WAYS IN WHICH MIDDLE LEADERS SUPPORT TEACHERS IN INTEGRATING DIGITAL TECHNOLOGY

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ABSTRACT

The focus of this qualitative study was to investigate strategies middle leaders have used to successfully guide their colleagues in the integration of digital technology into their classrooms to further their pedagogical development towards 21st century learning. The perceptions of both middle leaders and teachers regarding the support they have received, and the challenges they have faced, in implementing the use of digital technologies into their teaching pedagogy was examined. Their perceptions of the resulting challenges in supporting the teachers through these changes, and the successful strategies that have been used to drive change were also sought. Semi structured interviews with middle leaders and teachers highlighted a number of challenges they have faced; however, these also elicited few successful strategies. The findings that have emerged from this study include the issues of access to digital technology encompassing problems with students not bringing devices, and infrastructure and equity for both students of low socioeconomic families and low decile schools. Ideas around a lack of teacher understanding of 21st century learning and their consequent resistance to change were expressed, and finally the need for senior and middle leadership that provides a clear vision which is inclusive and collaborative.
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List of Abbreviations

Wi-Fi  Wireless local area networking
ICT  Information and Communication Technology
IT  Information Technology
OECD  Organisation for Economic and Cooperative Development
CEO  Chief Executive Officer
NZCER  New Zealand Council for Educational Research
BYOD  Bring your own device
TPACK  Technological Pedagogical Content Knowledge
SAMR  Substitution Augmentation Modification Redefinition
TKI  Te Kete Ipurangi
COW  Computers on Wheels
Chapter 1

INTRODUCTION

Introduction

The increasing globalisation occurring in the world has meant that traditional methods of transmission and regurgitation of information used in education in the past are no longer viewed as appropriate. This, alongside the introduction of devices into classrooms, has meant that students now have ready access to information that previously tended to make up the basic content of subjects. Technology has also allowed people to communicate worldwide, leading to an increased importance of communication skills that can cross cultural divides. With the introduction of digital technologies into classrooms, the main shift towards 21st century learning is the need for skills based, rather than content-based teaching. Students need to learn about the world and how to work within it, rather than focus on subject content which is now readily available to them. This has meant a pedagogical shift for teachers from the ‘font of all knowledge’ to facilitation of inquiry.

Hartnett (2017) states, “digital technology is changing every aspect of life from how we communicate to the way we learn” (p. 1) requiring a need for change in educational pedagogy. As such, 21st century education and increased access to digital technology have become key issues for teachers in modern pedagogy. Middle leaders are the key personnel in secondary schools to lead any changes in curriculum and pedagogy in order to deliver education in the 21st century model (Bassett, 2016; Cardno & Bassett, 2015; Fitzgerald & Gunter, 2006; Grootenboer, 2014). This research is being undertaken to gain insight into the current perceptions of middle leaders and teachers in New Zealand Secondary Schools with regards to the use of digital technology in classrooms as an aid to providing 21st century education.

According to Bull and Gilbert (2012), ‘traditional’ forms of education were developed for 20th century conditions, and to be responsive to 21st century learners, schools must
think differently about their role, and provide teachers who are confident in their ability to teach, willing to be innovative, with strong leadership (Schleicher, 2015). In its Four-Year Plan 2016 - 2020, the Ministry of Education (2016) identifies three long term education system outcomes, one of which is for New Zealanders to have the skills and knowledge for work and life. “Demand for future-focused learning is increasing – the Ministry’s Information and Communication Technology (ICT) strategy and our 21st century practice in teaching and learning priority ensure we have the right focus to meet this need” (p. 10). They identify a need to support teachers to “develop 21st century teaching practice, flexible learning environments and digital literacy” (p. 18).

Middle Leaders understand the needs of the staff in their curriculum area whilst having an overview of the whole school context. This makes them the driving force in managing any change process as those mentioned above, currently being undertaken within the educational system (Brown, Rutherford & Boyle, 2000; Craggs, 2011; Fitzgerald, 2009; Harris, Busher, & Wise, 2000; Kirkham, 2005). This main focus of this study was to investigate strategies middle leaders have used to successfully guide their colleagues through the changes brought about by the integration of digital technology into classrooms to further their pedagogical development towards 21st century learning.

**Background**

Bull and Gilbert (2012) identify five ‘mega-trends’ from literature that they believe are driving the need for educational change: the digital revolution, globalisation, increased networking, demographic and economic changes, and ‘wicked problems’ such as global warming. Much research has been carried out around the skills required by the 21st century learner. Researchers refer to these skills as 21st century, higher order thinking, deeper learning, or complex thinking and communication (Saavedra & Opfer, 2012). The term 21st century skills is used in North America whilst the term 21st century competencies is used in Europe (Voogt, Erstad, Dede, & Mishra. 2013). For want of a better term, this report will refer to this concept as 21st century skills,
teaching and learning even though some critics find this term vague and overused (Saavedra & Opfer, 2012).

Many have attempted to describe 21st century skills, knowledge, attitudes and attributes (Dole, Bloom & Kowalske, 2016; Saavedra & Opfer, 2012; Tan, Chua, & Goh, 2015; Voogt et al., 2013). Combined, they suggest that critical thinking and problem solving, communication and collaboration, cultural awareness and adaptability, creativity and initiative, ICT related skills, the ability to analyse, and leadership are needed to compete globally. It is not about more knowledge, rather the ability to understand different contexts (Mansilla & Jackson, 2011). These skills are not unique, critical thinking and problem solving have always been important. Communication and collaboration have also been integral in education in the past, however they do take on new meanings in the 21st century context (Voogt et al., 2013). The concept of 21st century learning is about growing global knowledge, interdependence, problem solving, critical thinking skills and competence; going beyond discrete knowledge, requiring students to be able to assess authentic and complex tasks (Mansilla & Jackson, 2011; Tan, Chua and Goh, 2015). As such, the emphasis of education is no longer about what students know or the reproduction of information, but on how they use the knowledge they now have access to (Gentry, Baker, Thomas, Whitfield and Garcia, 2014). To meet these challenges, it will no longer suffice to continue with the type of education carried out in the past (Schleicher, 2012).

A number of recent studies have highlighted the need for multidisciplinary skills to solve complex global problems so that students understand the earth as a system (Mansilla & Jackson, 2011; Saavedra & Opfer, 2012; Tan et al., 2015). Whilst disciplinary understanding is essential, it is often taught in silo to ensure that student knowledge is deeply embedded within a knowledge base, allowing them to problem solve and communicate ideas within these disciplines (Saavedra & Opfer, 2012). However higher order thinking skills are also important, and can be encouraged through more probing questioning to allow students to transfer knowledge and give deeper understanding. This however, takes time and can only be achieved through a trade-off between depth and breadth of knowledge (Saavedra & Opfer, 2012). To develop these 21st century skills, teachers must provide opportunities for cross
curricular contexts that are relevant, beginning with generative topics that are holistic (encompassing the ‘big picture’) requiring both disciplinary and interdisciplinary study are required (Saavedra & Opfer, 2012).

Some suggest that the traditional view of the world is becoming obsolete. A number of researchers agree that in this age of knowledge, because of globalisation and the advancement in digital technologies, there is increased access by students to information as well as communication around the world (Bull & Gilbert, 2012; Mansilla & Jackson, 2011; Snehi, 2011). Globalisation, the increased movement of people, ideas, capital and goods around the world, has driven the need for competent, reliable workers who can problem solve and have the ability to specialise (Mansilla & Jackson, 2011). This in turn has led to a need for more powerful, relevant and self-directed learners. One of the more important questions for teachers is how to develop a better understanding of how learners learn so that they can support learners in developing these 21st century skills (Bull & Gilbert, 2012). This changing view of education, from traditional content knowledge to a more student directed, inquiry approach, is a key issue for teachers and for the middle leaders who must drive this change in educational pedagogy. This is an emerging area in research as the requirements for education are changing (Schleicher, 2015), however there is little literature around how this is affecting the role of middle leaders in school who must lead this change.

Alongside this need for a change in pedagogy, teachers have also been expected to embrace the use of digital technology in their classrooms. Researchers such as Fullan and Langworthy (2013), suggest that the need for change in educational pedagogy is due more to the availability of exciting new technology, making the traditional educational system boring to both students and teachers alike. This is also leading to the need to rethink curriculum and teaching strategies. On the other hand, Dumont, Instance and Benavides (2010) go on to suggest that large investment into digital technologies has not changed learning because there has been too much focus on the technology itself rather than the learning process.

Fullan and Langworthy (2013) identify four barriers to the adoption of 21st century principles in education. These include policy and system level strategies, measurement of learning, knowledge of how students learn, and the adoption of new
pedagogical models and strategies. However, little research has been carried out on strategies to help teachers to enact these changes, or for middle leaders to drive them. As Voogt et al., (2013) point out, significant changes in curriculum to include 21st century competencies, new teaching methods, and assessment procedures are important, however these changes may need to be incorporated through the introduction of new content within traditional structures, integration of a cross curricular emphasis, or transformation of traditional curricula to a new 21st century model. Human nature however, has meant that any innovative ideas about pedagogy are often absorbed into traditional practice, thereby losing effectiveness (Schleicher, 2012). As Snehi (2011) suggests, the learner-centred approach is more difficult to put into practice, requiring more work by the teacher, and to be successful there must be both teacher and student motivation, commitment, resourcing, open mindedness and a willingness to take risks. This highlights another key issue that I have experienced in my role as a middle leader, providing the support and development of teaching strategies to lead the changes required for 21st century education.

Much has been written in literature about leading change (Busher & Harris, 2000; Craggs, 2011; Fullan, 2003) as well as the resistance to change (Craggs, 2011; Fullan, 2001; Ruding, 2000; Scott, 1999). In order for the curriculum changes and pedagogical shifts required for successful implementation of 21st century teaching practices, there is a real need for leaders, in particular middle leaders, who are open to change, challenge assumptions, have good judgement, and are able to earn the trust of their colleagues, whilst balancing tensions and staying on track (Duke 2004). However, many agree that, with the rapid rate of change that has been occurring in New Zealand education since the 1980s, middle leaders tend to feel ‘swamped’ (Busher & Harris, 2000; Fullan, 2001; Ingvarson, Kleinhenz, Beavis, Barwick, Carthy, & yinson, 2005). Middle leaders are important in managing the change process because they not only understand the needs of teaching staff in general, but should also have a school wide overview (Brown, Rutherford & Boyle, 2000; Craggs, 2011; Fitzgerald, 2009; Harris, Busher, & Wise, 2000; Kirkham, 2005). Leadership of this change by middle leaders is the third key issue I have experienced in my role as a middle leader. There is, however, little in the literature that provides strategies for middle leaders in leading this change.
There are three key issues that have provided the context of this study: 1) the development of ideas around the skills required by school leavers in the 21st century, 2) the increased access to digital technology which has in turn changed the world view of students, increasing access to knowledge, requiring them to be able to use and develop knowledge rather than the traditional need to learn content. Both of these have led to the third key issue, 3) the need for change in pedagogy and for leaders to drive this change.

**Rationale**

As both a middle leader and a teacher, I have had to consider a change in pedagogy from traditional, instructional methods, to facilitation and inquiry support. As suggested in the New Zealand curriculum (Ministry of Education, 2007), teaching should focus on the skills required by students to become lifelong learners who can communicate, collaborate and problem solve. One challenge I have faced, is becoming comfortable with these skills, as well as with the digital technology itself. I have found that the change required for this is difficult for teachers, causing feelings of insecurity and stress as their existing pedagogy is challenged. It is up to me as a middle leader to provide the professional development, time and support to facilitate the familiarising of teachers with 21st century skills, and through the development of units of work that will help teachers through this time of change. Middle leaders, such as myself, are the drivers of change and if there is to be a shift in teacher pedagogy, then it is the middle leaders who need to first understand the new pedagogies, to be able to drive teacher pedagogical change.

Middle leaders in secondary schools are often teachers who are experts in their fields. However, while they are experts in curriculum, they have had little experience in leading instruction or teachers. It is also up to the middle leaders in a secondary school to lead the pedagogical shift required to teach 21st century skills (Cardno & Bassett, 2015; Fitzgerald, 2009). I have found that there are many challenges involved in leading change of this sort, where teachers are feeling threatened and insecure, and relationships are paramount. Middle leaders require support to be able to succeed in
leading this change. While there is some research on the lack of support for leaders worldwide, in New Zealand there is some support for principals. Many agree however, there is still little research on support for middle leaders (Cardno & Bassett, 2015; Fitzgerald, 2009; Grootenboer, Edwards-Groves & Rönnerman, 2014).

In my experience as a middle leader in the process of integrating digital technology into my curriculum area, it is still not clear whether there is a general agreement for, and understanding of, the need for 21st century teaching and learning, or how to go about developing this understanding. Change is required by both teachers and middle leaders, and while middle leaders drive change, it is the perceptions and actions of both teachers and middle leaders that affect the outcome. As such, the perceptions and experiences of both teachers and middle leaders are important when looking at change of this magnitude. This research is being undertaken to identify the current perceptions of the teachers and middle leaders around the use of digital technology in their classrooms to develop 21st century teaching. I hope to also identify strategies that have been used by middle leaders to drive changes in pedagogy of teachers with the integration of digital technology into their classrooms, in the hope that they will help other middle leaders in the future.

Research Aims

The aims of this study are:

- To examine teachers’ perceptions of how they are supported to implement pedagogies for integrating digital technology
- To examine the challenges presented to teachers when implementing changes in pedagogy as a result of the integration of digital technology in the classroom
- To understand the challenges experienced by middle leaders in managing the pedagogical changes resulting from the introduction of digital technology in classrooms
- To identify some strategies middle leaders use leading the pedagogical changes resulting from the introduction of digital technology in classrooms
Research Questions

The questions posed by these aims include:

- What are teachers’ perceptions of how they are supported to implement pedagogies for integrating digital technology?
- What are the challenges faced by teachers with the introduction of digital technology to the classroom?
- What are the challenges faced by middle leaders in managing the changes in pedagogy required by the introduction of digital technology to the classroom?
- What strategies are middle leaders using to lead this change?

Thesis Outline

Chapter One

Chapter one introduces the research topic, an investigation into the challenges middle leaders face in leading the integration of digital technology into the classroom. Background information explaining the events leading to the introduction of digital technology into the classroom, and a rationale is provided. The research aims and questions are provided along with a thesis outline of the five chapters.

Chapter Two

This chapter provides a critical review of the literature. The demands of digital technology on pedagogy are detailed. The ensuing challenges for both teachers and middle leaders in coping with digital technology in their pedagogy are then outlined.

Chapter Three

An overview of research methodology and a rationale for the adoption of an interpretive approach in investigating the challenges brought about by integration of digital technology are outlined in this chapter. Selection of participants and methods of data collection and data analysis follow. Finally, consideration is given to validity and reliability, and ethical issues are discussed.
Chapter Four

An analysis of the findings from chapter four in the context of the literature from chapter two is covered in this chapter. The data is presented from the perspectives of both teachers and middle level leaders, under the headings: developing a common language, middle leaders and teacher perceptions of the benefits of digital technology, the challenges of integration of digital technology, support they have received, and successful strategies they have used in the integration of the digital technology.

Chapter Five

An analysis of the findings from chapter four in the context of the literature from chapter two is covered in this chapter. These findings are presented under the headings: teacher perceptions of support for the integration of digital technology into their classroom, the challenges faced by teachers with the integration of digital technology into their classroom, challenges faced by middle leaders in managing changes in pedagogy, and finally successful strategies used by middle leaders. A discussion of the conclusions drawn from this study, including recommendations, the limitations of the study and further areas for investigation follow.
Chapter 2

LITERATURE REVIEW

Introduction

This chapter presents a critical review of the literature arranged as an examination of three main themes that are relevant to this study. The introduction of digital technology into the classroom has changed the face of education and the consequent pedagogical requirements of a 21st century classroom which are detailed in the ‘Demands of technology on pedagogy’ section. This has placed new and unique challenges on teachers to change their ideas about their pedagogy, to move from the traditional, to a more student-centred approach. The current research ideas on this aspect are detailed in the next section, ‘Challenges to teachers’. Finally, research into the challenges to middle leaders and their role in leading the rapidly changing environment in education today is detailed in the final section of this chapter.

