheninger, 2014). Success for the participants was evident when they had a plan that was clear, deliberate and linked to the overall vision and values of the school.

The planning in relation to DLEs differed in two key ways from planning for other change initiatives. Firstly, participants acknowledged that they had a short-term plan in relation to digital technology, as the rate of change was often so quick that the plan was out-dated before it was even implemented. The literature similarly states that the digital technology change can often outpace the change happening in the school setting and that leaders often feel that they just cannot keep up (McLeod, 2015; Sheninger, 2014). Secondly, the participants felt that the planning for staff professional development needed to be in line with 21st century thinking. Some participants espoused that they had little if any knowledge about the pedagogy in relation to DLEs, and that they were unable to teach the required knowledge and skills to staff. As the literature confirms (Sheninger, 2014), leaders may not have all the understanding and knowledge of the new pedagogies surrounding digital learning but it is their role to invest in support that build both their own and their staff’s technological capacity. As Sheninger (2014) states, leaders should be “consistently engaging staff in brainstorming sessions in order to develop a collective vision on how to transform the school for the betterment of all students” (p. 33). The participants in this study were able to learn with their staff through the careful selection of professional development opportunities and expert advice.

Consultation
The third sub-finding relating to the characteristics of effective leadership was consultation and the importance of discussing the transition to DLEs with all stakeholders. The stakeholders included staff, the Board of Trustees, parents and students. It was evident from the interviews that participants felt that factors such as creating a ‘collaborative culture’ or a ‘sharing of common beliefs’ was an important element to effective leadership. This view is shared by a number of writers when they state that when leadership is focused on creating collaborative cultures then all the
stakeholders feel that they have a voice and a shared ownership in the change (Brewster & Railsback, 2003; Cardno, 2012; Fullan, 2013; Robinson et al., 2009). This helps to influence professional practice and make the transition to DLEs more relevant, meaningful and transparent. Being open and honest with all stakeholders regarding the transition to DLEs and showing the research relevance around the change initiatives was important to the participants. This is similar to the findings of Brewster and Railsback (2003) who state that, without trust and having open and honest communication, schools cannot improve and grow.

The participants indicated that by building a collaborative culture, the relationships between the community and the school were more respectful and trusting. However, some participants noted very strong held beliefs and values from parents that would never align with the vision and direction of the school. These strong beliefs and attitudes were often around the health and safety concerns associated with wireless networks and what parent stakeholders called ‘too much screen time’.

Again, the literature (Degenhardt & Duignan, 2010; Hew & Brush, 2006; McLeod, 2015; Sheninger, 2014; Stuart et al., 2009) is quick to point out that effective leaders need to be transparent and honest, championing their cause with clear research and rationales in support of the benefits to teacher pedagogy and student learning. The lack of a collective vision by leaders is viewed in the literature as the primary reason that digital technology in school fails (McLeod, 2015). The purchase of devices to keep up-to-date or to use as a marketing tool can sometimes become the primary reason for change to DLEs and used to convince stakeholders of the rationale behind the change. None of these reasons are related to learning, and stakeholders will inevitably conclude these reasons as inadequate to justify the change. Consultation was a means to gather additional information from all the stakeholders to add to the development of a clear plan and pathway forward.

**Personal professional development**

The last sub-finding to emerge was that a school’s educational leader needed to develop personally in regard to understanding what it is that they wanted their teachers and students to do with the digital technology. Participants in this study are all instructional leaders and as such their primary responsibility is to observe and evaluate instruction. They have been teachers in classes, middle leaders and now principals. They understand
the key functions and strategies of effective teaching. They have their own underlying values, assumptions and beliefs around teaching and learning. However, all of them indicated that to lead effectively they had to source information about how the digital technology could support teaching and learning so as to reaffirm those beliefs or change any strong held opinions. The understanding of 21st century pedagogy, curriculum and instruction was reliant on the participants personally taking the time to evaluate and then to justify whether the change to DLEs was worth the investment in both time and benefits to student learning.

The transition to DLEs is different to other change initiatives in education in relation to personal professional development as identified by both the literature and by the participants (McLeod, 2015). Firstly, due to the costs involved because of the speed at which the digital technology changes, participants believed that they had to have good personal knowledge about current trends and factors that influenced the pedagogy and student achievement. The principals acknowledged that they had to read, consult widely, visit other schools, take up personal study, model the tools, and converse with stakeholders. This helped to develop their own personal awareness so as to be up-to-date and to help minimise the mistakes made with the transition. Secondly, because of the lack of effort given to prepare leaders in the understanding of the challenges associated with DLEs and to support the effective use of the digital technology for teaching and learning, the participants had to be users of the tools and champions of the change. This is evident in the work of Sheninger (2012) who states that, “Digital leadership is about championing change that will transform schools into vibrant epicentres of learning” (p. 46). Participants acknowledged that they learnt personally, stayed current, improved their skills and experiences, were dedicated to the change, modelled its use, and planned and supported their staff with professional development.

**Staffing**

The second key theme to arise from the successes identified by the participants was the way in which staff development was managed and led. The principals identified two key staffing factors as important: firstly, the way the staff were professionally developed to improve their pedagogical knowledge and skills and, secondly, the way the leaders supported the removal of barriers concerned with staff personal beliefs and attitudes. This is consistent with the literature which reinforces the importance of providing timely,
challenging, and relevant support that strengthens staff confidence and ability with digital technology (Amos et al., 2014; Fullan & Langworthy, 2014; Hew & Brush, 2006; Schleicher, 2015; Sheninger, 2014; Sincar, 2013). The provision of professional development helps to influence teacher attitudes towards digital technology (Fullan & Langworthy, 2014; Schleicher, 2015), as well as provide teachers with the necessary knowledge and skills to utilise digital technology into classroom practice (Hew & Brush, 2006).

Professional development - capability
The first sub-finding that enabled staffing success was the development of capability (staff pedagogical knowledge and skills). All participants acknowledged the key to a successful transition to DLEs was to have the pedagogy drive the innovation. Conscious decisions were made by the participants to include regular professional development, expert assistance concerned with curriculum and knowledge development, visits to other schools, conferences, and staff meetings that focused on understanding the pedagogical framework for introducing DLEs. All the participants acknowledged that it was pointless to have the devices without first having a clear understanding of 21st century skills and how these devices support learning and student achievement. This is in keeping with the literature that embraces collaborative teaching approaches (Johnson et al., 2014), digital pedagogical understanding (Amos et al., 2014), and the adoption of 21st century skills and competencies (MoE, 2014; Schleicher, 2015).

Professional development - motivation
Another sub-finding evidenced in the data from participants in relation to successful transitioning to DLEs with staff was motivation - the removal of barriers about staff personal attitudes and beliefs. Participants believed that they had created a climate and culture that embraced change. They had good support networks, clear guidelines and expectations regarding the use of digital technology, and many of their staff were personally capable and early adopters of digital learning in their classrooms. The principals also noted that they used these staff (early adopters) to provide support for those who were finding it difficult to adjust. The literature supports this notion of teachers supporting teachers (Baylor & Ritchie, 2002; Glover et al., 2002). Staff were provided with digital devices of their own to use. They were given time to adapt to the new tools as well as provided with professional development on how to use the device. A
similar device was provided for the students and any equipment issues were removed. The literature notes the importance of providing necessary resources for teachers (Stuart et al., 2009), providing regular professional development (Collins & Halverson, 2009), providing encouragement from the principal and other leaders (Garland & Tadeja, 2013; Robinson et al., 2009), and the inclusion of independent learning on the part of the teacher to remove barriers to the integration of digital technology (Jones, 2001; Stuart et al., 2009). Participants acknowledged that the majority of their staff embraced the change. This is in contrast to the literature that states that staff can often become victims of the way they have always done things which are linked to strongly established work routines (English, 2012; Schachter, 2010). A success noted by the participants was that their staff were quick to embrace the change once they saw the technologies relevance for improved engagement and development of 21st century learning skills.

**Infrastructure**

The third key theme to emerge from the data in relation to successfully transitioning to DLEs was infrastructure and the provision of systems and networks that operated well. This included the sub-findings of providing systems that worked and networking upgrades. For the provision of effective learning environments and to remove the stress for teachers all the participants acknowledged the need for infrastructural environments that worked. This included quality devices, networking, super-fast broadband and technical support. The support from the Ministry of Education in relation to the schools’ network and internet upgrades was viewed as a ‘necessity’ rather than a ‘want’, because without the necessary upgrades many advantageous learning tools and programmes could not be utilised. The literature reviewed is replete with evidence concerned with the need for effective infrastructure, networking functions, internet access and technical support to enable quality teaching and learning to transpire (Amos et al., 2014; Mama & Hennessy, 2013; MoE, 2014). As acknowledged by Amos et al. (2014) in their report, “the sophistication and complexity of infrastructure and network management needed to drive the digital learning environment, deserves serious scrutiny” (p. 18). All participants were quick to acknowledge that without quality infrastructure DLEs would not have been as successful, if at all possible.
**Stakeholders**

The last theme perceived by participants to be an important factor in the successful implementation of DLEs was the inclusion of stakeholders, comprised of staff, parents and students. The specific sub-findings related to stakeholders are: consultation with all stakeholders; and community and Board of Trustees acceptance. A key factor to the success of the participant’s transition to DLEs was the support they received from the school’s Board of Trustees. Participants viewed the Boards of Trustees as key stakeholders in the adaptation of DLEs. This support was both at the strategic and budgeting level. It included making strategic decisions with links to research and providing the necessary funds to purchase equipment and provide professional development. This is similar to the findings of Lim et al. (2013) where they state that discussions with school leaders, teachers and parents about the use of digital technology and its links to the curriculum need to be a part of the consultation and planning process. This is also mentioned in the consultation section of Question One where participants noted that when stakeholders ‘share common beliefs’ it makes the transition more relevant, meaningful and transparent (Fullan, 2013).

Another key to successful implementation of DLEs was that of community acceptance. This consultation involved the sharing of the educational strategy, the possible costs to parents, and the alleviating of security, health and internet safety issues. Although the literature reviewed is concerned with the importance of consultation and the development of a shared understanding, it does somewhat show a lack of clear guidelines for a process by which to do this. The participants acknowledged that they did this as a part of being an effective leader as they would any new initiative or change that took place in their schools.

In summarising the findings in relation to Research Question Two, the important factors identified by the research participants to have a successful transition to DLEs include: effective leadership; professional development; effective infrastructure; and stakeholder consultation.
Research Question Three asked: What challenges and barriers have primary school principals faced in leading the transition to digital learning environments?

There were a number of factors that were identified by the research participants as challenges and barriers to leading the transition to DLEs. The themes emerging as challenges were: effective infrastructure; staff professional development; stakeholder consultation; and effective leadership. It is interesting to note that the same themes were also evident as themes that led to the successful transition to DLEs.

Infrastructure

Infrastructure was viewed as very important when leading the transition to DLEs and it included the four sub-findings: sustaining the equipment and the environment; reliability of systems; costs; and network issues. The participants all acknowledged that within the area of DLEs things change quickly and keeping up to date and sustaining both the equipment and the environment was challenging. A common statement was that the environment was ‘moving faster than we can move’. The literature attests to this fast-paced digital environment (English et al., 2012), that changes regularly and without warning (Larson et al., 2010; McLeod, 2015; Schachter, 2010). This is further reinforced by Larson et al. (2010) who state that: “Leaders have to take personal responsibility for understanding changes in technology implementation and integration” (p. 12).