Demands of digital technology on pedagogy

The constant development of digital technologies, their importance to students, and the resulting need for the skills and competencies required to master these is changing the face of education in New Zealand, and indeed worldwide. (Dumont et. al., 2010; Johnson, Maguire and Wood, 2017). It is opening up new opportunities, requiring new skills, creating a resulting need for teachers to recognise and change pedagogy to a more interactive and less transmissive model (Abbiss, 2015; Benade, Gardner, Teschers and Gibbons, 2014). Wylie and Bonne (2016) cite Nikki Kaye, Associate Minister for Education, in her speech to the Better Asia Leadership Summit (2015), as saying “The Government’s digital strategy prioritises schools having state-of-the-art infrastructure (including high-speed reliable broadband and fully-funded uncapped data), 21st century teaching and learning and equitable access to quality content and resources.” Digital technologies are now present throughout education in New Zealand, with the 2015 New Zealand Council for Educational Research (NZCER)
survey of secondary schools recording 62% of schools having a Bring Your Own Device (BYOD) policy (Wylie & Bonne, 2016).

Digital technology is a range of tools that allow students the potential to practice 21st century skills in relevant topics through giving access to information, practise in filtering information, and the ability to communicate in a global context (Saavedra & Opfer, 2012). They are not only used to discover and master new content, but also to enable deeper learning and creativity (Fullan & Langworthy, 2014). Digital technologies are not only pedagogical tools but also provide a means for education systems to enhance the interactive, creative and analytical capabilities of students, providing increased flexibility to individualise learning (Snehi, 2011). They also have the potential to open up communication between teachers allowing the opportunity to develop and share best practice, and making teachers more accessible to their communities (Davis et al., 2015; Saavedra & Opfer, 2012). Teachers have the ability to transform learning environments and empower learners to expand their horizons, however Schleicher (2012) believes that this should not be the focus, as new technologies should be adapted to fit the learning environment, not the learning adapted to fit the technologies. However, Johnson et al. (2017) in their survey of New Zealand secondary schools found that digital platform resources in schools are underutilised, and that less than half the participating schools reported students using personal digital devices in all classes.

Barriers to the use of digital technology in the classroom identified by Johnson et al. (2017) include the cost of equipment and upgrades, affordability for parents and the cost of online services, which also impact on parental support. The Ministry of Education’s Four-Year Plan (2016) states that they will enable “access to digital learning opportunities to support 21st century practice in teaching and learning” (p. 30). However, the large financial pressures of providing devices for students has meant that funding models have been required, such as the New Zealand Ministry of Education Bring Your Own Device (BYOD) program, where these costs have been passed on to parents (Parsons & Adhikari, 2016). However, access to digital technologies by all students is an issue.
Hartnett (2017) suggests that there are differences in accessing digital technologies, with those from lower socioeconomic levels disadvantaged. The NZCER survey of secondary schools in 2015 showed that 88% of students in decile one to two schools did not have devices as their parents were unwilling or unable to buy them, in contrast to just 3% in decile 9-10 schools (Wylie & Bonne, 2016). While, according to Hartnett (2017) there is much research on the inequality in access to technology, these inequalities go beyond the availability of a computer to include such things as internet access, rural and urban environments, and type of technology (mobile phone or laptop). The 2016 survey carried out by Johnson, et al. (2017) also found that, although there was an overall increase in the number of students who had internet access at home since 2014, there was still a greater proportion of students in high decile schools than low with internet access. Hartnett’s (2017) findings also agree with this; those from lower socioeconomic communities are less likely to have a device, or access to the internet at home. In their study, Hartnett (2017) also found that students from the lower socioeconomic groups were more likely to use their device for social purposes, while those from higher socioeconomic families tended to use devices for more creative or educational purposes. Hartnett (2017) goes on to point out that initiatives from the Ministry of Education such as ‘Computers in Homes’ in 2014, while playing an important part in ensuring equity in the short term, need to be sustainable to truly close the gap.

Another barrier to integration of digital technology into education is based around teacher pedagogy. A revitalisation of education to adapt to the technology driven environment of the 21st century has created a need to rethink practice; however both Saavedra and Opfer (2012) and Snehi (2011) suggest that there has been little change in the traditional transmission model approach to teaching in secondary schools, even though research into integration of digital technology into teaching, such as the Technology, Pedagogy, and Content Knowledge (TPACK) model (Harris, Mishra & Koehler, 2009) and the Substitution, Augmentation, Modification, Replacement (SAMR) framework for the use of technology in the classroom (Puentedura, 2010) have been in evidence for some years. Harris et al. (2009) suggest that, when teachers integrate the three primary forms of knowledge; technology, pedagogy and content knowledge, they have successfully integrated digital technology into their teaching. Puentedura (2010) expands on this through the SAMR framework, the four-tier guide
to measure success in integrating digital technology into teaching practice. This framework starts with the substitution of paper with technology to complete these existing tasks. The next step in integration is augmentation of those paper tasks using technology as a tool, modification of tasks to be completed through the use of computers, and finally the replacement of traditional tasks with those that can only be completed on a computer. This requires a paradigm shift by teachers as suggested by Benade, et al. (2014).

On the other hand, Bull and Gilbert (2012) indicate that there has been a paradigm shift in thinking about education in New Zealand, leading to questions about what education is for and how students learn; and that this has influenced New Zealand educational policy development. The NZCER have designed projects to consider how difficult it is for 20th century teachers to shift their paradigms, whether they have the skills and dispositions to teach in the 21st century paradigm, and what tools teachers need to develop these (Bull & Gilbert, 2012). Johnson et al. (2017) cite Knezek and Christensen (1999) as identifying “six stages in the adoption of digital technologies: awareness, learning the process, understanding the application of the process, familiarity and confidence, adaptation to other contexts, and creative applications to new contexts” (p. 12). They go on to suggest that their survey indicated that most teachers were in the last three stages of adopting digital technologies.

It is the teacher that influences how technology is used in the classroom, however Hartnett (2017) suggests that there is evidence that, although teachers themselves have improved their understanding of the uses for technology in education, there has been little uptake of this technology in their classroom practice. Despite this, Johnson et al. (2017) reported that most schools agree that digital technologies have had a positive effect through enabling improved access to quality resources, teacher professional development, student engagement and personalised learning, meaning that more than half the students leave secondary school with the skills needed for the workplace. To produce globally competent students there should be a carefully designed curriculum, instruction and assessment with multiple disciplinary and interdisciplinary opportunities (Mansilla & Jackson, 2011). Voogt et al. (2013) suggest that significant changes in curriculum to include 21st century competencies, new teaching methods and assessment procedures are important, however these changes
may need to be incorporated through the introduction of new content within traditional structures, integration of a cross curricular emphasis, or transformation of traditional curricula to a new 21st century model.

With greater demands on teachers to prepare students for the 21st century workplace, there is a greater need for teachers to become transformative agents, requiring them to do more than just integrate the use of technology within the curriculum (Gentry et al., 2014). Voogt et al. (2013) suggest research has indicated a gap between the vision of how technology is used in a 21st century capacity, and actual practice. Teachers tend to focus on technology skills, rather than on providing students with authentic learning experiences, however because of lack of familiarity with digital technologies, teachers tend to be reluctant to take risks within their classrooms (Gentry et al., 2014).

Communication is the essence of teaching (Yu, 2013) and digital technology opens up communication between teachers and their communities, with teachers more accessible to students and their parents (Davis, Mackey & Stuart, 2015). This is a major challenge to teachers who need to have the skills to integrate technology into the classroom. However, teacher attitudes, willingness to change and pedagogical beliefs are often the critical issues preventing the success of this integration (Yu, 2013). Wadmany and Kliachko (2014) found that where teachers had a traditional and superficial knowledge of technology, their use of technology and ability to change their pedagogy was limited, as opposed to those who were already student centred in their thinking.

Traditionally, education policy focused on the provision of education; however, according to Schleicher, (2012) and Snehi, (2011), the content and the curriculum needs to be realigned to incorporate the introduction of a 21st century constructivist approach. The policy shift caused by the introduction of ‘Tomorrow’s Schools’ in the 1980s in New Zealand, led to the development of a new framework for the New Zealand Curriculum in the 1990s (Craggs, 2011; Jesson, 1995). The current New Zealand curriculum puts equal weight on both specific subject achievement objectives rather than content, and five key competencies, with a vision for students to be confident, connected, actively involved, lifelong learners (Craggs, 2011; Ministry of Education 2007, p. 8). This makes the New Zealand curriculum closely aligned to the
needs of the 21st century curriculum suggested by the Organisation for Economic and Cooperative Development (OECD) (Hipkins, 2015). The New Zealand curriculum “encourages all students to reflect on their own learning process and to learn how to learn” (Ministry of Education, 2007, p. 9). While there has been some movement towards integration of the current curriculum skills into teaching, they are still being taught through traditional values (Craggs, 2011). Similarly, the extent to which digital technologies have been adopted by teachers affects the integration of these skills, whether it be at the substitution level of the SAMR framework, or the replacement level (Parsons & Adhikari, 2016).

A 21st century curriculum should engage students by addressing global challenges across disciplines, contain globalised contexts for learning to deepen understanding and critical reasoning skills, connect to universal themes to broaden student exposure to different cultures, illuminate the global history of knowledge, and allow learning through collaboration (Mansilla & Jackson, 2011). It is generally agreed that it should also include the big ideas, tools, methods and the language of the discipline, to provide the foundational knowledge (the core content), meta knowledge (how we use this knowledge) and humanistic knowledge (what we value) required in the modern world (Mansilla & Jackson, 2011; Voogt et al., 2013). However, these skills are difficult to include explicitly in standalone courses and contexts, making them more difficult to assess (Saavedra & Opfer, 2012) creating many challenges for teachers to adopt.

Challenges for teachers

In the past, teaching was about standardisation and conformity; now it is about innovation and personalisation. As Osborne (2014) suggests. Education is experiencing a period of rapid change, both in New Zealand and worldwide. Teachers are expected to be agents of innovation through both curriculum and pedagogy, teaching students not only content knowledge but also understanding of the process of learning (Bull & Gilbert, 2012; Schleicher, 2012). In its Statement of Intent 2013-2018 (2013), the Ministry of Education states that future focussed education educates learners to be innovative and to participate and contribute to society in an economically
competitive world, thereby serving the needs of the nation. According to Schleicher (2012) and Snehi (2011), the traditional problem-solving approach of teachers is about breaking problems down into small pieces for students to solve, sequenced according to the teacher and presented from an adult perspective thereby removing student individuality. They go on to suggest that learning is now about synthesising disparate pieces of information to identify patterns, making activities the focus. Mansilla and Jackson (2011) agree that “globally competent students are mentored by teachers skilled at preparing young minds to understand and act on matters of global significance” (p. 53). This begs the question of where content knowledge fits.

Although basic content knowledge is still necessary, some believe that traditional rote-learning is no longer applicable in education today (Mansilla & Jackson, 2011). It needs to change from reproduction of past knowledge to the production of new learning. Education needs to move from being teacher centred to student-centred, from teaching to learning facilitation, from content-based to outcome-based, with assessment following suit (Mansilla & Jackson, 2011). This means a paradigm shift to change the quality of the teaching and learning process (Snehi, 2011). Technology is now very evident in the classroom, and with the continually evolving nature of this technology many students are now able to access information globally as a matter of course (Gentry et al., 2014). The interactivity of the internet and other media have meant that information is no longer a linear presentation, frozen in time as it is in print form; rather it is dynamic and ever changing (Thornburg, 2004). Although mastery of knowledge may no longer be considered as important as in the past, students do need to be able to interpret, apply and create knowledge, and digital technology is a promising tool for this (Saavedra & Opfer, 2012; Tan et al., 2015).

Digital technology, however, has not yet gained its full potential, in part due to teachers not yet maximising its pedagogical value, often just using it within a transmission model to provide text and regurgitate information (Substitution of the SAMR framework), thereby not practicing the skills required of a 21st century learner (Parsons & Adhikari, 2016; Saavedra & Opfer, 2012; Tan et al., 2015). As such, teaching now requires different content, methods and technologies, with a more interdisciplinary approach; moving from information transmission to problem solving, passive to participatory learning, from delivered wisdom to user-generated wisdom.
Wicked problems and ambiguous goals need to be set for students. Education is no longer about teaching a fixed syllabus of content as this information can now be easily accessed by students through the use of technology (Schleicher, 2012; Snehi, 2011). There is a need to rethink the relationships, practice and measurements that are fundamental in our education system (Fullan & Langworthy, 2013).

Questions of global significance are not often found in textbooks making them difficult for students to answer as simple knowledge acquisition is not involved. Mansilla and Jackson (2011) suggests that teachers should support students to gather and interpret information from a wide variety of sources, produce coherent arguments with evidence to support their views, whilst meeting the core learning requirements of the curriculum. Students should be given the opportunity to develop their beliefs and ideas on intercultural awareness through engaging cognitively and emotionally to learn other people's values and beliefs; however, teachers should also be sensitive to the delicate tensions involved whilst reflecting on their own perspectives (Mansilla & Jackson, 2011). It follows that the ability to be able to communicate in meaningful ways by considering the why, when and how of communication is also important for students; and teachers can only do this by providing multiple opportunities for students to practise and reflect on communication (Mansilla & Jackson, 2011).

Fullan and Langworthy (2014) point out that the ‘new pedagogies’ involved in education today are not about new strategies but a shift in the learning partnership between students, teachers, and learning tools such as digital technology. 21st century teachers need to be student centric, well versed in a variety of teaching and learning approaches, holistic, and digitally efficient. Snehi (2011) argues that teachers should be adaptors, communicators, learners, visionaries, leaders, role models, collaborators, and risk takers. As such, teachers are faced with the dilemma of having to change the traditional face of education systems from one of pure cognitive skills to one which enables students to become lifelong learners with 21st century global competencies (Osborne, 2014; Schleicher, 2012). The role of the teacher has now shifted from ‘teaching’ to 'learning facilitation’ and more recently to ‘facilitated and supported inquiry’ (Fullan, Cuttress, & Kilcher, 2005). With this movement towards more student-centred pedagogy, Grant and Hill (2006) identified five factors for teachers to overcome. They should be able to accept their new role in the classroom,
have more tolerance and flexibility in the learning process, be confident in integrating
digital technologies and new technology beyond the classroom, and become more
aware of the comfort levels of both the teachers and students around them.

21st century learning is about balancing a range of approaches and methods such as
‘guided discovery’ and ‘direct instruction’, and combining them to best fit the students
and context at any one place or time, requiring teachers to be adaptable through a
high level of knowledge of these different approaches (Schleicher, 2012). Teachers
need to be able to identify the best pedagogical methods for students and differentiate
accordingly; however, they cannot be expected to do this if they themselves do not
have the capacity to demonstrate the ability to apply those different approaches
themselves (Saavedra & Opfer, 2012; Schleicher, 2012). According to Fullan and
Langworthy (2014), where teachers were historically assessed on their ability to
deliver specialised content using direct instructional strategies, the new pedagogical
model means teachers are now assessed on their pedagogical capacity or repertoire
of teaching strategies, and their relationships with students to enhance the process of
learning.