Participants were aware that in making decisions they had to ensure that digital purchases were both reliable and cost effective. All principals acknowledged the cost of ‘keeping up to date’ and ‘sustaining’ the latest resources in their schools was a challenge. Poor choices concerning the equipment, purchasing unreliable systems, which cost a lot to replace, were often made because of the poor advice given from ‘so-called’ experts in the field of technical infrastructure. The literature reviewed speaks of issues concerned with cost factors and the need for a dependable ‘road map’ when making purchases so as to minimise these expenses (Gosmire & Grady, 2007; Greaves et al., 2010; McCampbell, 2001).

The sub-finding, networking, was a very important challenge that needed constant reviewing. Participants acknowledged the issues concerned with poor networking infrastructure, wireless connections, limited or no internet and server issues, in the early
days of operation, as being major factors in contributing to the challenge of implementing DLEs. As indicated earlier from the research findings relating to Question Two, the introduction of the Ministry of Education network support has assisted with this challenge (Amos et al., 2014; MoE, 2014).

**Staffing**

Another challenge identified by the participants was staffing challenges, which included the sub-findings of: loss of trained staff, professional development costs; and pedagogical understanding and implementation. These concerns included the loss of expertise and the costs to retrain other staff to the same or similar ability. The literature reviewed mirrors these results, stating that a motivated and engaged teacher can help to support student learning in the digital landscape (Degenhardt & Duignan, 2010; Glover et al., 2002). Research also tells us that when the pedagogy is based on a learning partnership between the student and teacher that this helps to harness the intrinsic motivation of both the teacher and the student (Fullan & Langworthy, 2014). Professional development was a costly exercise as identified by all participants, but also one that was viewed as necessary. Participants ensured that costs were included in the budgeting plan for each year as they saw it as an on-going exercise. The literature reviewed identifies cost as a significant challenge but one that can be resolved with strategic thinking and planning (Gosmire & Grady, 2007; Greaves et al., 2010).

The sub-finding challenge related to staffing was pedagogical understanding and implementation. All participants acknowledged the need to spend significant time and money to develop staff understanding of 21st century pedagogy and practice. As identified in Question Two, the success to effective implementation was to ensure all staff had an understanding of the pedagogy and how to implement this into practice (Amos et al., 2014; Johnson et al., 2014; MoE, 2014; Sincar, 2013). As identified in the findings by Sincar (2013), inadequate staff development in the understanding of pedagogy is a strong barrier for leaders as they attempt to integrate digital technology into the educational environment. All participants recognised that this was an area that took time and resources and was a significant challenge due to the changing of staff, and their often strong held beliefs and attitudes around education. Participants acknowledged that professional development was first and foremost to improve the capability of teachers so that they knew why to use digital technology and how to use it. As Schleicher (2015)
qualified, if teachers do not see how digital technology changes teaching practice, or why it should, then they will not action either the pedagogy or the practice into their daily teaching.

**Stakeholders**

For the transition to DLEs to be effective, all stakeholders need to be consulted through the transition. Sub-headings identified in the data arising from stakeholder challenges include: parental expectations; acceptance of the need for DLEs; and parent perceptions and concerns with the introduction of digital devices.

Principals noted that to solve the issues surrounding parental expectations, regular communication and information needed to be provided. This included the informing of policies and procedures to do with cyber safety, amount of use, platforms and equity issues. ‘Bring your own devices’ (BYOD) had also created equity issues in that parents were unable to afford the equipment. To overcome this challenge schools provided equipment either for free or on a leased term. The literature acknowledges similar challenges in relation to equity with similar solutions as actioned by the participants (Crump & McIlroy, 2003; Sincar, 2013). The findings of Amos et al. (2014) further describe the need for strategic planning that achieves equitable access to digital devices for every learner.

Stakeholder concerns were often related to health and safety issues. Cyber bullying, poor posture, electromagnetic radiation poisoning and over stimulated screen time were some of the factors mentioned by participants as barriers to the implementation of DLEs. Extreme positions of some stakeholders placed almost a complete standstill to the implementation of DLEs until the challenges in question were resolved. The literature reviewed does not specifically mention stakeholder concerns but does identify the challenges inherent with DLEs: resistance to change; mistrust in the value of digital technology; and fear of the digital technology (English et al., 2012; Perrotta, 2013; Sheninger, 2012).

**Leadership**

The final theme related to the challenges inherent with the transition to DLEs was effective leadership. The participants mentioned being overly cautious as a significant challenge. Checking, rechecking and triple checking were espoused as slowing down the
advancement of the transition to DLEs for the participants. Having to rely on others’ expertise and then waiting before making a decision was also viewed as challenging. The literature mentions the need for leaders to be well planned (Bates & Sangra, 2011; Scott, 2004), but doesn’t acknowledge the often challenging time consuming pathway to that plan.

This identified over-cautious stance by the participants raises an interesting question as to whether the slow deliberate action by leaders was purposeful, or linked to what the literature called strongly establish work routines, that result in educational thinking that relies heavily on trusted and true models of teaching and learning (Bolstad, 2011). The unknown and unfamiliar landscapes of DLEs require leaders to have the right skills and right knowledge to effectively implement them. Leaders who feel under skilled or unable to keep up (Schachter, 2010), may deliberately or unintentionally slow down the progress even to the point that they actually don’t realise why they are doing it (Sheninger, 2014).

In summary the research has identified several challenges that need consideration when leading the transition to digital learning environments (DLEs): an infrastructure that is stable and well resourced; staff who are professionally developed and have a good understanding of the links to 21st century pedagogy; stakeholders who share in the process; and leadership that is able to navigate a clear pathway through the challenges and barriers.

**Research Question Four asked: What conditions are available to support primary school principals’ personal capabilities and personal professional knowledge in order to lead the transition to digital learning environments?**

From the research there were a number of factors identified that could help strengthen the participants’ personal capabilities and personal professional knowledge when leading the transition to DLEs. The leadership theme presents the sub-findings of: personal professional development; ability to lead and manage change; being generationally aware; being instructionally aware; building trusting relationships; membership of a professional group; and no support from the MoE. The literature acknowledges the importance of leaders’ personal capabilities and knowledge in leading the transition to
DLEs (Chang, 2012; Demski, 2012; Fullan & Langworthy 2014). Some authors acknowledge the need for technological leadership capability as a necessary and essential skill for sustainable change and the transformation of school culture (Papa, 2010; Sheninger, 2014). The ability to lead and manage change was viewed by all participants as an important capability. This condition has already been outlined in the research questions relating to expectations and successes.

**Personal professional development**

**Generationally aware**

All participants acknowledged the need to be generationally aware as a personal capability that was conditional on personal professional development. The participants espoused the need to read widely, access networks that supported their personal development and ask staff; showing that it is okay not to know it all. The literature reinforces this when it states the need for leaders to be co-learners with their staff (Demski, 2012; Fullan, 2014; Sheninger, 2012). Research also tells us that generational awareness helps to foster understanding and more effective communication amongst staff (Fullan, 2014; Sheninger, 2014). Participants identified the need to support each generation with the necessary professional support, whether it be basic structured one-to-one support or more self-selected development. The goal was to support the learning of staff of different generations emphasising their strengths and finding ways to overcome their challenges. Knowledge was acquired by the participants, through membership in professional learning groups, attending professional workshops with staff, and asking for support from staff.

**Instructionally aware**

Instructional awareness is acknowledged in the literature relating to educational leadership as exerting influence over instructional improvement (Blase & Blase, 2000; Cardno, 2012; Robinson et al., 2009). Being a lifelong learner alongside staff and developing as a team was strongly supported by all principals. The participants noted that, indirectly, they helped to shape what happened with the transition to DLEs through modelling to staff, providing professional development opportunities and having a sound pedagogical knowledge of DLE complexities. Again, the principals noted that this knowledge and understanding of the complexities of DLEs was attributed to personal reading, professional development, membership to professional learning networks,
attending conferences and conversations with colleagues. This active form of leadership incorporates both generationally aware, instructionally aware and relationship building.

Building trusting relationships
Participants noted the importance of building trusting relationships with staff as a personal capability required when implementing DLEs. The literature reinforces this notion and endorses openness (Cardno, 2012), engagement of everyone in discussion (Demski, 2012), and valuing what people have to offer through the building of coherence and capacity of staff (Brewster & Railsback, 2003). As relationship builders, principals led the way, were hands on, supported and encouraged, cared for the learning community, were the driving force behind the change, and were continually looking to enrich teaching practice. The participants, as part of being effective technology leaders, personally developed these skills over time. They were viewed as an integral part of supporting staff through the change of transitioning to DLEs.

Technological leadership
The research is replete on the importance of the leader having an understanding of digital technology (Chang, 2012; Demski, 2012; Fullan, 2014; Papa, 2010; Sheninger, 2014), and how to lead the change (Scott, 2004) to incorporate digital technology into the educational environment. School effectiveness is linked to the leaders’ involvement (Hallenger & Heck, 1998), and has a direct effect on student learning outcomes (Robinson et al., 2009). Technological leadership is noted to be different to other forms of leadership in that it relies heavy on digital technology as a conduit for change (Sheninger, 2014). The research speaks of the need to have an awareness of how to identify the challenges and pitfalls with digital technology (Papa, 2010), and to be a risk-taker (Sheninger, 2014), providing expert advice and resources (Amos et al., 2014). However, these characteristics are also required for any type of leadership change whether it is technologically focused or not. Participants acknowledged that although the leadership of digital technology was similar in some aspects to other leadership initiatives, it still relies heavily on digital technology as the pathway for the change to happen. The common understanding was that digital technology was not going away and that, regardless of their experiences or lack of knowledge, the principals had to go beyond their own comfort zones and those of their staff, to reshape instruction and transform pedagogies in ways appropriate for developing 21st century skills for their students.
No support from the Ministry of Education (MoE)

Another sub-finding strongly noted by the principals was the lack of personal development support from the Ministry of Education with regard to assisting with the development of their personal capability and knowledge attainment. This condition was particularly evident when they stated that the Ministry of Education (MoE) had not supported them with their personal understanding and that the MoE were not forthcoming with support, additional funding or policy guidelines and pathways. The pathway to becoming generationally aware, instructionally aware and to build trusting relationships, was through self-acquired personal professional development, not from anything that the MoE had available.

The literature reviewed agrees with the views of lifelong learning and the need for leaders to personally acquire the capabilities and knowledge to lead effectively with digital technology (Amos et al., 2014; Anderson & Dexter, 2005; Chang, 2012). The findings of Anderson and Dexter (2005) support the notion of the leader developing their skill set in the operation and use of digital technology so as to not only learn about the digital technology for themselves but also to model to, and support their staff. The assistance offered from the Ministry of Education acknowledges the online professional learning communities available for leaders to access (Amos et al. 2014). As for the reason why the participants were unaware of this support offered by the Ministry of Education, the research does not state, however, it still leaves a question as to why the support network was not well known by the participants.

In summary the research has established several factors required to support leaders personal capacity and professional knowledge when leading the transition to DLEs. These are: access to support networks; current research literature; professional development opportunities with staff; conferences; and personal professional development. All of these factors were viewed as important to help them manage the change, be generationally aware, instructionally aware and help to build effective relationships while implementing the transition.

Conclusion

In conclusion, the findings have acknowledged the need for school leaders to:
1. Have a clear understanding of the process involved in leading change in a digital context;
2. Have the ability to support the professional development associated with the changing pedagogy and practice with benefits to student learning outcomes;
3. Allocate sufficient resources for infrastructure management; and
4. Be life-long learners, understanding the changes inherent with the transition to DLEs through personal professional development.
CHAPTER SIX
CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

Chapter six presents the conclusions from this research and makes recommendations for future practice. Four conclusions are presented which are associated with the four research questions that have guided this study. This is followed by recommendations, the limitations of the research, suggestions for further research and a final concluding statement.