Bolstad, Gilbert, McDowell, Bull, Boyd and Hipkins (2012) suggest a rewrite of the
position of disciplinary knowledge, where engagement, authentic learning,
collaborative knowledge building and knowledge systems that move between
disciplines would be better, putting disciplinary knowledge in context rather than as an
end in itself. Abbiss (2015) on the other hand promotes caution in adopting these new
ideals. She indicates concerns around equity in understanding and adoption of these
ideals by teachers, and that although there is much evidence in the adoption of these
future focussed, transformational, democratic and equitable ideals, the longer-term
implications of these changes are yet to become apparent. Both Abbiss (2015) and
Benade et al. (2014) even go as far as to question whether the ideals that have been
promoted as 21st century learning are actually new at all, and that the need for
pedagogical shifts by teachers is not new. They suggest that the qualities that define
a 21st century learner (empowerment of students and a greater democratisation of the
teaching process) are actually the qualities that have been promoted in 20th century
research, and that the only difference is the introduction of digital technologies into the
classroom. This means that the pedagogical shifts purported to be needed by teachers
are actually those brought about by the connectedness, collaborative abilities and openness of digital technology (Benade et al., 2014).

Parsons and Adhikari (2016), however, highlight the concerns of teachers regarding the integration of digital technologies into the classroom such as disruption and distraction, increased cyber-bullying, security, student management, change management, and lack of equity. They go on to cite Bruder (2014) as emphasising the need for structures to be put in place to counter these issues. However, it must be pointed out that while the allure of the exciting new technology is strong, it is not always productive (Fullan & Langworthy, 2013). Prensky (2001) first introduced the term “digital native”, referring to those who were born in the digital era, as opposed to the “digital immigrant”, or those who were brought up before digital technologies as learning tools existed. These terms have become popular in the literature, however Benini and Murray (2013) point out that there is little actual evidence that “digital natives” actually possess the skills to learn using digital technologies. Even Prensky (2009) has moved away from these terms claiming they have become less relevant with the increased use of technology by both teachers and students. Hartnett (2017) agrees, and puts forward the viewpoint that the so called “digital natives” do not have inherent abilities and that their digital abilities need to be developed. It is therefore up to schools to provide the opportunity for students to develop their digital technology skills (Hartnett, 2017).

Bull and Gilbert (2012) indicate that there has been a paradigm shift in thinking about education, leading to questions about what education is for and how students learn. In their study of perceptions of digital technology, Wadmany and Kliachko (2014) found that students wanted student-centred teaching with the teacher as facilitator to build caring relationships with students, while remaining up to date with, and using new technologies. A number of researchers agree that tensions exist because of the shift in the teacher learner relationships, teaching and learning strategies, and assessment (Abbiss, 2015; Dole et al., 2016; Fullan & Langworthy, 2013). The increased opportunities for community connections and development of the learning capacity of students often clashes with teacher beliefs regarding effective teaching and learning methods and assessment requirements that create a barrier to innovation (Abbiss, 2015). She goes on to claim that teacher discomfort arises from shifting ideas about
the relevance of importing disciplinary knowledge, with the focus moving away from knowledge, towards a more skills-based form of education.

Changing the entrenched beliefs of teachers is challenging and teachers need to be assisted with this change alongside continuous updating of professional knowledge of practice (Schleicher, 2012). Voogt et al., (2013) believe that although teachers find 21st century learning important, they do not promote it in their classrooms. To change practice there is a need to build the capacity of educators to encourage teacher self-efficacy (Schleicher, 2015; Snehi, 2011). The New Zealand government has funded a number of professional development programmes based around the development of awareness of digital technologies since 1999, from the Information and Communication Technologies Professional Development program aimed at enhancing the understanding and use of ICT in schools from administration to teaching, to the more recent developments of Te Kete Ipurangi (TKI) and ‘Pond’ providing on-line resources for teachers and their development (Ministry of Education, 2017). Johnson et al. (2017) suggest that the rapid rate of change in digital technologies means that ongoing professional development is important for teachers as they develop the integration of digital technologies into their teaching, and according to Wylie and Bonne (2016) professional development in digital fluency is a national priority for the Ministry of Education in 2017. To assist both student and teacher learning, the Ministry of Education has announced the full integration of digital technology into the New Zealand curriculum in 2018 with the intention that, by the end of year 10, all students should be digitally capable (Ministry of Education, 2017).

Teachers need to find ways to teach students to think, however to do this, teachers should acquire not only the technical capacity, but also the 21st century competencies to prepare for new pedagogical approaches to teaching and learning (Gentry et al., 2014). The TPACK model, showing how technological knowledge can be integrated with pedagogical and content knowledge is an example of one 21st century model that could help guide teachers to expand their 21st century competencies (Voogt et al., 2013). Inquiry based teaching approaches are another example of updated practice which requires a complex pedagogy, highly dependent on the knowledge and skills of the teacher due to the “unstructured” nature of the learning process, to help students develop the skills to work with complex issues (Schleicher, 2012). Schleicher (2012),
states that this approach suggests “innovative learning environments are characterised by a good balance between discovery and personal exploration on the one hand, and systematic instruction and guidance on the other, all while bearing in mind individual differences in students’ abilities, needs and motivation.” (p. 45). The development of a culture of innovation requires the development of a core technical knowledge base for the teaching profession, and the development of this pedagogy is a most critical area for professional development (Saavedra & Opfer, 2012; Schleicher, 2012).

Wylie and Bonne (2016) point out that international research has shown that it is important to match the investment put into infrastructure and hardware to the professional development of teachers. Parsons and Adhikari (2016) agree that digital devices alone are not enough. Infrastructures such as wireless broadband and the supporting policies and procedures are important. Alongside appropriate infrastructures, the study carried out by Davis et al. (2015) found that technology enables the use of a teacher inquiry process, where teachers used evidence-based practice to improve student achievement, was a driving force in effecting change within a school. Robertson (2007) highlights the brevity of time available to develop material and technical difficulties as having a significant impact in introducing technology, while Wylie and Bonne (2016) indicate the need for release time for teachers to enable collaboration and development of digital technology integration into teaching.

It is the middle leaders of a school who must deal with the tensions created by the need for teachers to develop not only their technical capacity to use digital technology, but also the skills required for the 21st century classroom. They must lead teachers through this time of change, to develop and integrate these skills into their pedagogy.

**Middle Leadership**

A number of researchers agree that teaching has evolved from standardization and conformity to more student-centred approaches, and it is the leaders who provide teachers with the tools to enable this (Lingard, Hayes, Mills & Christie, 2003; Schleicher, 2012). Although these researchers refer to the senior leadership in a
school, it needs to be pointed out that, leadership can occur at all levels within a school. Research has also shown that effective school autonomy depends on effective distribution of leadership, training and development for school leaders and appropriate support, incentives and education systems that promote leadership at all levels, from principal to teacher (Robinson et al., 2009; Schleicher, 2012; Schleicher, 2015). Grootenboer et al., (2014) highlight teachers as leaders promoting efficacy, innovation and knowledge. The OECD study, Schools for 21st century learners (Schleicher, 2015) also highlight the importance of self-efficacy for teachers, but stress that guidance is needed from leaders to allow innovation to work towards a student-centred school, provide opportunities for continuous improvement, and adopt a system-wide approach to programme development (Schleicher, 2012; Schleicher, 2015).

Successful leadership occurs when there is relational trust through expertise, active engagement in planning and practice, encouragement of team culture, sound resourcing and planning, sound professional development opportunities, and practice founded in research (Robinson et al., 2009; Ministry of Education, 2012). Bull and Gilbert (2012) suggest that successful leaders need to be able to communicate and develop ownership of a vision, mission or purpose through good communication, cognitive and relationship skills, providing autonomy. Much research has been carried out about the role of leadership and the skills required by the leader, however most has been focussed on the principal rather than those in the middle (Grootenboer et al., 2014). Effective leaders make evidence-based decisions, and provide the instructional leadership teachers require in a collaborative environment, thereby creating a modern 21st century learning environment (Schleicher, 2015).

Middle leaders are the professional leaders in the school, bridging the gap between the educational work of the classroom, leading pedagogical change, working to support classroom teachers and students, and the management and administration of the school to ensure the implementation of the school vision and values. It is the middle leaders who create the culture of a school (Cardno, 2012; Grootenboer et al., 2014). Middle leaders of curriculum are, however, often chosen for their expertise in a particular curriculum area rather than their administrative or management capabilities (Kirkham, 2005). In Grootenboer et al.’s (2014) study of middle leadership, they identified the strong importance placed on middle leaders managing not only
curriculum and administrative practices, but also the maintenance of relationships of teachers in times of change. Wider partnerships and increased communication between teachers have been identified as important, and it is the leaders that provide the opportunities for this through groups such as learning communities (Bull & Gilbert, 2012; Schleicher, 2015).

According to Craggs (2011), there is much in the literature about the critical role middle leaders play in developing curriculum and pedagogy in schools, however, as Grootenboer et al. (2014) points out, researchers have paid little attention to this area of leadership despite its critical influence on student learning. Both Grootenboer et al. (2014) and Hattie (2008) recognise middle leaders as being the critical agents of development by making learning visible and influencing student outcomes in a way that is unavailable to other leaders within the school. It is the middle leaders who are important in aligning the curriculum, pedagogy and assessment practices (Lingard et al., 2003). Curriculum leadership is now essentially the responsibility of the middle leaders as they have the expertise in their own subject area and therefore have the greatest influence on the quality of teaching and learning, and any developments or changes needed. They decide the core curriculum content to enable students to understand and work within the global community (Mansilla & Jackson, 2011; Busher & Harris, 2000; Craggs, 2011). Dole et al. (2016) suggest that the educational culture of a school has a big influence on the ability of teachers to be able to make shifts in their teaching pedagogy. This makes middle leaders key in any curriculum or pedagogical change (Craggs, 2011; Grootenboer et al., 2014), however development of middle leadership is lacking (Bassett, 2016).

The New Zealand Ministry of Education has identified the need for development of leadership at all levels in schools, however, while support is in place for principals and aspiring principals, there is little professional development for the middle leadership level (Bassett, 2016; Cardno & Bassett, 2015). The OECD study Schools for 21st Century Learners (Schleicher, 2015) points out that in many countries, principals are not offered enough professional development to be able to provide the support for learning in the 21st century. In New Zealand, principals are afforded some training for school leadership through the National Aspiring Principals’ Programme and the First-time Principals’ programme. It is, however, the middle leaders, such as heads of
curricula areas, who are the instructional leaders within the school and therefore lead the changes required by 21st century learning, that are lacking in professional development (Osborne, 2014; Craggs, 2011).

Grootenboer et al., (2014) identify three dimensions to the role of middle leadership; leading, teaching, and professional development. To lead the move from a traditional, standardised, normalised education system, transformational leadership is required, making shared vision important (Robinson et al., 2009; Robertson, 2007). Davis et al. (2015) also identified a need for a shared vision with future focused expectations as important in leading change, as this will promote ownership of ideas rather than just ‘buy in’ for digital technologies to become an integral part of practice, rather than an add on. Robertson (2007) also identified the need for time, a collaborative school-wide approach, trust and adequate support systems as being important when implementing change within the school context. Leaders should support teachers to be free to innovate in their practice, but to also be accountable for the findings, to ensure that student learning is at the forefront of change (Davis et al., 2015).

Teachers in the 21st century need continuous professional development to keep up to date with knowledge, skills and the competence required to be “high level knowledge workers who constantly advance their professional knowledge as well as their profession” (Schleicher, 2012, p11). Professional development provides opportunities for teachers to share ideas and using experts from within the school to help develop practice fosters an environment of collaboration and innovation (Davis et al., 2015). Timperley (2006) suggests that professional development is best practised on site so that it becomes part of school culture, but that this requires instructional or learning centred leadership. Because of this, it is the middle leaders who have the greatest impact on this teacher development, meaning that professional development for the school leaders themselves is important (Grootenboer et al., 2014; Snehi, 2011). Supporting a collaborative culture for teachers through networking and sharing resources is becoming increasingly important for leaders. However, there is evidence to suggest that there is an increasing amount of professional development around collaborative practice however success is less apparent (Schleicher, 2012; Schleicher, 2015). Some believe that this is in part due to leaders not creating the environment needed for this type of activity (Schleicher, 2015).
Change is one of the most complex things to cope with, and the rapid rate of change occurring currently in schools makes it even more difficult, yet it is vital for teachers to engage with it (Osborne, 2014). The trick is to not only implement change, but to also maintain that change (Spillane, 2013). The challenge faced by middle leaders in effecting change such as that needed for 21st century teaching is to provide sufficient and relevant development to their team to improve understanding and practice to enable this change (Cowie, Hipkins, Boyd, Bull, Keown & McGee, 2009; Duke 2004).

According to Fullan et al. (2005), leading change is a complex process and leaders need to be able to communicate the school vision and strategic intent of the change; to use well researched, evidenced-based information about the new approach; have a sound knowledge of the change process itself; understand teachers’ current beliefs of practice and have relational trust in order to help teachers engage in the change; have an awareness for the capacity for change; and finally have strategies in place to deal with resistance to change (Ministry of Education, 2012).

While there has been much research on leadership and the role of leaders in schools, the focus has been on senior leadership, with little focussed on the role of the middle leaders. There is little research to be found on the role of the middle leaders in the change management required to encourage teachers to integrate digital technology and 21st century skills into their pedagogy.

**The challenges of change management for middle leaders**

As previously stated, the challenge faced by middle leaders in effecting change such as that needed for 21st century teaching is to provide sufficient and relevant development to their team (Cowie et al., 2009; Duke, 2004). Change management involves a balance between beliefs and values, who should change and why; the knowledge and skills required to achieve the change, both of those leading the change and of the required changes; and finally, a vision of the successful outcome should be (Timperley & Parr, 2005).
Osborne (2014) refers to the design principles put forward by Lawson and Price (2003) when leading change. These are that to lead change there must be a purpose to believe (the school vision), the skills required to change (the pedagogical principles), reinforcement systems (collaboration and appraisal), and consistent role models (preferably the leaders themselves). To lead change such as that required to change practice, leaders should respond to the strengths and weaknesses of their teachers (Ministry of Education, 2012), encouraging and supporting a collaborative environment where teachers can help each other to improve learning for all, an environment where teachers are free to talk about their errors and difficulties, and to share their ideas for improvement (Hattie, 2008). Timperley and Parr (2005) however, refer to the complex nature of change and the limited success rate.

Many agree that school leadership is crucial to successfully lead change, while building relationships between leaders and teachers is key to leading any form of change or innovation such as that required by the introduction of digital technologies into the classroom (Davis et al., 2015; Robertson, 2007; Robinson et al., 2009). Robinson et al. (2009) highlight the importance of transformational leadership, the need to build trust through fostering a culture of collaboration, communication, and support. However, Robertson (2007) highlights the difficulties of building trust both within the school and the wider communities, thereby indicating that distributed leadership is also needed as a vehicle for change.

While it is the role of senior leaders to provide a culture that is supportive of risk taking to allow change, Ng Foo Seong and Ho (2012) believe it is the role of middle leaders to provide the knowledge and skills needed to implement instructional change. On the other hand, Bull and Gilbert (2012) suggest that change can better be implemented through the development of a ‘learning community’ whose underlying purpose is to lead change through finding new solutions to overcome existing assumptions. Middle leaders are however, the leaders of change, actively involved in change management through communicating the requirements to those involved and supporting the processes required to implement change (Geer, 2014; Ministry of Education, 2012).

When change involves altering the values and beliefs of teachers then those requiring the change should be prepared to develop a mutual understanding of those beliefs for
change to be successful (Timperley & Parr, 2005). Linsky (2009) describes the change involved in adapting to 21st century learning as the ‘distribution of loss’, as teachers are losing the comfort of their old developed practice to try something new and unknown, making support for teachers undergoing this adaptive change critical (Osborne, 2014). This form of change can often lead to teachers feeling threatened at a personal level as their own beliefs and values are challenged, and that their skills and strengths are no longer valued, making it difficult for them to fully engage with the new system (Osborne, 2014). To put the long-held beliefs of educational pedagogy aside and to alter ingrained practice will elicit resistance and a sense of loss, and therefore grief. It is the role of the leader to guide teachers through this process by understanding the individuals involved and adapting the support provided to suit (Osborne, 2014). There is a need to develop trust between leadership and teachers, where all have input into the decision-making process, ensuring shared ownership (Davis et al., 2015).

Leaders and teachers are mutually dependant and it is their reciprocal activities that are necessary to achieve organisational objectives and consequent change (Robertson, 2007). When the leadership team actively participate in exploring how digital technologies can enhance student learning, they create a culture of inquiry and enhance trust in new ideas, thereby leading change (Davis et al., 2015). Teachers are the catalysts for change (Schleicher, 2015) and when teachers are involved in leadership within a school there is more success in organisational change and improvement in student outcomes (Ministry of Education, 2012; Harris, 2008; Leithwood & Mascell, 2008).

It is important for principals to recognise the importance of the role of middle leaders in implementing sustainable change within the school and that the development of middle leaders is imperative to bring about the change in pedagogy required to enhance 21st century teaching practice (Grootenboer et al., 2014). However, in their 2016 Survey of New Zealand Schools, Johnson et al. (2017) found that although digital technologies are driving changes to pedagogy, change management is not covered in their ICT Strategic Plans. “To drive positive change a clear vision for learning is critical. Simply adding technology to a learning environment is unlikely to lead to better

This chapter has provided substantial review and critique of the relevant literature around 21st century education. Three key themes around the demands digital technology is placing on teachers, along with challenges they are facing with integration of digital technology, and where middle leadership is placed within these changes have been critiqued, providing a foundation for this research. The next chapter will present the research methodology along with the process for data analysis and ethical considerations.
Chapter 3

METHODOLOGY

Introduction

This chapter details the epistemology, the interpretive paradigm, and qualitative research methodology used by the researcher in this study. The method used in this research, including the data analysis and validity of this method are further outlined in this chapter. Finally, the considerations given to the ethics in this study and a description of the sample used is outlined below.

Epistemology

The educational researcher approaches the world with a set of ideas: their ontology (personal knowledge), axiology (values), and rhetoric (how knowledge is written about). This leads to a specific set of questions (epistemology) that can be examined in a number of ways; the methodology (Creswell, 2002, Denzin & Lincoln, 2005). My ontological view is that of an interpretivist, based on perceptions of middle leaders and teachers in their understanding of the support they need to develop their teams to encourage 21st century practice. People tend to construe things in different ways, subconsciously making judgements regarding their position within an interaction. The interpretation of these judgement tends to lead to the construction of their perceptions of their social world (Bryman, 2012; Cohen, Manion & Morrison, 2007). In this research, I will be interpreting the perceptions, or sets of meanings, of teachers and middle leaders to make sense of their preparedness for the changes brought about by the introduction of digital technology to the classroom.

The development of strategies by middle leaders to support teachers through the pedagogical shifts required by the introduction of technology into the classroom is a research problem derived from an incomplete knowledge or understanding. This is a
research problem as it exists in this particular situation but is not understood and has consequences that contribute to better understanding in the future (Booth et al. 1995).

The epistemological view I have taken in this research is interpretive. It is to understand the perceptions of teachers and the strategies that have been used by middle leaders in supporting teachers through the pedagogical shifts required by 21st century education. The research will be based on interpretive knowledge claims founded in the need to understand the complexities of the world around us to develop meanings from our experiences (Creswell, 2002). I will attempt to find understanding from a fluid situation in which middle leaders are trying to find sense of the current, rapidly changing situation in education (Osborne, 2014). I will also examine the strategies they use to do this, using assumptions that agree with the view of an interpretive paradigm as described by Davidson and Tolich (2003).

The problem faced in my own role as a middle leader, and as part of a team developed to support middle leader development within my school, is guiding middle leaders in the integration of digital technology into classrooms to further develop 21st century teaching pedagogy and curriculum in the school. The benefits of this would be to produce students who are lifelong learners, prepared for the 21st century workplace (Ministry of Education, 2013). Measurements taken by the interpretive approach are often founded in the responses of the participants to broad questions, and influenced by the researcher's own background and views. Bryman (2012) suggests that “the social world must be interpreted from the perspective of the people being studied” (p. 399) and the researcher seeks to probe beneath the surface of a problem. The participants themselves have an important role in developing the methodology with the interactive conversation enabling the voices of the participants to emerge, providing rich data via verbatim quotes in the participants own words (Creswell, 2002). The researcher brings their own history and ideas to the study, their ethics, politics, traditions and concepts of themselves leading to the paradigm of the researcher, whether they are positivist or post positivist, interpretive or constructivist, in turn driving the research design, with the methodology and consequent methods of data collection, analysis and evaluation developed from this (Denzin & Lincoln, 2005). My experiences will have an effect on my interpretation of the views of other middle leaders, but will also help to establish a rapport with these teachers and gain insight into their views.
This investigation is exploratory, exploring the challenges faced by middle leaders leading teachers in the change in pedagogy brought about the integration of digital technology into the classroom. It therefore requires an interpretive approach as it is looking at individualistic and personal views (Cohen et al., 2007). I will be searching for meanings in the responses of teachers and middle leaders using interpretive practices to try to answer the questions put forward by this research (Denzin & Lincoln, 2005).

**Methodology**

In line with an interpretive paradigm, this research will be undertaken through a qualitative approach, as it is about causes (strategies used) and outcomes (changes in teacher pedagogy) rather than focusing solely on the outcomes themselves. These causes were broken down into small ideas that form a whole, using measurements that were observational and subjective (Creswell, 2002). This research is suited to this approach because it takes into account that people attribute their own meanings to an environment, requiring a more subjective, relativistic, qualitative approach to understanding individual behaviour (Bryman, 2012; Cohen et al., 2007). The qualitative approach as an ethnographic research design is a more recent methodology and involves a wide range of procedures, including interviews to gather evidence towards a theory (Creswell, 2002). Denzin and Lincoln (2005) state that “qualitative research is a situated activity that locates the observer in the world.” (p. 3).

Qualitative research uses interpretive practices to transform the world into a series of representations or sensitized concepts, giving a general sense of guidance as to what to look for to bring meaning to the researcher (Bryman, 2012; Cohen et al., 2007). Although seen as unreliable by quantitative researchers because of its impressionistic, subjective nature, qualitative research is the better option in this case as it is about capturing individual points of view within the constraints of everyday life (Denzin & Lincoln, 2005). However, the small number of interviews carried out in research such as this does not allow generalisations to be made or replication of the study. It is a
snapshot of a particular situation at a particular point in time. Because of this, qualitative researchers are more interested in the quality of the inferences made from the data gathered from the interviews, and the contextual understanding of a concept (Bryman, 2012).

This research is about the strategies used to support teachers through a time of changing educational pedagogies, making qualitative research appropriate as it often conveys a sense of change (Bryman, 2012). The methods used in qualitative research are many, and involve open ended questions and a wide range of methods for collection of data (Creswell, 2002; Denzin & Lincoln, 2005). Interviews will be used to collect data in this research because in-depth information is required to develop an understanding of the views of middle leaders and teachers on the challenges faced by middle leaders as a result of the introduction of digital technology into the classroom, and the strategies that have been used to support teachers through the consequent changes in pedagogy (Hinds, 2000).

**Method**

Teachers and middle leaders from three mid to large sized, coeducational, state secondary schools in Auckland were interviewed. The schools were of low, mid and high decile ratings, giving the perspectives of teachers and middle leaders of students from a range of low, mid and high socioeconomic backgrounds. All three schools had been through the School Network Upgrade, providing ultra-high-speed broadband to the school, although it should be noted that it is up to the school itself to provide the infrastructure to provide Wi-Fi access within the school grounds. The three schools were reported to be in their third year of Bring Your Own Device (BYOD). In total, five middle leaders and six classroom teachers were interviewed from a wide range of learning areas, both core and option subjects. Classroom teachers had been teaching for between three and 39 years, while middle leaders had been teaching between 12 and 25 years and in a middle leadership position for between four and 20 years, giving a wide range of age and experience in both teachers and middle leaders.
This research required a purposive sampling method, where the subjects recruited have a direct link to the research questions, namely those teachers and middle leaders involved in working through the changes in pedagogy that digital technology in the classroom have brought about (Bryman, 2012). Interviews were undertaken with six classroom teachers and five middle leaders from three secondary schools (two teachers and two middle leaders from each school, although only five middle leaders volunteered to take part in the interviews), who have had digital devices available for student use in the classroom for more than one year. Sample size is dependent on the researcher and the purpose of the study with an increased chance of getting close to participants when the sample size is smaller (Bryman, 2012). This number of interviews provided a range of information without overloading either the researcher or the participating schools and teachers.

The interviews undertaken for this study were semi-structured, with a specific set of questions asked of each respondent, but with the chance for discussion to take place to develop themes and ideas as appropriate, so that conclusions could be arrived at inductively (Bryman, 2012; Fontana & Frey, 2005). Interviews in qualitative research allow the interviewee’s point of view to be investigated and developed. It allows insight into what they see as important and relevant (Bryman, 2012). Structure tends to limit the ability of the researcher to see through the eyes of the participant, however increased flexibility can be attained through asking general questions that allow understanding to build, with guiding questions added which respond to the issues deemed important to the interviewee, or to draw out ideas that relate to the research questions (Bryman, 2012).

Two sets of questions were used in this study: one set for the classroom teachers (Appendix A), the other for the middle leaders (Appendix B). The interviews included questions that allowed me to understand the perceptions of the challenges in managing the changes in pedagogy required by the introduction of digital technology into classrooms and curriculum planning, the strategies used to meet these challenges and the support received. Fontana and Frey (2005) suggest that the “interactional encounters and the nature of the social dynamic of the interview can shape the nature of the knowledge generated” (p. 341). As the interviewer, I attempted to be casual and friendly whilst maintaining a neutral disposition, a type of ‘interested listening’, as
suggested by Fontana and Frey (2005), to maintain neutrality and reduce the impact of my opinions on findings. Interviews took place in the workplace of the interviewee in a quiet and private space provided by either the interviewee or the person organising my visit to the school, with the permission of the principal.

Middle leaders’ questions (Appendix B) were initially the same or similar to those of classroom teachers (Appendix A), with further questions around successful leadership of integrating digital technology into the classroom used. The question format of the interview schedule was to ask initial open-ended questions phrased to provide answers to the research questions of this study. Each main question included a series of guiding questions that I could use to help draw out the meanings of those being interviewed. These were asked as deemed appropriated by the researcher in the circumstances described by the interviewee. I started with ‘breaking the ice’ questions to gain general information and a common understanding of the language used. Specific questions were then asked with guiding questions used to draw out interviewee perceptions and understandings. Any jargon or other topic specific language was explained to avoid any ambiguity (Fontana & Frey, 2005). I was careful of terminology when interviewing teachers, however, as a middle leader myself in a similar situation there is a familiarity to the setting in which I carried out the interviews (Bryman, 2012).

Although leadership questions were intended specifically for middle leaders, if the classroom teachers interviewed had ideas about leadership, I included guiding questions to gain an insight into teacher perceptions of leadership, to gather further relevant information to answer the research questions of this study. Interviews were carried out as semi-formal conversations with the guiding questions used to give a focus for the interview so that the specific issues of the research questions were addressed. These questions also gave some order and flow to the interview conversations while ensuring that the language used was appropriate (Bryman, 2012). The interview questions were piloted on members of my own department to help ensure flow, and highlight unexpected contingencies that could arise (Bryman, 2012).

The interviewee was not anonymous to the interviewer; however, anonymity was maintained within the transcript and data collation stage by the use of codes (T1 - T6
for teachers, M1 - M5 for middle leaders) and no mention was made of the schools involved, other than their decile rating as this was deemed relevant to the findings. The electronic data was stored on my laptop hard-drive. Access to my laptop data is password protected. I backed up the data onto an external hard-drive and this was kept in a locked filing cabinet in my workplace office.

Data Analysis

Data analysis in this study was about moving from a research question towards propositions using grounded theory (Bryman, 2012; Lofland, Snow, Anderson & Lofland, 2006) of how to move forward in helping middle leaders to develop modern teaching pedagogy in their colleagues. The form of analysis used covered Lofland et. al.’s (2006) four defining features of the analysis process: inductive analysis driven by the data with the researcher as the central agent; the interactive nature of the analysis between the researcher and the data; and the intensive labour input and time by the researcher were carried out.

The research questions were all open-ended questions that guided analysis while allowing for the development of themes and ideas from the data itself, without preconceived ideas (Bryman, 2012; Lofland et. al., 2006). Transcripts were analysed through sorting into broad categories using a systematic process, and discussing those findings in the context of the research aims (Bryman, 2012; Lofland et. al., 2006). Categorising the transcripts was deemed the most appropriate form of analysis to increase the validity of findings (Cohen et al., 2007). Constant comparison, as described by Bryman (2012) was used to ensure development of themes as interviews progressed. Initially an open coding system was used, with the categories in a constant state of revision, providing indicators of concepts that were constantly compared. The transcripts were analysed by highlighting ideas and perceptions of the interviewees. These were then put into a spreadsheet and sorted into general or common themes, with the number of teachers and middle leaders holding these ideas recorded. The themes chosen were guided by those described in the literature review and those that would help the researcher to answer the questions posed by the research aims.
While the schools from which the interviewees came were not recorded, the ideas of the teachers and middle leaders were kept separate to allow validity of data through cross checking between the two types of roles represented by the interviewees. Final data analysis used selective coding, with relationships between core categories and emerging themes examined (Bryman, 2012). The findings were presented in table form, showing the themes and the numbers of teachers, middle leaders and overall interviewees that held these ideas.

Validity

Using Cohen et al.’s, (2007) definition of validity for effective qualitative research this study is valid in its gathering of rich data from appropriate participants while maintaining objectivity as the researcher. “Validity refers to the extent to which a question or variable accurately reflects the concept the researcher is actually looking for” (Davidson & Tolich, 2003, p. 31). While various researchers have identified many different types of validity (Cohen et al., 2007; Davidson & Tolich, 2003), this research demonstrated interpretive validity as it is the researcher's interpretation of teacher and middle leader perceptions that are being used.

While the validity of interpretive research has been questioned historically based on the forms of measurement involved, where social measurements are not obvious and difficult to place values on (Davidson & Tolich 2003), this research is more suited to a theoretical interpretive form of validity. It is based on the researcher’s ideas around the need for middle leader support during this period of change in pedagogy. It used the perceptions of these middle leaders of the current situation to suggest what support is needed to help them bring about change, analysing the real-world situation against the researcher's ideas and coming up with generalisations about the current status of modern teaching pedagogy at the time of the study.

The target sample for this study is small and, while external validity can be gained when the findings are able to be generalised beyond the immediate sample studied, bias to an unknown extent exists. Even though a random sample of the target
population was taken, there is no guarantee that the target sample is representative of middle leaders and teachers as a whole or that the sample size was big enough, or not influenced by interactions between the researcher and those interviewed, the setting or even the timing of the interviews (Keeves 1997).

Reliability in this study was gained through internal consistency where a range of questions for each category were asked (Cohen et al., 2007). Triangulation of findings was obtained through the interviewing of both middle leaders and teachers, getting two perspectives of the same issue, thereby providing more reliable findings through adding depth to the inquiry (Cohen et al., 2007, Davidson & Tolich, 2003). Denzin and Lincoln (2005) suggest that gaining multiple perspectives of an issue gives increased comprehension of reality, making the interpretations more reliable. Although, due to the complex nature of human behaviour, it is difficult to capture the full spectrum of a situation using only one research method, thereby adding possible distortion to findings (Cohen et al., 2007), for the purposes of this research, interviewing both middle leaders and classroom teachers allowed me to obtain different viewpoints of the same research problem.

**Ethics**

Initially, I personally approached the principals of three mid- to large-sized, coeducational, state secondary schools in Auckland, providing Information for Participants. After a brief recruitment talk at a staff meeting, an email with Participant Information (Appendix C) introducing my study and requesting participation was sent to teachers and middle leaders. Informed consent meant that respondents were fully informed, and that their consent was voluntary (Wilkinson, 2001). In the school situation, consent to carry out research was first gained from the principal. Explanations of the purpose of the study, and asking for permission to carry out research and respecting negative responses allowed autonomy for the interviewees (Hinds, 2000; Wilkinson, 2001). Information given included the nature and reasoning behind the research project, any benefits or burdens, what interviewees were required to do, and the voluntary nature of their participation (Wilkinson, 2001). Participants were then selected on a first in first served basis and the interviews scheduled for a
time mutually convenient to the interviewer and interviewee. Participants were from different schools and although I may have met a few of them briefly at subject association meetings, I have not worked with or personally know any of them other than on a distant professional level. Any that I did know well would have been asked not to participate in the research to eliminate any chance of bias.