As illustrated in Figure 6.1, five themes when leading the transition to digital learning environments, five conclusions have emerged from the data analysis which include: effective leadership; professional development of staff; stakeholder acceptance and consultation; teaching and learning with links to student achievement; and providing effective infrastructure.

Figure 6.1 Five themes when leading the transition to digital learning environments
Figure 6.1 details the underlining themes of leadership, teaching and learning, infrastructure, stakeholders and staffing. These themes are mirrored by the literature reviewed, and analysis of the research data completed, and illustrates the key themes involved in the leading of the transition to DLEs. Situated at the centre of Figure 6.1, and having an overarching influence, is, ‘leadership’. Effective school leaders are life-long learners, relationship builders, visionary, instructionally aware, generationally aware and able to manage change. Figure 6.1 displays the cornerstones of ‘teaching and learning’, ‘infrastructure’, ‘stakeholders’ and ‘staffing’ as contributing to supporting the leadership of the transition to digital learning environments. The ‘teaching and learning’ cornerstone is the development of beliefs and values regarding student engagement with links to achievement and creating a balanced environment where digital tools help to support learning. The ‘infrastructure’ cornerstone is concerned with providing quality networks and effective devices that work well and support the teaching and learning in classrooms. The ‘stakeholders’ cornerstone is participating in consultation and developing an acceptance by stakeholders in the rationale for DLEs, and the ‘staffing’ cornerstone is concerned with providing opportunities for staff to build their personal capability in both pedagogy and practice, and helping to remove the barriers to personal attitudes and beliefs through effective professional development.

Each cornerstone reinforces leadership by providing strong foundations for digital learning environments (DLEs) to function. As indicated by the arrows, leadership influences all the cornerstones and is the key action that enables each cornerstone to function effectively and facilitate the transition to DLEs.

The themes are acknowledged in the perceptions held by principals in the data analysed and help to add weight to the key conclusions, which include the need for school leaders to:

1. Be able to implement the change required when transitioning to DLEs;
2. Have the ability to support professional development associated with changing classroom pedagogy and practice that improves student learning outcomes;
3. Allocate sufficient resources for infrastructure management; and
4. Be life-long learners, understanding the changes inherent with the transition to DLEs through personal professional development.
KEY CONCLUSIONS

This study was set out to investigate the transition to digital learning environments (DLEs) in New Zealand primary schools and the changes in leadership understandings that resulted due to this transition. The study sought to answer four key questions:

1. What is expected of primary school principals as educational leaders in leading the transition to digital learning environments?
2. What successes have primary school principals achieved in leading the transition to digital learning environments?
3. What challenges and barriers have primary school principals faced in leading the transition to digital learning environments?
4. What conditions are available to support primary school principals’ personal capabilities and personal professional knowledge in order to lead the transition to digital learning environments?

The following conclusions are concerned only with this study and refer only to the participants of this study.

Key conclusion One: The educational leader needs to be able to implement the change required when transitioning to DLEs.

Since the introduction of digital learning into education in the early 1980s, changes in the way that teachers teach and students learn with this technology has challenged leaders to be aware of these changes and provide clear frameworks and processes to support them. Educational leaders must have an understanding and ability to provide the conditions and support to implement change if they are to overcome strongly established routines, unclear educational policy and manage the uncontrollable environment that is technological change.

This conclusion has arisen from the research study, and is also mirrored in the literature reviewed, which includes the recommendations in the *Future-focused learning in connected communities* (Amos et al., 2014) report. The report calls for strong educational leaders who understand change management and are able to reshape traditional schools’ often strongly held beliefs about students, curriculum, assessment and teaching and learning. But, in particular, an educational leader who understands the digital landscape, is aware of the expectations that come from the landscape, and can plot a well-planned and communicated path through the challenges inherent within.
The literature review is also clear that the leader should understand how incorporating digital learning into the educational environment has the potential to improve student learning outcomes (Gosmire & Grady, 2007). The conclusion advocates for a clear understanding of the change process, including why the change is necessary and how it has the potential to improve student outcomes. Transitioning to DLEs, just because the school up the road is doing it or someone says it might be a good idea, is no longer a clear rationale or justification for the transition (McLeod, 2015). The leader must have a clear vision and be able to articulate the philosophy behind that vision to the school's stakeholders (Fullan & Langworthy, 2014). Leaders need to be able to link the purpose behind the change; the process involved in the change; and how the change will impact teaching and learning practice. The purpose, process and implications for practice need to be clearly communicated to the people involved so that the transition to DLEs is effective, and this is non-negotiable.

Technology leadership differs in relation to the leadership of change that happens in other aspects of the school environment. Firstly, it is fast paced and when leaders are working in this fast paced environment they are working in an era of continual change. Secondly, digital technology is consistently evolving and this rate of scale of external technological change outpaces the internal investments made by schools. Something new, bought only yesterday, will be upgraded tomorrow. The speed of change and the rate of change are uncontrollable. Therefore, the technological leader requires skills to deal with constant and variable change, being strategically driven and able to make timely decisions concerning the digital environment. However, even with a well-structured plan and strategy for the implementation of DLEs, digital technology will always outpace the very best leader. The key is to articulate a clear vision, that is adaptable to the changes and supports the key outcome of the development of 21st century pedagogy (Sheninger, 2014).

The participants in this study were distinguished by their particular skills, knowledge, attitudes and personal involvement with digital technology. They were leaders of change who embraced uncertainty, were connected to learning support networks and looked globally for solutions, and they understood the challenges associated with digital technology. To be effective in this changing technological landscape requires the leader
to have effective pedagogy driving the changes in education. This point leads onto the next key conclusion, which focuses on professional development and the key imperative, pedagogical understanding.

**Key conclusion Two: The educational leader needs to have the ability to support professional development associated with the changing classroom pedagogy and practice.**

Educational leaders, to be effective when transitioning to DLEs, must build a professional school learning culture that promotes the understanding of 21st century pedagogy and practice. They also need to be able to show how utilising this practice leads to: improvements in engagement with the curriculum; motivation to progress further with their learning and transfer this learning to other areas of the curriculum; and, if possible, linking the learning with digital technology to positive student outcomes and achievement.