Cohen et al. (2007) suggests that ethically, a qualitative study is considered valid when the researcher does not try to control or manipulate variables or conditions, to accurately portray the reality of the situation at that time. However, this is difficult in the educational sense in terms of the anonymity of the respondents or the school to which they belong. As Bell (2007) suggests, there was assurance given that respondents would not be identified (confidentiality) in this study, which, as Cohen et al. (2007) and Voogt et al. (2013) suggest, improved the honesty of answers gained, thereby improving the reliability of the findings. In this study, anonymity was maintained through the use of codes to represent the interviewees. Thematic coding of the responses was used to ensure anonymity and to allow for the development of ideas to answer the final two aims of this research.

In this research, all care was taken to avoid discomfort during the interviews and the interviewee was given the choice to opt out of answering any questions they felt put them at risk. The interview was recorded and the interviewee was asked to sign a participant consent form (Appendix D) to ensure their consent was given, and a participant confidentiality agreement (Appendix E) to ensure anonymity and confidentiality. The interview was transcribed by myself and the transcript was returned to the interviewee for checking. It was explained to the interviewee that if they wished to withdraw they needed to email me with a request to withdraw their transcript up to two weeks post review of transcripts, however this did not occur. Any data collected from this transcript would have been removed from the analysis of findings by the researcher.

Cultural validity, using a cultural setting appropriate to the research aims, was obtained through interviewing those affected by the changing education pedagogies currently taking place, while maintaining a sensitivity to the participants, their cultures and their circumstances, so that the reliability of the findings of the study could be assured.
(Cohen et al., 2007; Voogt et al., 2013). In this study, it was the beliefs about modern teaching pedagogy with the introduction of devices and therefore the globalisation of education being sought. Cultural differences are inherent in modern teaching practice and it was essential for me to show respect for the participants (aroha ki te tangata) and meet with them face-to-face (kanohi kitea); observe, listen and then speak (titiro, whakarongo, korero); share and host participants generously (manaaki ki te tangata); adopt caution (kia tupato); not hurt the mana of the participants (kaua e takahia te mana o te tangata); and not flaunt my knowledge (kia mahaki) (Cram, 2001; Tuhiwai Smith, 2012).

**Summary**

This chapter presented my adopted methodology in undertaking this research. The method of data collection was described, followed by the way in which this data was analysed. Considerations for reliability and validity, was discussed, and finally, the ethical implications of my research were presented. The following chapter will present the findings of my research.
Chapter 4

FINDINGS

Introduction

This chapter outlines the findings of this study, starting with the establishment of a common language to ensure full understanding of the perceptions of those interviewed. Following this the findings of the developing themes are detailed. The themes include middle leader and teacher perceptions of: the benefits of digital devices for teaching; the effects of digital devices on teaching pedagogy; the challenges of having devices in classrooms; and the support they have received in integrating technology into the classroom. The final two themes; perceptions of the challenges faced by middle leaders in integrating digital technology into their curriculum areas, and the successful strategies that have been used to integrate digital technology follow. The last section of this chapter summarises these findings.

In total five middle leaders and six classroom teachers from three coeducational state secondary schools were interviewed from a wide range of learning areas, both core and option subjects. Middle leaders have been represented in the following findings using the codes M1 to M5. Teachers have been represented by the codes T1 to T6. Following are the findings presented in table form, showing the themes identified by the researcher, and the numbers of teachers, middle leaders and overall interviewees that held these ideas.

Developing a common language

To ensure the interviewer and the interviewee had a shared understanding of the terminology used around digital technology and 21st century learning, initial questions were focused on the understanding of what constituted digital technology and devices. When asked what constituted a device, the low and mid decile schools stated that school computer rooms or Computers on Wheels (COWs), and phones represented
the term ‘device’; whereas in the higher decile schools, students’ own laptops, tablets and phones were considered devices. In the majority of cases digital technology was used to disseminate course or content information through, for example, PowerPoints and worksheets, visual representation to reinforce teacher explanations, or for assessment presentation. In three cases a particular program or application was almost exclusively used. Only two of those interviewed recognised the interactive nature of digital technology, while only one middle leader worked with their whole curriculum area or department to modify their courses to include delivery through a digital platform. This middle leader was one of only two teachers (the other being a classroom teacher) who could articulate an understanding of the skills required by students in a 21st century learning environment.

**Middle leader and teacher perceptions of the benefits of digital technology for teaching**

Early questions were based around the benefits or having digital devices available to students for teaching purposes. These were discussed as those benefits that teachers had noticed or, in the cases of those who did not have access to Wi-Fi in their teaching area, the possible benefits teachers felt would be available. Benefits considered were of value to both the teachers and the students, and not necessarily confined to the classroom. As can be seen in the findings for this section of the interview presented in Table 4.1, teachers perceived more benefits for the students than for the teachers. The table shows the themes that emerged from the interviews, and the number of middle leaders and teachers who held these views. The total number of those interviewed, whether a teacher or a middle leader, is also shown in order to find those views that most commonly held by all interviewees.
4.1 Middle leader and teacher perceptions of the teaching benefits of having digital devices available to students

<table>
<thead>
<tr>
<th>Emerging Themes</th>
<th>Middle Leader</th>
<th>Teacher</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefit to students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved differentiation</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Improved student autonomy</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Improved individualisation</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Improved feedback and monitoring of work</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Improved student collaboration</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>More interactive</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Less interactive</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Improved student engagement</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>More student choice</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Reduced student choice</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Students can work at their own pace</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Benefit to teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved teacher sharing of resources</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Reduced time wastage</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Improved presentation of assessments</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Improved availability of classwork</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The emerging themes in this section can be divided into two areas; those of benefit to the students and, to a lesser extent, those of benefit to teachers. All middle leaders interviewed identified improved student autonomy and differentiation as the most obvious benefit that had come about due to the introduction of devices into the classroom, as opposed to only half of the teachers interviewed. Individualisation, feedback, and monitoring were also considered important, although once again more middle leaders identified this than teachers. Of benefit to teachers, five interviewees were interested in the improved sharing of resources. Few of the middle leaders or teachers considered improved collaboration, the interactive nature, student engagement and choice as positive, while some teachers even commented that choice and interactivity would reduce in importance. Teachers were more likely to point out benefits to them as teachers than middle leaders, whose focus tended to be more towards student benefits.
All middle leaders and three teachers interviewed recognised the improved opportunities digital technologies provided for students to take control of their own learning. They identified students as starting to learn the skills needed to be self-motivated and independent learners. Middle leader M1 highlighted that students could learn more about the process of learning.

_They’re learning a lot more about the process of learning than just learning for the sake of remembering things._ (M1)

The availability of digital technology was also seen as a means for individualisation of learning. It was considered important in allowing students to take control of their own learning as stated by Middle leader M2.

_For us it’s about being able to not have everyone doing everything at the same time._ (M2)

Digital technology was considered as providing the means to differentiate the work presented to students to fit their abilities and prior knowledge. As a consequence, while those that needed it could receive extra help, others could be extended on an individual basis. This was seen as a benefit by all middle leaders and once again by only half the teachers. This was often spoken about alongside individualisation of learning and teachers having more time during class to spend with individual students who need more help than others. Teacher T1 highlighted the importance of differentiation and the individualisation devices allowed.

_To allow students to learn according to their ability, according to their vested interest, according to their energy at the time, being able to utilise prior knowledge for further learning (T1)_

Freeing up of time was also considered a factor by three of those interviewed, in allowing teachers to provide better and more timely feedback to students and to monitor their work output.
Four of those interviewed considered the interactive and collaborative nature of digital technology important, while only three considered improved student choice a benefit. On the other hand, two of those interviewed considered that more choice and interaction would not be helpful. Student engagement and better presentation of assessments alongside reduced time wastage in class were also considered benefits by three of those interviewed. There was more emphasis put on disseminating information, such as the improvements in sharing information between teachers and with students, and feedback and monitoring students. In these cases, the teacher still expected to be very much in control of student learning, with little allowance or acknowledgement of full student autonomy. Often the pedagogical shifts were very much espoused, however there was little real evidence when deeper conversation was undertaken. Teacher conversations were generally centred around teacher convenience giving little credit to the students’ ability to work things out for themselves.

*Key Findings*

Middle leaders were more likely to be able to identify benefits to students, with many being able to give multiple benefits. Teachers on the other hand, were less able to think of any benefits, and those that were identified were around teacher convenience and dissemination of information, rather than autonomy, differentiation or individualisation. Few were able to link access to digital technology to a change in pedagogy.

*Effects of digital technology on teaching*

Middle leaders and teachers were asked whether the introduction of devices into their classrooms had changed the way they teach, their pedagogy. Few of those interviewed identified any changes, however this may have been due to the issues with students not actually having their own devices to use in the classroom or access to reliable Wi-Fi as seen in a later section of these findings. The number of responses to these questions was very low, as can be seen in Table 4.2, with teachers more likely to admit that there has been little to no change in what they do. The table show the
themes that emerged from the interviews, and the number of middle leaders and teachers who held these views. The total number of those interviewed, whether a teacher or middle leaders, is also shown in order to find those views that most commonly held by all interviewees.

4.2 Middle leader and teacher perceptions of how the presence of devices in the classroom has affected their teaching and pedagogy

<table>
<thead>
<tr>
<th>Emerging Themes</th>
<th>Middle Leader</th>
<th>Teacher</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Changes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Devices have changed our view of learning</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>More time with students building relationships</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>More responsive to student needs</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Authenticity of work an issue</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Authenticity not an issue</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Need to teach students how to use the devices</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Assessment needs to change</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>No change</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used as a substitution to worksheets and texts, or use of one particular program only</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Teacher is better at explaining things</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>High trust model scary</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other teachers lack understanding in how to use devices</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

In this area, there was little difference between middle leader and teacher views, although more middle leaders identified changes, as opposed to a number of teachers who noted no change in their pedagogy. Middle leader M2 identified the tensions teachers currently face, their concerns about how devices will impact on their teaching.

*I think devices are just the tool. There’s definitely a need to transform learning, but I don’t think people necessarily go in at that level. (M2)*
Teacher T2 voiced the concerns of teachers around how to combine the use of devices with traditional teaching methods. It should be noted that half of the teachers and one middle leader interviewed were only using the devices to disseminate worksheets through particular programs.

*The task is to balance as successfully as I can, the traditional use of paper and pen with the IT. I think neither one should be exclusive, and it’s just a matter of making it work together to the students’ advantage.* (T2)

Four of those interviewed felt that they had more time to build better relationships with students when using devices during class time, and were able to be more responsive to student needs, as stated by middle leader M1.

*I think in terms of interaction it’s been really nice and the kids are more willing to buy into it than if you just stand up there and feed them information.* (M1)

There is, however, some disagreement as to how devices would affect student-teacher interactions in the classroom, thereby impacting on teacher-student relationships. Middle leader M3 suggests that the presence of devices increases interaction between the teacher and the student.

*I have all my resources hyperlinked on PowerPoint and I just find that easy because it frees me up in the classroom, gets me away from the desk and…. gets me talking to the kids and see what they are doing… I use it more as a classroom management tool.* (M3)

On the other hand, middle leader M4 suggests that they would move around the room less. It is important to note however that this middle leader does not currently use devices regularly in their classes.

*But instead of walking around to see what they’re doing, the clear way to do it would be on my device. So, there’d be less circulation around the class physically, but it would be more electronic monitoring I guess.* (M4)
Five of the eleven interviewed noted that devices had changed their view of learning, while four identified a number of teachers only using devices at the substitution level of the SAMR model as noted by middle leader M4.

*I think a lot of teachers don’t actually realise how [devices] can completely change the way that you run your classroom. A lot of teachers are just in the substitution part of SAMR.* (M4)

One teacher identified the need for assessment requirements to change to incorporate the use of digital technology in the classroom. More commonly the issue of authenticity of assessment work was mentioned as a problem, as indicated by middle leader M1, although this same middle leader was not ready to tackle that problem yet.

*It is an area that I need to look at more. Especially as it becomes a bit more prolific with the use of google classroom and things like that. But again, we just try to educate the kids about it. If you do it and we catch you, that’s it.* (M1)

*We’ve looked [at bought programs for authenticity] and the licenses for those things are just huge…. We’re not charging the kids five grand a year.* (M1)

Another interesting aspect of this data is tensions highlighted around the teacher’s role in the classroom. Three teachers felt that they were better at explaining things to students and therefore needed to teach the whole class, while two middle leaders felt that they needed to teach students how to use the digital technology and the programs used. One middle leader and one teacher identified the lack of understanding of the teachers themselves in using technology, while two teachers described the use of digital technology as a high trust model and as being “scary”, as stated by teacher T3.

*I think you have to have a very high trust model to allow students to work independently on their laptops without being distracted by the media.* (T3)
Key Findings

There were not as many responses to questions around changes in pedagogy from either middle leaders or teachers. Most responses indicated only surface changes, however part of this may be attributed to the lack of use of devices by teachers in their teaching at this stage due to lack of Wi-Fi or availability of devices in the classroom, as can be seen in the next section on challenges.

While a number of those interviewed acknowledged that the presence of digital devices in the classroom have changed their view of learning, most teachers showed a reluctance and uncertainty around changing their pedagogy for something that they were unsure of how to use and could not articulate answers for this question. This can be seen by the opposing statements around how to use the digital devices, authenticity, and the role of the teacher in the classroom.

Middle leader and teacher perceptions of the challenges of digital technology in the classroom

The second research question in this study was to identify the challenges teachers have faced in introducing digital technology to their classrooms. This was an area that provided a lot of responses, however it should be noted that one school did not have consistent access to Wi-Fi throughout, meaning that students were unable to use their devices in the classroom. Two of the schools were low to mid decile and this also had an impact on their use in the classroom, as a high proportion of students purportedly did not have devices to bring. These factors influenced the answers to this question, although all teachers were enthusiastic in responding to this section of the interview. There was little difference in responses between middle leaders and teachers. These findings are presented in Table 4.3 below. The table show the themes that emerged from the interviews, and the number of middle leaders and teachers who held these views. The total number of those interviewed, whether a teacher or middle leaders, is also shown in order to find those views that most commonly held by all interviewees.
4.3 Middle Leader and teacher perceptions of the challenges presented by having digital devices in the classroom.

<table>
<thead>
<tr>
<th>Emerging Themes</th>
<th>Middle Leaders</th>
<th>Teachers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access to devices</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student don't bring devices</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Equity</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Lack of access to Wi-Fi</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Behaviour</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off task behaviour / distraction</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Off task behaviour / group work</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Off task behaviour no problem</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Restricted access to Wi-Fi needed</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Teacher Insecurities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changing mindset</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Lack of confidence means teachers must know use before giving to students</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Teachers must take responsibility for learning to use technology</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teacher must teach how to use device</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Complexity</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Rapid rate of change</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Lack of resourcing</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Assessment</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

By far the most common issue identified by both teachers and middle leaders was around availability of devices. There were a number of reasons given for this. Students not bringing their devices to school for reasons such as inconsistent use by teachers, identified by eight interviewees including the views of middle leader M4.

*Because all the kids don't have devices, the teachers aren't actually using them so why would a kid bring a device [to school] (M4)*
That’s a pipedream isn’t it. 21st century learning. Nice in theory, isn’t it? But then devices aren’t the be all and end all either. But they’re a great tool for dividing the have and the have nots. (M4)

Issues of equity such as families being unable to afford devices, were identified by five of those interviewed, as stated by middle leader M4.

And it was like, ‘oh, but we told them to have devices’. But they’re not going to because our demographic is not going to do it. And if you’ve only got a few kids in class with them, why would they bring it. Because the teachers are not actually using it. (M4)

Finally, a lack of parental support or internet at home, as suggested by teacher T4, meant that students did not bring devices.

The parents just refused to buy them. They signed an agreement saying that they would when they enrolled. (T4)

Off task behaviour was another challenge identified by five of those interviewed, often having a negative impact on teachers as described by teacher T5.

Going off line, off task, it makes me anxious, makes me annoyed. That’s a negative. (T5)

There was some confusion around the effects of groupwork on off task behaviour where five interviewees said that group work increased off task behaviour, while four said that group work reduced off task behaviour because students could not share their social media as easily, as suggested by teacher T4.

When they’re in a social group they’re more inclined to stay on task with their devices because you can’t share social media unless they were sharing with each other. (T4)

On the other hand, three of those interviewed said that off task behaviour was no different with devices, and that if students wanted to go off task, they would. Three of those interviewed suggested the use of limited access to educational sites to help control off task behaviour, as suggested by middle leader M3.
Facebook’s blocked for a very good reason, YouTube’s blocked, teachers can use YouTube but kids can’t. Teachers are allowed Facebook too. (M3)

While another middle leader (M1) linked off task behaviour to how devices were used in teaching rather than access to the devices themselves.

*It depends what you’re using devices for. ...the use of social media when they’re not supposed to is a lot more prevalent when the task they are working on is a lot more monotonous. ...if they’re just doing a google doc for the sake of doing a google doc it’s a lot worse. But if they’re using them for the sort of thing they’re used to using them for, searching for video footage, or look at YouTube clips.... I think they’re more likely to stay on task.* (M1)

Four teachers recognised the need for a change of mindset. This change was identified as being needed by both teachers and students, as seen in comments made by teacher T1.

*It’s a mindset on the part of the pupil too. I still think we’re not moving that self-management, key competency thing…. They’re still reliant on us feeding them...* (T1)

*We have to break down these silos. We have to get into more thinking. It’s a whole mindset that needs moving.* (T1)

Indications of this were evident in the comments by three interviewees who identified the need for teachers to take responsibility for making the change. Other individuals considered content more important than anything, or that the teacher is the best person to do that as shown by statements made by teacher T5.

*I do a better job… than any other YouTube videos. Because I see the kids, I feel them, I pause when I have to, I repeat when I have to.* (T5)

Indications of the change of mindset required could also be seen in comments by three of those interviewed. They commented on the need to teach students how to use the
technology and the complexity of using devices in teaching. The rate of change was also identified as a problem by one teacher. Three middle leaders identified the lack of teacher confidence in using technology as being a challenge or a barrier to progress, both shown in the statement made by middle leader M3.

*I need to feel confident with technology myself before I can take it into the classroom and I need to feel I can manage it so I don’t mind the students bringing devices but initially it was how are they going to use those devices?* (M3)

This need for a change in mindset was also evident in the comments made by both teacher T3 and middle leader M2, who both identified that the students themselves could become the teachers if given the chance.

*I just feel like young children are raised to inherently operate phones or laptops and to use the web without really being instructed to do so.* (T3)

*The kids are always happy to show that they know more than their teacher.* (M2)

Security, as identified by two of those interviewed including teacher T2.

*If we supply [laptops] there’s a security risk and even if we don’t supply them there’s a certain element of security for the kids.* (T2)

Lack of resourcing, and the focus on assessment, also identified by two interviewees including middle leader M3, were identified as challenges to a lesser degree than the issues mentioned above.

*We do tend to get caught up on credits, our school is a great school for data and for the credits … there is a balance between that and the lifelong learner stuff, the skills that are beneficial for everyday life don't really equate to credits…* (M3)

*Key Findings*
The biggest challenge facing teachers in all three schools was the students who did not bring their own devices, or even have access to the digital world, although this was considered to be for a number of different reasons. For some, it was that their families could not afford a device, or to fix a broken device. In other equally frustrating cases, students did not bother to bring devices because of intermittent use of devices in classes, indicating a lack of support by other teachers in actually adopting the use of devices in their teaching, and from leadership who did not have systems in place to promote the need for devices to parents.

Another big challenge for teachers was the issue of off task behaviour. While most were frustrated by the ease with which students had access to social media during class, a few did point out that if a student did not want to pay attention in class they would not, with or without a device. This may in part be due to the lack of understanding in how devices can be used to engage students in their learning and how giving student’s autonomy over their learning may help them to focus on their tasks.

The change in mindset required by both teachers and students, although not well recognised, was mentioned as another way to reduce off task behaviour, where students are trained in the skills required for learning rather than just the content of traditional teaching styles that still appear to dominate teacher pedagogy as shown in comments such as teacher knows best, teacher explains things properly, teacher needs to differentiate work, teacher needs to teach students how to use technology.

A third area of frustration was around how devices should be used in teaching, from the technical details of infrastructure and digital platforms, to the pedagogical shifts required by the changing student-teacher relationships inevitable with the learning focus moving from the teacher to the student.

Middle leader and teacher perceptions of the support they have received
Once challenges were identified it was relevant to move on to the support that both middle leaders and teachers had received with the introduction of BYOD into their school. Overall, both middle leaders and teachers found a lack of support in the introduction of digital technology, although they were mostly focussed on professional development. Three areas of emerging themes were identified; support within schools, other support provided through associations or outside professional development, and further challenges of taking advantage of any support that is provided. These themes are presented in Table 4.4 below. The table show the themes that emerged from the interviews, and the number of middle leaders and teachers who held these views. The total number of those interviewed, whether a teacher or middle leaders, is also shown in order to find those views that most commonly held by all interviewees.

4.4 Middle leader and teacher perceptions of the support they have received with the introduction of BYOD into their schools

<table>
<thead>
<tr>
<th>Emerging Themes</th>
<th>Middle Leaders</th>
<th>Teachers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Within School Support</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In school limited Professional Development (PD), on basic use</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Ad hoc support from colleagues</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Other Support</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject associations help</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Subject associations do not help</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Outside PD needed, needs to be higher order, deeper thinking</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Find own information on web</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Challenges</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of time</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Lack of consistent use across schools</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Lack of training of students and student teachers</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Lack of support for trialling</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Nine of the eleven interviewed found in school professional development limited to basic as stated by teacher T2, with teacher T3 even describing it as “patronising”, and middle leader M2 describing it as “scattered”.
“We have PD days and the sharing of technological experience and development in relation to IT is minimal. It seems to be always back to things like restorative learning and differentiation between boys and girls…” (T2)

Another teacher (T5) described the ad hoc learning received from colleagues as the most successful form of help in learning to use digital technology.

“…. I look for it myself. I go to teachers and say show me what to do, how did you know how to do that… and doing it in my spare time…” (T5)

Three middle leaders found that their subject associations were helpful in spreading ideas around teaching with e-learning, as describe by middle leader M3. On the other hand, one middle leader and one teacher did not find their subject associations helpful. All were from different curriculum areas so this may have been a factor, with different associations from different curriculum areas being more digital savvy than others. Six of the eleven middle leaders and teachers interviewed agreed that externally provided professional development encouraging the deeper, higher order thinking around changes in pedagogy was needed.

“We have forums for our subject area, online forums as well as cross group meetings which are in person, so every time someone posts something on the forum it comes up through email … I’m on Pond, they’re putting up resources” (M3)

Lack of support was a common discussion point in the interviews, with four of those interviewed identifying lack of time to take advantage of support offered, three identifying lack of consistency of support, and two identifying the value of professional development as being challenges. These were, however, more often brought up by teachers than middle leaders. The need to find ideas for use of digital technology being carried out in their own time, as describe by middle leader M2, though ‘surfing the web’ was described as time consuming and not consistently possible.

“You’ve got to do it in your own time” (M2)
When asked about ministry provided sites such as TKI and Pond, very little was known or they were considered not helpful for what was needed. Teacher T3 did point out, however, that teacher autonomy was needed to develop understanding of the availability of resources.

“You’re only as limited as to your own wanting or willingness to look or explore” (T3)

One teacher trialled the digital assessments for NZQA but found it very difficult because of lack of support from senior leadership in getting adequate access to devices for students to practise.

Key Findings

Devices are a tool for delivering 21st century learning, however this point seems to have been missed in the introduction of digital technology to the classroom. There is general agreement that there has been a lack of training and a lack of time given to developing the use of digital technology in delivering the curriculum to students. When asked about finding information on the incorporation of digital technology into their teaching, both teachers and middle leaders vocalise the lack of professional development time, and the ‘patronising’ workshops focussed on basic use of digital devices, rather than the pedagogy that should be discussed. Barriers to the uptake of digital technology by teachers centred around a lack of confidence and a lack of resourcing to encourage change. Most considered the professional development provided by schools as centred around the basic use of the most commonly used programs, with little provision made for teachers who were competent in the use of digital technology. There was little mention of professional development around the pedagogies required by 21st century learning and how digital technology can assist with this.

Perceptions of the challenges faced by middle leaders in integrating digital technology into their curriculum areas
As teachers, middle leaders have faced the challenges of not only integrating digital technology into their own classrooms, but also encouraging colleagues in their curriculum area to do the same. Not only should they take into account the changes in pedagogy required by the teachers they are leading, they should also drive changes in courses that naturally occur when students start to become more autonomous in their learning. Although classroom teachers articulated some of these problems, middle leaders were by far the most vocal when discussing the challenges that they have faced in the broader departmental sense. Four main types of challenges emerged from these interviews; challenges with collaboration, with infrastructure, with leadership, and for leadership. These are presented in Table 4.5 below. The table show the themes that emerged from the interviews, and the number of middle leaders and teachers who held these views. The total number of those interviewed, whether a teacher or middle leader is also shown in order to find those views and views that were most commonly held by all interviewees.
4.5 Middle leader and teacher perceptions of the challenges of change management

<table>
<thead>
<tr>
<th>Emerging Themes</th>
<th>Middle Leaders</th>
<th>Teachers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Challenges with Collaboration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation for BYOD</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Lack of sharing within school</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Lack of sharing within department</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Lack of whole school consultation</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Resistance to sharing</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Lack of senior leadership support for collaboration</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Challenges with Infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of consistency in platforms used</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Issues with infrastructure</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Disconnect between pedagogy and infrastructure</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Challenges with Leadership</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of whole school vision</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Lack of leadership or direction</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Lack of big picture thinking</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Lack of time to upskill</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Lack of allocation of resource</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Lack of support to encourage students to bring devices</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Lack of professional development</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Lack of external support</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Lack of consistent support</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Challenges for Leadership</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance to change</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Change management</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Range of abilities of teachers</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Lack of practical strategies</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Eight of the eleven middle leaders and teachers interviewed felt that there was inadequate preparation for the introduction of digital technology into their teaching pedagogy. This was highlighted by teacher T3, who found themselves totally
unprepared when students started to bring devices to school, and lamented the lack of leadup time.

“...it felt like everyone just showed up with a laptop and it was, now what am I supposed to do? I think the adjustment period can be quite disorientating.” (T3)

Middle leader M2 would have liked the time to explore the pedagogies involved before BYOD was introduced.

“Having the time to, sort of, look into all this, and work out how it’s working and why it’s working and why it’s not working, is it going to actually have to be something separate that I layer on top of everything else I’ve got to do.” (M2)

On the other hand, one middle leader, whose department has embraced the use of digital technology in delivering their courses, felt well prepared because they, as a team, had spent the leadup time in researching the use of digital technology and 21st century learning prior to the introduction of BYOD at their school.

All middle leaders and half the teachers interviewed stated that the lack of sharing of ideas, both within curriculum areas, and within the school, meant that they were not able to develop their use of digital technologies in their teaching. Middle leader M5 highlighted that there does need to be some school wide discussion of ideas for parity.

“I think it should be departmental in terms of, not necessarily that everyone uses it the same way but that the opportunities and the ability to use this in your classroom has to be intentionally nurtured within the department. And I think it should be school wide rather than department wide, so there needs to be some parity across the whole school.” (M5)

However, as teacher T2 pointed out, this lack of sharing was often exacerbated by resistance of teachers to using digital technology, and a lack of support by senior leadership in providing opportunities for sharing.
“We try to share with other people but there is this kind of resistance within the school to sharing IT. It’s kind of like an afterthought.” (T2)

Issues with the infrastructure were also seen as a big challenge by five those interviewed. The lack of consistent use of one platform such as Microsoft 360 or Google Schools for digital communication within the school was a regular complaint. One school had changed the platform it was using within the three years of BYOD meaning that teachers had to learn a new system, as stated by middle leader M5. “Infrastructure’s a big issue. But there’s also no real sort of whole school approach to the use of devices… We start something and then we stop it.” (M5)

Another school even had the senior leadership using one platform and the teachers using a completely different one, as shown by the statement made by middle leader M3. Three of those interviewed indicated issues around access to Wi-Fi. These included the problems with Wi-Fi being unavailable throughout the school or Wi-Fi access being unreliable and often overloaded. Alongside this was the disconnect between the person in charge of the infrastructure and therefore access to Wi-Fi, and the person in charge of pedagogy so that the demands for access and the need for improved infrastructure were not communicated.

“We have conflicting platforms here. We have some that use, well the school likes the Microsoft Office platform but a lot of the teachers are using the Google Classroom platform because it’s more functional for them so we have this sort of two tier thing… I would prefer that we just went with one but it seems that seniors like the one that the teachers don’t” (M3)

Five middle leaders also identified lack of vision and lack of leadership as causing problems for them. Further to this, senior leaders seen as unsure of what they wanted and lacking in the big picture thinking behind the changes in pedagogy brought about by digital technology in the classroom was also identified by two of those interviewed. As middle leader M5 pointed out, progress cannot be made without some agreement between teachers and leadership as to direction for the integration of digital technologies into teaching and what this means for pedagogy.
“For real progress to be made it needs to be discussed as a whole school, as a whole staff and decisions made. So not the sort of top down approach. It needs to be that management sit down with staff and say ‘where are we going with this’. ” (M5)

On top of this, as middle leader M2 pointed out, this will not happen without leadership from the senior leaders of the school.

“I don’t think people understand what the big picture is. … [senior leaders] don’t talk about it enough to them as a group. You’ve got to sell it. You’ve got to market it. And some people… if they’re good at eLearning they just do it themselves…. I think it’s a collective responsibility that we all help each other.” (M2)

As middle leader M5 suggested, collaboration between senior leadership, middle leadership and teaching staff was needed to develop a shared vision for the school to move forward.

“I don’t think anything will work if it’s a top down, imposed leadership. The leadership has to be a leadership that is consultative so that people’s fears are addressed, that people aren’t forced into it, but gradually it grows. So, it has to be organic, but it also has to have a clear vision and direction as a school that this is where we’re going.” (M5)

Middle leaders were often confused about what was required of them and their teachers in relation to BYOD, receiving mixed messages from senior leadership. This was shown in their feeling of lack of support for such things as time to upskill as identified by four of those interviewed. Resource allocation and the need to encourage students to bring devices were also identified by four interviewees as challenging. Consistency of professional development, both internally and externally provided, was also considered a challenge by three middle leaders and teachers. Teacher T6 shows the confusion faced by teachers when leadership does not support them well.

*I think we feel … in reality we are so far behind we’re just not used to it. The level of PD we’d need and the time…. I don’t think we would necessarily get that time if we*
magically, suddenly got Wi-Fi … to set it up properly so we could run with it at 100%.”  
(T6)

The range of abilities of teachers was identified as a barrier to integration of digital technologies within curriculum areas by two of those interviewed. Middle leader M3 highlighted that those who are less digitally able take up a lot of time to develop practice.

“Well there are varying skills of technology within the department. We have a teacher that embraces technology, that uses google docs, that embraces collaborative learning. He is very good at using the technology … so his class is in the computer lab at least twice a week. ...We have another teacher who is old school so he is learning, I’m training him up … so let’s just say it’s taking baby steps. He understands that it’s better for the kids that he learns it but it’s challenging … it’s taking a bit of time…” (M3)

This lack of understanding by teachers within the curriculum area often caused uncertainty, as described by teacher T3, which surfaced as a resistance to change by three interviewees.