Leader and staff awareness of the pedagogy and practice encompassing the use of digital technology to support learning is a critical factor when transitioning to DLEs. This is reinforced throughout the literature so that staff know the why, how, and when of learning and what is appropriate to teach children when using digital technology (pedagogy), and how to use the digital technology (practice) to acquire new knowledge and skills (Amos et al., 2014; Beetham & Sharpe, 2013; Fullan & Langworthy, 2014). Mama and Hennessy (2013) believe that when staff understand the pedagogical shift from the traditional teaching methods to effective teaching with digital technology, and are provided with opportunities to experience the digital technology to support teaching and learning, then beliefs and values change to include more integration of digital technology into their practice. To further enhance this understanding of pedagogy, an effective professional development system has to be in place. This development system must include the leader as a co-learner with the staff. Leaders must lead the change through modelling effective use of the digital technology in their own practice and being actively involved in all technological professional development opportunities (Robinson et al., 2009). Therefore, the first key components of conclusion two are the understanding of effective pedagogy, and how to use the digital technology (practice) that includes the educational leader championing the cause and being actively involved.
Finally, both the literature (Fullan & Langworthy, 2014; Johnson et al., 2014; Schleicher, 2015; Tamim et al., 2011), and the participants of this study identified that effective leaders ensure that the benefits to student learning outcomes are presented. Although the links to improved student achievement may be tenuous (Lim et al., 2013; OECD, 2015), benefits in the form of greater engagement, independence and motivation through the use of authentic and relevant tasks are acknowledged (Johnson et al., 2014; Ward & Parr, 2011; Wright, 2010). In utilising the tools that students use daily, teachers need to understand the ‘why’ of the transition to digital learning environments as well as the best way to use these tools to support student learning. Teachers and school leaders may resist adapting current approaches if they do not see the need for change, or they are not convinced that they lead to better student outcomes. The conclusion acknowledges the need for an effective professional development plan that clearly explains the educational benefits of transitioning to DLEs to all stakeholders. When an effective teacher knows that the teaching and learning being implemented is supporting the potential for greater student learning outcomes, then the changing of their beliefs and attitudes towards the acceptance and use of digital technology is a natural occurrence (Fullan, 2013).

Key conclusion Three: The educational leader needs to allocate sufficient resources for infrastructure management.

A lack of appropriate infrastructure was an area of constant concern for the participants. The introduction of technologies and devices that were difficult to use and access, were unreliable, and/or lacked technical support were acknowledged by both the authors of the literature review (Amos et al., 2014; Banoglu, 2011; Fullan & Langworthy, 2014; MoE, 2014; Papa, 2010), and the participants as being a barrier to digital learning. This literature encourages educational leaders to provide tools and infrastructure that are enabling for both teachers and students (Amos et al., 2014). The costs of keeping up-to-date with the digital technology and access to the digital technology for students were two identified barriers relating to infrastructure concerns that reduced the capabilities of the school to enable adequate and effective instruction. The cost factors included keeping ‘up-to-date’ with the latest wireless systems, networks, devices and internet access. Despite the considerable investment into infrastructure (MoE, 2014), and the declining costs of networking and digital devices, cost was still considered by some participants to be a serious barrier to the digital technology being central to schooling. Others disagreed and concluded that the support
via Network for Learning (N4L) and Ultra-fast broadband via the School Network Upgrade Project (SNUP) as well as donations and the accessibility of grant funding helped in reducing the cost. The literature (Amos et al., 2014) reinforces this, as the Government of New Zealand has stated that their role is to provide supporting infrastructure, which they have been rolling out over the country for the last five years. This rollout includes the coordination of appropriate infrastructure, networking and internet capability, as well as professional development and support (MoE, 2014). Most participants acknowledged this support but still noted that the on-going costs associated with maintaining the reliability of the internet access and network infrastructure, and sustaining the equipment were still a barrier to effective implementation of DLEs.

Along with the cost factors associated with infrastructure, access to the digital technology was another barrier identified by some of the participants. Others argued that access barriers were reducing due to cheaper, more mobile devices, the use of cloud based computing and the belief that if a device could not be afforded by the student then the school would assist by providing access to a device. The literature acknowledges the challenges with providing equitable access suggesting that school leaders need to explore alternative ways of finding the necessary learning devices to support their students (Sincar, 2013). All participants acknowledged that inequities could arise from having digital technology in schools. However, all participants had strong personal values of striving for equity and access to devices for all their students, no matter the cost.

At the systems and operational level of the school, this conclusion clearly identifies the need for educational leaders to provide appropriate, well-functioning infrastructure that enables teachers to teach and students to learn with the use of digital technology.

**Key conclusion Four: The educational leader needs to be a lifelong learner, understanding the changes inherent with the transition to DLEs through personal professional development.**

For the successful leadership of the transition to digital learning environments, all participants acknowledged the need for personal professional development. The participants were aware that as a leader they helped to shape and support the development of 21st century pedagogy and practice. The need to manage, participate and connect with
digital learning was viewed by the participants as a critical factor in the support and development of this curriculum. They were also all aware of the impact that digital technology was having on society, teaching, infrastructure, resources, stakeholder relations, and the way in which teachers teach and students learn. Participants were also aware of how, statistically, digital technology was now pervasive in all aspects of their daily lives. The world was becoming digital and because of this the participants could see a change in the educational landscape and, being proactive, effective leaders, they engaged in personal professional development to provide support for their schools and staff. Due to these changing times and the challenges and potentials that the introduction of DLEs offered, all the principals placed on themselves the personal expectation of learning aspects of technological pedagogy and practice. They were also quick to acknowledge that they did not ‘know everything’ but tried to stay as close to the cutting edge as possible. Personal professional development, therefore, was seen as both a personal expectation and an absolute necessity.