“People are always afraid of what they don’t know……. Teachers are able to adapt…. then you just adapt, you change, you do what you’re told…. I think there might be some sort of limitation to people’s adaptability based upon their resistance…. When we’re forced to do something you’re less likely to want to do it” (T3)

This resistance to change lead to discussions around the need for middle leader development to cope with the need for change management by two of those interviewed. One middle leader identified the need for some practical strategies to cope with this change, as the ability to cope could be considered individually, depending on the background and resilience of teachers, as described by middle leader M2.

“It depends very much on personality, and on prior experience, and failure, and how you handle risk.” (M2)
Key Findings

Middle leaders generally found that the lack of vision within the school made it difficult for them to lead any change in their departments or curriculum areas. The lack of vision was further compounded by the lack of consultation with both middle leaders and the whole school, around infrastructure, policies and the requirement for pedagogical change. When senior leadership did not give clear direction and the resources to develop, middle leaders were left to flounder on their own, unable to make progress in isolation.

Added to this was the reluctance of many teachers to change their practice to incorporate the requirements of 21st century learning. Many agreed that it is a lack of confidence in both the vision of 21st century learning and in the teacher's own ability to let go in the classroom and allow students the autonomy to use devices to take control of their learning. This has led to a need for change management by middle leaders, however most of the middle leaders spoken to in this study have had little training or support for the successful management of this change.

Successful strategies for integrating digital technology into teaching

The findings from discussions around strategies that middle leaders have found successful showed that the type of leadership used by the middle leader was highly important in the success of integration of digital technology into the classroom. Few middle leaders questioned could actually identify successful strategies for integrating digital technology into their curriculum areas, with most of the information gained coming from one particular middle leader whose department had worked together to produce courses that were delivered digitally with some success. Only one other middle leader and one teacher were also able to answer questions in this category. The themes emerging from interviews about successful strategies fit into three categories; leadership style, strategies, and wider issues. These are presented in Table 4.6 below. The table show the themes that emerged from the interviews, and the number of middle leaders and teachers who held these views. The total number
of those interviewed, whether a teacher or middle leaders, is also shown in order to find those views that most commonly held by all interviewees.

4.6 Middle leader and teacher perceptions of successful strategies in implementing digital technology into curriculum areas.

<table>
<thead>
<tr>
<th>Emerging Themes</th>
<th>Middle Leaders</th>
<th>Teachers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership Styles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborative and inclusive leadership</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Middle leader models learning</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Leadership training</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Responsive leadership</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Distributed leadership</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Strategies for Implementation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having collaborative colleagues</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Trial and error</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Making time to plan and develop courses</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Intentional planning</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Middle leader and department vision of what students need</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Student focussed pedagogy</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Constant review and feedback</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Wider Issues</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ministry intervention to provide devices to low income families</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The type of leadership was deemed most important by two middle leaders and one of the teachers interviewed. Middle leaders M1 and M2 proposed that leadership that encouraged collaboration and inclusiveness allowed them to successfully integrate the use of digital technology within their curriculum areas.

“I think taking a collaborative approach is definitely one of the biggest successes for us… You get more buy in because more people are responsible for different aspects.” (M1)
“To me a big part of my sort of leadership role is to give reasons why, not just say we’re doing it because I want to do it. There’s got to be some sort of merit to it.” (M2)

Middle Leader M1 expanded on their type of leadership by describing the need for distributed leadership, with vision, as contributing to successful integration of digital technology into their course planning and development, aided by keeping students at the centre of development, and using feedback to inform future development.

“I’ll usually allocate tasks to people… It’s just too big for one person to handle, especially in a department. So, I like everyone having a bit of input, plus it gives them a bit of a leadership role as well.” (M1)

“We’ve got a specific purpose behind it, I think that’s the biggest driver for us… If you have a clear purpose of what you want these things for, you’re more likely to get them.” (M1)

Responsiveness was also considered important by middle leader M1 as shown by putting aside the time to plan as a group thereby helping integration of digital technology into teacher pedagogy. Not only did this middle leader feel that time helped to produce a good plan for integration of digital technology, it also allowed teachers to come to grips with the pedagogical shifts, thereby helping the leader to manage the change process.

“You’ve got to put the time in now and then it’ll pay for that… later down the track.” (M1)

“The more people that have time to get their head around the whole idea the less opposition there is towards it.” (M1)

This was backed up by teacher T3 who shared these ideas.

“I think if it was your shared passion to do something, if you were passionate about BYOD, then it would just come as second nature for you to do it. But if you’re not as on board then it becomes more of a challenge to do things.” (T3)
Teacher T3 also pointed out that when leaders model and share in the learning process, allow for trial and error, and share in the failures and celebrate the successes, the teachers they lead are more likely to be on board and easing the change process.

“I am extremely pleased to be in this department. The rapport we have.... So, because we have those kinds of relationships we’re able to share things openly and honestly. And people are approachable” (T3)

Middle leaders M1 agreed that sharing the failures and learning from them was important.

“Being able to accept that not everything works, there’s going to be something that doesn’t.” (M1)

In one of the low decile schools, a Ministry of Education intervention that provided low income families with a device for the student and affordable internet at home, with training in its use, was very successful but appeared to be a one-off experience that has not yet been repeated and only reached a limited number of students.

**Key Findings**

The most successful strategy in the integration of digital technology and 21st century pedagogy was effective leadership. Leaders who were able to promote a safe and collaborative environment within their departments were more likely to bring about the changes required to encourage 21st century education. Responsive and distributed leadership meant that the teachers within these departments had good ‘buy in’ from teachers in developing eLearning courses, as well as a willingness to take responsibility, and to put in the extra time required to develop these courses.

Although one ministry intervention in a low decile school was successful as a one off, these types of help were not seen as being sustainable, and did not promote the shift in pedagogy needed for the changes required by teachers to create in a 21st century learning environment.
Summary of findings

The aim of this research is to find middle leader and teacher perceptions of how they are supported to implement pedagogies for integrating digital technology into the classroom, the challenges faced by teachers with this integration, the challenges faced by middle leaders in managing the changes in pedagogy required by the introduction of digital technology to the classroom, and the strategies middle leaders found successful in leading this change.

While some benefits to having digital technology available in the classroom were identified, they were largely superficial. This was in part offset by the lack of identification of the effect that devices had had on classroom practice. Increased student autonomy and the ability to differentiate were highlighted by a number of teachers, however the way the digital technology was used (at the substitution level of the SAMR framework), and the need for teachers to control the learning process tended to mask these benefits. Improved communication between teachers and students was also seen as a benefit by both middle leaders and teachers, although this was once again offset by the confusion of teachers around how to actually use the devices in the classroom. Middle leaders were more likely to identify the benefits and effects on pedagogy of having digital technology in the classroom than classroom teachers.

It was acknowledged that the integration of digital technology into the classroom required support, not only with professional development, but also in the infrastructure, policies and guidelines put in place by senior leadership and the Ministry of Education. Problems with equity between students of different socioeconomic levels was often brought up by teachers from all three schools. In the two schools of mid to low decile, challenges were exacerbated by lack of Wi-Fi access and lack of support around students having devices in class. On top of this, lack of teacher confidence in using digital technology, and how to integrate it into their teaching practice, was also seen as a barrier to integration of digital technology into the classroom. Other challenges faced by both teachers and middle leaders were around off task behaviour, security, and assessment.
Both middle leaders and teachers felt that the support they had received was inadequate. In-school professional development was described as basic and ‘patronising’, while time to search and collaborate with others, both within and between schools, was hard to find. It was noted that professional development around the pedagogical shifts required for integration of digital technologies and 21st century learning was missing from both in school and external providers.

Middle leaders found that the lack of vision, consistency and understanding of the changes required by senior leadership was the biggest issue they faced. Lack of quality infrastructures and policies around the BYOD environment meant that middle leaders were left ‘rudderless’. Lack of consultation meant that there was a disconnect between the support and expectations of senior leadership with the rest of the school. Most of this information, however, came from the two schools where the infrastructure was not in place, in itself highlighting the lack of vision of the senior leadership around digital technologies and 21st century learning.

With only three interviewees commenting on success in the integration of digital technology into curriculum areas, there was little information for determining successful strategies. Overwhelmingly, the type of leadership shown by the middle leaders was the driving force for success, rather than any knowledge of 21st century learning or the use of digital technology, as it allowed for learning and change to occur as a group. In the one curriculum area that showed the most success in integration, the leader had some leadership training and displayed effective distributed leadership that allowed for teacher and student autonomy. The leader was collaborative, responsive and inclusive, putting the students at the centre of any developments. They also had a shared vision for the curriculum area and worked closely with senior leadership to assist in that change. All teachers within the curriculum area were also open to learning, making the management of change much more successful.
Chapter 5

DISCUSSION

Introduction

This main focus of this study was to investigate strategies middle leaders have used to successfully guide their colleagues in the integration of digital technology into their classrooms to further their pedagogical development towards 21st century learning. To do this, I initially examined the perceptions of middle leaders and teachers regarding the support they have received and the challenges they have faced in implementing the use of digital technologies into their teaching pedagogy. Further investigation of the perceptions of middle leaders and teachers in identifying the resulting challenges in supporting the teachers in their curriculum areas through these changes follow, and finally, the successful strategies that have been used to drive change. Interviews with middle leaders and teachers highlighted a number of challenges currently faced, however elicited few successful strategies.

The following chapter discusses the findings of this study in relation to the questions posed by the aims of this study, namely:

- What are teachers’ perceptions of how they are supported to implement pedagogies for integrating digital technology?
- What are the challenges faced by teachers with the introduction of digital technology to the classroom?
- What are the challenges faced by middle leaders in managing the changes in pedagogy required by the introduction of digital technology to the classroom?
- What strategies are middle leaders using to lead this change?
Middle leader and teacher perceptions of support for the integration of digital technology into their classroom

Some recognition of the benefits to students of the presence of digital technology in their learning was evident in the findings from this study, although few were able to link access to digital technology to a change in pedagogy. The big picture view of researchers such as Fullan and Langworthy (2014) and Sleicher (2012), who have identified digital technology as expanding the horizons of students allowing deeper learning, was less evident. Middle leaders were more likely to be able to identify benefits to students. Teachers, on the other hand, were less able to articulate benefits to students, with most benefits centred around teacher convenience, dissemination of information, differentiation and individualisation, rather than the 21st century concept of student autonomy. The benefits identified by teachers agree with findings in recent research, namely the positive effect of digital technologies through enabling improved access to quality resources, and giving ready access to information; although the ability to communicate in a global context found by Johnson et al. (2017), Saavedra and Opfer (2012), and Snehi (2011) was not identified.

Improved opportunities for differentiation and individualisation of learning for students was considered the most important benefit of having digital technologies in the classroom. Both Johnson et al. (2017) and Snehi (2011) agreed with these findings, stating that digital technology allows flexibility and improved access to individualised learning. Although Johnson et al. (2017) identified individualised learning and improved differentiation as making learning more accessible to students, thereby improving student engagement, few teachers or middle leaders in this study considered improved student engagement as an important benefit. Rather, they were more focussed on the perceived increase in off task behaviour caused by access to digital technologies. The creative and interactive nature of learning as identified by Saavedra and Opfer (2012) and Snehi (2011) was also not identified as a benefit by many teachers in this study.

Davis et al. (2015) identified digital technology as opening up communication between teachers and their communities, however, other than a few teachers commenting on the improved ability to provide ready access to classwork and to feed back to students,
the communication between teachers and students was also not considered a benefit. In this study, on the other hand, teachers did recognise the benefits of being able to communicate with other teachers and learning communities to share resources and improve practice, as also identified by Davis et al. (2015), Johnson et al. (2017), and Saavedra and Opfer (2012), even though many considered lack of time a barrier to this.

The lack of recognition of the benefits of having digital technology in the classroom and students being able to communicate with a global view and indeed the barriers commonly identified, indicates the teachers in this study generally do not have a clear understanding of how to use digital technology in their teaching practice. Nor do those interviewed appear to understand the need to reflect on their pedagogy in the light of 21st century learning and the needs of their students. The lack of responses by teachers when asked if digital technology had made a difference to their pedagogy agrees with the findings of Johnson et al. (2017), who found in their recent survey of New Zealand schools that digital platforms and technology are underutilised in schools. This implies that there is a definite gap between the vision of how digital technology should be used as described by the literature (Fullan & Langworthy 2014; Sleicher, 2012; Voogt et al., 2013) and the actual practice found both in this study and that of Johnson et al. (2017). Most responses indicated only surface changes, however part of this may be attributed more to three factors: the lack of use of devices by teachers in their teaching at this stage, lack of Wi-Fi or internet access, and lack of availability of devices in the classroom.

The reluctance and uncertainty of teachers around changing pedagogy for something that they were unsure how to use may be a result of a lack of understanding of how to use technology in teaching. One reason could be that, as Yu (2013) found, teachers need the skills to integrate technology in the classroom. This is supported by Wadmany and Kliachko (2014) who stated that teachers who have a traditional and superficial knowledge of technology have limited ability to change pedagogy. As Saavedra and Opfer (2012), and Snehi (2011) go on to state, teachers need to rethink their practice, however there has been little change in the traditional transmissive approach to teaching. Professional development is needed to assist teachers in any changes in pedagogy as a result of digital technology in the classroom.
When asked about finding information on how to incorporate technology into their teaching, both teachers and middle leaders vocalised the lack of professional development time, and the ‘patronising’ workshops based around basic use of digital technology and applications, rather than the pedagogy that should be discussed. Digital technologies are a tool for delivering 21st century learning, however this point seems to have been missed in the introduction of digital technology to the classroom (Saavedra & Opfer, 2012). Both Robertson (2007), and Wylie and Bonne (2016) identify a lack of training and time given to developing the use of digital technology in providing students access to the curriculum.

Barriers to the uptake of digital technology by teachers in this study centre around a lack of confidence and resourcing to encourage change. Most considered the professional development provided by schools as focussed on the basic use of the most commonly used programs, with little provision made for teachers who were competent in the use of digital technology. There was little mention of professional development around the pedagogies required for 21st century learning and how digital technology can assist with these. However, as Schleicher (2015), and Snehi (2011) indicate, there is a need to build the capacity of educators to encourage teacher self-efficacy, and professional development focussed on the development of pedagogy is critical to achieving this (Saavedra & Opfer, 2012; Schleicher, 2012). As Johnson et al. (2017) identified in their study, digital technologies have a positive effect on teacher autonomy through enabling improved access to teacher professional development, while Schleicher (2012) points out, teachers need constant professional development to keep up with technological developments, as technology is continually evolving (Gentry et al., 2014). The NZCER have carried out projects to consider the difficulties teachers face in adopting 21st century paradigm shifts (Bull & Gilbert, 2012), however the effect of these projects is uncertain in light of the fact that there was no evidence of knowledge of these projects by the interviewees in this study, or in the findings of Johnson et al. (2017), and Wylie and Bonne (2016).

Whole staff professional development that is not well planned to enhance the learning of all teachers, or differentiated so that the needs of all teachers in school are met, has not encouraged the deeper understanding of 21st century learning aided by digital
technology. As Dumont et al. (2010) suggest, there has been too much emphasis in professional development on actual use of digital technology rather that the learning process. Using expertise from within schools is an ideal situation for professional development, however the concepts of 21st century learning and the required pedagogical shifts is relatively new, and experts within schools are not always available. This study indicates that, at this stage, teachers are unable to take full advantage of having digital technology in their classrooms for a number of practical reasons, including a lack of access to the internet and lack of students with devices. However, the lack of understanding of the potential benefits of using digital technology in their classrooms is by far the most obvious barrier, and, until there is effective professional development focussed on the pedagogical shifts required for 21st century learning, teachers will continue to flounder and only use the digital technology available to them in a surface fashion. Professional development that encourages a change in teacher pedagogy to develop students who are 'life-long learners' (Ministry of Education, 2017) is recommended.