All participants’ responses mirrored the literature concerned with modelling effective use of digital technology and being involved in the professional development (Robinson et al., 2009; Sheninger, 2014; Tamim et al., 2011). This personal expectation was understood as necessary, due to the participants’ awareness of the leadership literature that states their involvement in professional learning has a high impact on staff motivation and student learning outcomes (Robinson et al., 2009). All participants clearly understood their role in supporting professional development and this was viewed as a high personal expectation.

To effectively lead the change to DLEs, participants noted that without substantial and extended personal professional development in both the understanding and implementation of teaching and learning (pedagogy) and the knowledge and skills of how to use devices to their fullest potential (practice), they would not be able to create and support the appropriate learning environments. This is reflected by the authors in the literature (Amos et al., 2014; Perrotta, 2013; Schleicher, 2015), who acknowledge the leader as central to change, both in helping to remove the barriers to teacher beliefs, attitudes, and also teacher knowledge in regard to the use of the digital technology to support student learning. All participants remarked on their need to read widely, be involved in professional learning opportunities, visit other schools demonstrating good
practice and generally keep up-to-date with the latest advancements in digital technology. Arguably some participants noted the difficulty in ‘staying ahead of the game’, especially when they were involved in many other day-to-day functions that consumed their time. However, an important aspect acknowledged by all principals was the need for the pedagogy to drive the practice.

Summary
The future of digital learning environments (DLEs), is anyone’s guess, but the findings of this research are clear. It calls for educational leaders who are able to: lead technological change; keep pedagogy and practice at the forefront of all professional development; provide a quality infrastructure; and continue to be lifelong learners to ensure that the transition to DLEs is successful.

RECOMMENDATIONS
The findings of this research have led to the development of four recommendations. It is important to recognise the small size of the study and that the following recommendations can only be applied to the findings from the participants. While the factors of expectations, challenges, successes and personal professional development have been examined separately, their connections cannot be downplayed. In understanding the literature and research findings it is important to emphasise the role of the leader as a major factor. Leadership is intertwined with multiple factors and conditions for the effective transition to DLEs. Therefore, the recommendations acknowledge the interconnections between each theme and the ways in which leadership plays a pivotal role in moulding, maintaining and supporting schooling effectiveness:

1. That principals allocate time and resources to strategically plan a clear pathway when transitioning to DLEs. Effective planning of any change but, in particular, technological change, will allow for a leader to minimise the challenges inherent with digital technology and celebrate the successes that come from being strategically prepared;

2. That principals allocate sufficient time and resources to support the professional development of 21st century pedagogical knowledge and technological skills for their staff. This includes the allocation of release time, one-to-one mentoring and support for teachers to reflect and analyse their own and others’ practice in relation to teaching using digital technology, and how this practice has the
potential to increase student engagement and achievement. This recommendation also has significance for the Ministry of Education. They need to continue to strengthen the community networks available for teachers and leaders to engage in professional dialogue and discourse that is based on sound evidence that builds both teachers and leaders technological pedagogy and practice;

3. That the Ministry of Education, in consultation with educational leaders, continue to invest financial support for the establishment of technological infrastructure that allows for high speed internet connections, upgraded school networks, environments that support 21st century innovation, and relevant technological advice and guidance. This will ensure that all schools have equal access to the resources they require to teach, and for students to learn, using digital technology; and

4. That principals have support for their personal professional development. In recognising that digital competencies are essential skills for the success of 21st century learners, support for principals in developing their personal capabilities is required to enable them, with the support of their stakeholders, to strategically plan a responsive and adaptive curriculum to meet the diverse needs of their learners. This recommendation is significant for the Ministry of Education. They need to acquire professional development opportunities that support leaders’ knowledge and understanding of digital technologies and provide evidence-based research into the potential that digital learning environments have to improve student-learning outcomes.

LIMITATIONS OF THE STUDY

The first limitation of this study is the small number of participants used in the research. Consequently, it is conceivable that the findings and, therefore, the resulting conclusions may not be a precise representation of the perceptions and experiences of principals in all New Zealand primary schools. As Anderson and Arsenault (1998) noted, qualitative research studies may be rationalised and seen as relevant to other settings if the reader observes noticeable contextual connections. Therefore, this infers that it is up to the readers of this research to assess the degree to which these findings and conclusions can be connected to their own environment (Cohen et al., 2011).
Secondly, the use of one method may be viewed as a limitation due to the issues with the triangulation of data when consistency and objectivity are trying to be achieved (Cohen et al., 2011). This would have allowed me to further confirm, through multiple methods of investigation, different perspectives that may have provided additional support for the findings and observed relationships.

SUGGESTIONS FOR FUTURE RESEARCH

This research has highlighted possible suggestions for future research. These suggestions include:

• As the research has been restricted to a small geographical area with only eight principals within the Auckland area participating in the study, a larger sample of New Zealand schools, which includes secondary schools could be explored in more depth;

• Additional research into how digital technologies support the improvement of student learning outcomes and achievement would be worth exploring. This would include the investigation of how students utilise the digital technology, and the ways in which school leaders measure student and teacher implementation of digitally assisted teaching and learning to show academic improvements. While this study has highlighted the challenges and successes of implementing DLEs, it still remains unclear as to how these successes are linked to student achievement. Therefore, further research into the benefits of DLEs to improve student achievement would be beneficial to both leaders and teachers;

• All schools in this research project identified strong issues with providing timely and appropriate professional development in relation to 21st century pedagogy. Further research into how schools are meeting the training requirements of their staff in relation to pedagogy and practice could be of benefit as this may be an area of concern for schools and the Ministry of Education alike;

• With the increasing use of digital technology in New Zealand primary schools, a number of participants indicated the on-going costs of keeping up-to-date with infrastructural concerns. More research into the concerns and issues arising from networking and internet access may allow for solutions to be generated for these problems. An in-depth examination into the success and challenges of both the Network for Learning (N4L) and School Network Upgrade (SNUP) projects would be of benefit to see how this has impacted on school infrastructural
environments either positively or negatively. This research would be of interest to the Ministry of Education to further support the development of infrastructure and assistance to schools;

• One school in this research project identified strong issues with stakeholder expectations concerning the dangers associated with the use of digital technology. Further research into how schools are meeting the health and safety concerns associated with wireless networking could be of benefit; and

Lastly, with the increased use of digital technology in schools, a number of participants identified little to no personal development support for leadership with the transition to digital learning environments. Given that the majority of participants interviewed had a high level of aptitude with digital technology, having learned their skills on their own, it would be valuable to identify how leaders with a lesser aptitude acquire the skills to effectively lead and make decisions around the transition to DLEs. More research into the issues surrounding the lack of personal professional development for leaders may provide solutions to this problem. This could include a close examination into the support offered by the Ministry of Education, where a strong indication was that the assistance was little to non-existent.

**CONCLUSION**

This research investigated the perceptions of eight principals in New Zealand primary schools with leading the transition to digital learning environments (DLEs). The findings and recommendations are made available to any school leader contemplating the transition to digital learning environments (DLEs) and add to the body of literature already available. There is a need for school leaders to take a well-planned approach when transitioning from traditional learning environments to digital learning environments (DLEs) in order to meet the challenges associated with the change and to reap the numerous rewards evident in its success.
REFERENCES


Denzin, N. K., & Giardina, M. D. (2007). Decolonizing and politics of knowledge: Ethical futures in qualitative research. Walnut Creek, California: Left Coast Press.


doi.org/10.1787/9789264231191-en


Tamim, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F. (2011). What forty years of research says about the impact of technology on learning a


APPENDIX A - INTERVIEW QUESTIONS

Expectations and reality: Primary school principals’ experiences of change leadership in the transition to digital learning environments (DLEs).

Each interview will begin by explaining to the participant’s information about myself, the research topic, defining the term Digital Learning Environments (DLE) and describing how I will use the research findings. Participants will be asked to sign a consent form before the interview begins.

Interview Schedule

1. Can you tell me about your experiences of being a principal in a school that has moved to DLEs? What about when your school was making the transition to DLEs?

2. What factors do you think have contributed to the success of Digital Learning Environments (DLEs) in your school?

3. How would you describe the ideal DLEs?

4. What has been your positive experience with Digital Learning Environments (DLEs) in your school setting?
   a. What successful things have you introduced to your school?
   b. What other positive initiatives are planned for your school?
   c. If you could rank your top three most significant successes what would they be?

5. What challenges have you experienced with the transition to DLEs?
   a. What have been your top three most significant challenges?

6. Have you had any failures in transitioning to DLEs?
   a. If so in your view, what contributed to these?
   b. Did you overcome these failures? How?

7. What do you think will be the future challenges with transitioning to DLEs?

8. As a professional leader involved in change,
   a. What internal expectations are placed on you as a leader to implement DLEs?
   b. What external expectations are placed on you as a leader to implement DLEs?
9. What have you done personally to raise your own knowledge, understanding and skill in this area?

10. What specific knowledge, skills and values do you think leaders need to support the transition to DLE?

11. As a leader involved in many preparation and professional development opportunities, what factors, opportunities and so on exist to provide support for your personal development to meet these challenges?

12. Are there any areas that we have not covered that you feel are important for me to know in order to better prepare principals to lead the change to DLEs?
APPENDIX B - INTERVIEW PARTICIPANTS INFORMATION SHEET

Expectations and reality: Primary school principals’ experiences of change leadership in the transition to digital learning environments (DLEs).

My name is Aaron Kemp and I am currently enrolled in the Master of Educational Leadership and Management degree in the Department of Education at Unitec Institute of Technology, and seek your help in meeting the requirements of research for the Thesis course, which forms a substantial part of this degree.

There is a recognised expectation to transition to DLEs with the aim of improving student learning outcomes. However, there is little evidence to suggest that this correlation is a reality. My research will critically examine principals’ experiences with identifying and meeting both internal and external expectations from a variety of stakeholders in regard to the transition of their schools from a ‘traditional’ learning environment to a digital learning environment (DLE). It will also examine the successes and challenges faced in this transition.

I request your participation in the following way:

I will be collecting data using interviews and would appreciate being able to interview you at a time that is mutually suitable. I will also be asking you to sign a consent form regarding this event.

Neither you nor your organisation will be identified in the thesis. I will be digitally recording your contribution and will provide a transcript of your interview for you to check before data analysis is undertaken. I do hope that you will agree to take part and that you will find this participation of interest. If you have any queries about the project, you may contact my supervisor who is contracted to Unitec Institute of Technology.

My supervisor is Alison Smith and may be contacted by email or phone.
Phone: (09) 921-9999 ext 7363
Email: alison.smith@aut.ac.nz

Yours sincerely

Aaron Kemp

UREC REGISTRATION NUMBER: 2015 - 1018
This study has been approved by the Unitec Research Ethics Committee from (date) to (date). If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 6162). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
DATE

TO: [participant’s name]

FROM: Aaron Kemp

RE: Master of Educational Leadership and Management

THESIS TITLE: Expectations and reality: Primary school principals’ experiences of change leadership in the transition to digital learning environments (DLEs).

I have been given and have understood an explanation of this research and I have had an opportunity to ask questions and have had them answered. I understand that neither my name nor the name of my organisation will be used in any public reports. I understand that the interview will be digitally recorded. I also understand that I will be provided with a transcript of the interview for checking before data analysis is started and that I may withdraw myself or any information that has been provided for this project up to a date 10 days following the receipt of the interview transcript.

I agree to take part in this project.

Signed: ________________________________

Name: ________________________________

Date: ________________________________

UREC REGISTRATION NUMBER: 2015 - 1018

This study has been approved by the Unitec Research Ethics Committee from (date) to (date). If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 6162). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.