Challenges faced by middle leaders and teachers with the introduction of digital technology into the classroom

The biggest challenge facing middle leaders and teachers in all three schools was equity, with many students not bringing their own devices or not able to access to the digital world, although this was for a number of different reasons. Abbiss (2015) agrees that equity is an issue faced by many schools in New Zealand. Other major challenges identified were around the perceived prevalence of off task behaviour, and issues around pedagogical shifts.

Families that could not afford a device, or to fix a broken device, were a common challenge to those interviewed in this study. This agrees with the findings of Johnson et al. (2017). Barriers include the cost of equipment and upgrades, affordability for parents and the cost of online services. This also impacted on parental support for the use of devices, with some parents in lower socioeconomic areas not even providing them. Both Hartnett (2017) and Johnson et al.’s (2017) findings suggest that there are differences to access to digital technologies, with those from lower socioeconomic
levels disadvantaged as they are less likely to have a device or access to the internet at home. Parsons and Adhikari (2016) also highlight the large financial pressure that providing devices for students puts on families. Hartnett (2017) points out that initiatives from the Ministry of Education such as ‘Computers in Homes’ in 2014, while playing an important part in ensuring equity in the short term, need to be sustainable to truly close the gap. One teacher in this study described the ‘Computers in Homes’ initiative as being successful, but only for a few students. They also pointed out that this happened for a single year and was not sustainable or able to assist the number of students who needed help. There is a definite need to put a support system in place for families in lower socioeconomic areas to ensure equity in access to the global community for all students; an ideal fraught with logistical, economic and political problems.

In other equally frustrating cases, students did not bother to bring devices because of intermittent use of devices in classes. This indicated a lack of support by all teachers in the school actually adopting the use of devices in their teaching, and from leadership who did not have systems in place to promote the need for devices to parents. Research agrees that the use of digital technology in teaching has not yet gained its full potential. Parsons and Adhikari (2016), Saavedra and Opfer (2012), and Tan et al. (2015), suggest that this is in part due to teachers not yet maximising its pedagogical value, often using technology within a transmission model to provide text and regurgitate information (the substitution level of the SAMR framework). This is evident in this study with teachers who identified the benefits of digital technology as the availability of work to students outside of class time for homework, catch-up and revision. However, the lack of infrastructure within schools exacerbated these issues. As Johnson et al. (2017) suggest, it is difficult to encourage the use of digital technology by teachers and students if they do not have ready access to Wi-Fi.

Another challenge teachers mentioned was the issue of off task behaviour. While most were frustrated by the ease with which students had access to social media during class, a few did point out that if a student did not want to pay attention in class they would not, with or without a device. Parsons and Adhikari (2016) also highlight the concerns of teachers regarding the integration of digital technologies into the classroom such as disruption and distraction in the classroom, increased cyber-
bullying, security, problems with student management, change management and lack of equity. Hartnett (2017) goes further in stating that students from lower socioeconomic groups were more likely to be distracted in class by social media due to the novelty factor. Blocking access to social media sites was suggested by some teachers in this study and Bruder (2014) agrees, identifying the need for structures to be put in place to counter issues of distractedness, student management and security.

On the other hand, the prevalence of the challenges of off task behaviour was also identified in this study as possibly being in part due to the lack of understanding in how devices can be used to engage students in their learning. This included giving both teachers and students autonomy over their learning to help them to focus on their tasks. Both Schleicher (2012) and Snehi (2011) suggest that teaching now requires different content, methods and technologies, with a more interdisciplinary approach. Both teachers and students need to move from information transmission to problem solving; passive to participatory learning. Wadmany and Kliachko (2014) agree that students want student-centred teaching, with teachers as facilitators who could build caring relationships with students, while remaining up to date and using new technologies.

The change in mindset required by both teachers and students to achieve this form of learning, although recognised by only a few of those interviewed in this study, could be another way to reduce off task behaviour. What was evident in this study was the prevalence of traditional teaching styles, as shown by comments such as ‘teacher knows best’, ‘teacher explains things properly’, ‘teacher needs to differentiate work’, ‘teacher needs to teach students how to use technology’. This traditional, teacher centred approach, removing student individuality, is outcomes focussed rather than content focussed, with students mentored by teachers (Mansilla & Jackson, 2011; Schleicher, 2012; Snehi, 2011).

Gentry et al. (2014) suggests that a lack of familiarity with digital technology by teachers has led to a tendency for them to be reluctant to take risks with it in the classroom, focussing on teaching technology skills rather than providing authentic learning experiences. A number of those interviewed in this study agreed with the findings of Hartnett (2017), that digital technologies need to be taught to students, that
their abilities are not inherent but need to be developed. For others, the allure of the exciting new technology is strong, but is not always productive (Fullan & Langworthy, 2013), as seen through the often-prolific use of specific applications to impart information by some teachers in this study, while ignoring the other benefits digital technology can bring to the classroom. Abbiss (2015) agrees that the learning capacity of students often clashes with teacher beliefs regarding effective teaching and learning methods. A number of researchers (Abbiss, 2015; Dole et al., 2016; Fullan & Langworthy, 2013) have identified that tensions exist because of the shift in the teacher-learner relationship, teaching and learning strategies, and assessment.

The pedagogical shifts required by the changing student-teacher relationships inevitable with the learning focus moving from the teacher to the student. The nature of content is ever changing and dynamic (Thornburg, 2004), and teachers need to balance a range of approaches and methods, be adaptable, and identify the best pedagogical methods for students to differentiate accordingly (Schleicher, 2012). Grant and Hill (2006) suggest that teachers should have more tolerance and flexibility in the learning process, be confident in integrating digital technology beyond the classroom, and become more aware of the comfort levels of both teachers and students. Teachers are expected to be agents of this innovation through both curriculum and pedagogy, teaching not only student content knowledge but also teaching the students understanding of how they learn (Bull & Gilbert, 2012; Schleicher, 2012). Yu (2013) suggests that teachers need to have an attitude and willingness to change pedagogical beliefs. Abbiss (2015) and Benade et al. (2014) however, suggest that the ideals promoted as 21st century learning are not new, just a pedagogical shift brought about by the connectedness and collaborative abilities made available by digital technologies in the classroom. Fullan and Langworthy (2014) agree that education today is not about new strategies but a shift in the learning partnership between students, teachers, and learning tools such as technology. The prevalence of traditional ideas and teacher centred approaches of a number of teachers interviewed in this study showed that there is a definite tension in the altering of student-teacher relationships that are starting to take place in the classroom.

Linsky (2009) describes the changes involved in adapting to 21st century learning as the ‘distribution of loss’, as teachers are losing the comfort of their old developed
practice to try something new and unknown, making support for teachers undergoing this adaptive change critical (Osborne, 2014). This form of change can often lead to teachers feeling threatened at a personal level as their own beliefs and values are challenged and that their skills and strengths are no longer valued, making it difficult for them to fully engage with the new system (Osborne, 2014). The challenges described by teachers in this study highlight the tensions that teachers are facing in integrating the use of digital technology within the traditional teaching methods used. Few teachers showed an understanding of the changes in student teacher relationships, and the possibilities brought about by connectedness and the collaborative nature of learning made available by digital technologies. There was a wariness towards change in beliefs, with some able to espouse new ideals whilst showing little evidence of change when questioned further.

The challenges faced by teachers in the study range from social to pedagogical. The issue of equity is not one that can easily be overcome by teachers in the classroom or at middle leadership level. Issues of equity need to be tackled at the ministry level, however support at the wider school level could include the availability of more devices to students whose families are unable to provide them themselves. However, once again this comes back to Ministry level as the resourcing required to achieve this is currently prohibitive to most schools.

On the other hand, the issues of lack of devices due to inconsistent use by all teachers, off task student behaviour and the mindset shifts of the teachers and students are challenges that effective leadership and clear vision could solve. The management of the changes required by teachers to make the pedagogical shifts in the use digital technology to change the student teacher relationship, allowing students autonomy over their learning, is essential to overcoming the challenges currently faced by the middle leaders and teachers interviewed in this study.

**Challenges faced by middle leaders in managing changes in pedagogy**

Middle leaders generally found that the lack of vision within the school made it difficult for them to lead any change in their departments or curriculum areas. This lack of
vision was further compounded by the lack of consultation with both middle leaders and teachers around infrastructure, policies, and the requirement for pedagogical change. Dole et al. (2016) suggest that the educational culture of a school has a big influence on the ability of teachers to be able to make shifts in their teaching pedagogy. Davis et al. (2015) also identified a need for a shared vision with future-focused expectations as important in leading change, as this promotes ownership of ideas. While Robinson et al. (2009) and Robertson (2007) both identify that transformational leadership is required, making shared vision important in leading this type of change. According to Fullan et al. (2005), leading change is a complex process and leaders need to be able to communicate the school vision and strategic intent of the change. Middle leaders in this study all identified a lack of school vision as making leading the introduction of digital technology of the classroom very difficult.

Alongside a lack of clear direction, lack of resourcing, including infrastructure, meant that middle leaders were left to flounder on their own, unable to make progress in isolation. Both Wylie and Bonne (2016), and Parsons and Adhikari (2016) identify infrastructures such as wireless broadband and the supporting policies and procedures as important in integration of digital technology into the classroom environment. In one of the schools visited in this study, wireless internet was not available throughout the school, and in another, the wireless internet was unreliable. Common among all three schools was the lack of communication between those in charge of infrastructure and those in charge of pedagogy and digital platforms. These issues created a mismatch between expectations and practicalities, providing added challenges and frustrations to teachers and middle leaders who were expected to integrate the use of digital technologies into their teaching, often causing them to ‘give up’. There is agreement among researchers that school leadership is crucial to successfully lead change, while building relationships between leaders and teachers is key to leading any form of change or innovation such as that required for the introduction of digital technologies into the classroom (Davis et al., 2015; Robertson, 2007; Robinson et al., 2009). This was not able to occur in situations where these mismatches were found in the schools in this study.

Added to this was the reluctance of many teachers to change their practice to incorporate the requirements of 21st century learning. As Gentry et al. (2014) point
out, lack of familiarity with digital technology means teachers are reluctant to take risks in their classrooms. This is reinforced by Yu (2013) who suggests that the lack of willingness, and attitudes against change, prevent the success of digital integration. Many comments in this study indicated that it is a lack of confidence in both the vision of 21st century learning, and in the teacher’s own ability to let go in the classroom to allow students the autonomy to use devices and take control of their learning, that is limiting the successful adoption of digital technology in the classroom. To overcome this, middle leaders must be able to successfully manage change, however most of the middle leaders spoken to in this study have had little training or support in change management. Johnson et al. (2017) agree that although digital technologies are driving changes to pedagogy, change management is not covered in school ICT strategic plans. It is the leaders who provide teachers with the tools to enable the adoption of more student-centred approaches (Lingard et al., 2003; Schleicher, 2012), through encouraging and supporting a collaborative environment where teachers can help each other to improve learning for all, are free to talk about their errors and difficulties, and can share their ideas for improvement (Hattie, 2008).

The lack of both confidence and change shown in this study agrees with the findings of Schleicher (2015), who states that leaders are not creating the environment needed for this type of development because of lack of opportunity to collaborate. Middle leaders are critical in developing and aligning curriculum and pedagogy (Craggs, 2011; Grootenboer et al., 2014; Hattie, 2008; Lingard et al., 2003). Many agree that it is the middle leaders that drive change (Ministry of Education, 2012; Harris, 2008; Leithwood & Mascell, 2008), and are actively involved in change management through communicating the requirements to those involved, thereby supporting the processes required to implement change (Geer, 2014; Ministry of Education, 2012). According to Fullan et al. (2005), middle leaders must have a sound knowledge of the change process itself, understand teachers’ current beliefs of practice, and have relational trust in order to help teachers engage in the change.

The challenge faced by middle leaders in effecting change such as that needed for 21st century teaching is to provide sufficient and relevant development to their team to improve understanding and practice to enable this change (Cowie et al., 2009; Duke, 2004). Leaders should support teachers to be free to be innovative in their
practice, but to also be accountable for the findings to ensure that student learning is at the forefront of change (Davis et al., 2015). Professional development providing opportunities for teachers to share ideas, and using experts from within the school to help develop practice fosters an environment of collaboration and innovation (Davis et al., 2015; Timperley, 2006). Professional learning communities could give teachers the opportunity to develop their own global competence as well as pedagogy (Mansilla & Jackson, 2011) and a collaborative culture for teachers through networking and sharing resources is becoming increasingly important for leaders (Bull & Gilbert, 2012; Schleicher, 2012; Schleicher, 2015). A common challenge identified by both middle leaders and teachers was lack of time to collaborate with others and reflect on practice.

It is the middle leaders who have the greatest impact on teacher development, meaning that professional development for the school leaders themselves is important (Grootenboer et al., 2014; Snehi, 2011). The development of middle leaders is imperative to bring about the change in pedagogy required to enhance 21st century teaching practice (Grootenboer et al., 2014) and the integration of digital technologies to the classroom. The one middle leader in this study who had undergone some leadership training proved the most successful in guiding the teachers of their curriculum area in the integration of digital technology and 21st century teaching practice. While the New Zealand Ministry of Education has identified the need for development of leadership at all levels in schools, currently support is only in place for principals and aspiring principals, with little professional development for the middle leadership level (Bassett, 2016; Cardno & Bassett, 2015).

While senior leadership should provide the vision, infrastructure and supporting policies to provide full use of digital technologies in a school, as well as time to collaborate, it is the middle leaders that must actually drive any change in pedagogy. This is not possible, however, in an uncertain environment with the limitations and challenges identified by both the middle leaders and teachers in this study. Alongside this, the lack of understanding by middle leaders around the requirements to successfully manage the changes required to shift teacher pedagogy, the need to support teachers through the challenges of this change, must be addressed. Once again, professional development is key, not only around the change in pedagogy, but also development of middle leadership potential to manage change.
Successful strategies used by middle leaders

The principles for leading change, the need for vision, pedagogical skills, collaboration and leaders as role models (Osborne, 2014) are not very evident in the findings of this study. This is highlighted by the lack of suggestions of strategies that have worked by those interviewed, and is also seen in the lack of successful full integration of digital technology into classrooms. Although one ministry intervention in a low decile school was successful as a one off, these types of help are not sustainable and do not promote the shift in pedagogy needed for the changes required by teachers to teach in a 21st century teaching environment.

The main strategies that were identified as successful in this study were the result of the effective leadership exhibited by only one middle leader. The leader who was able to promote a collaborative and sharing environment within their department was able to bring about the changes required to encourage 21st century pedagogy. Responsive and distributed leadership meant that the teachers within this department had good ‘buy in’ in developing eLearning courses allowing a degree of student autonomy, as well as a willingness to take responsibility and to put in the extra time required to develop these courses. As suggested by Timperley and Parr (2005), when change involves altering of the values and beliefs of teachers, then those requiring the change should be prepared to develop a mutual understanding of those beliefs for change to be successful. Schleicher (2015) suggests that a system-wide approach to programme development should be adopted, while Bull and Gilbert (2012) suggest that successful leaders need to be able to communicate and develop ownership of a vision. The success of the curriculum area that worked as a team to successfully integrate digital technology use into their courses is evidence of this.

This group showed that successful leadership occurs when there is relational trust through expertise, active engagement in planning and practice, encouragement of team culture, sound resourcing and planning, sound professional development opportunities, and practice founded in research (Robinson et al., 2009; Ministry of Education, 2012). Middle leaders should have an awareness of the capacity for
change, and have strategies in place to deal with resistance to change (Ministry of Education, 2012), however, as Bassett (2016) points out, development of middle leadership is lacking, as is evidenced in the findings of this study. Professional development of middle leaders to provide the conditions that allow teachers to develop their pedagogy to embrace the pedagogical changes required by learning in the 21st century is recommended for the future.

Conclusion

The main conclusions that have emerged from this study include:

- The challenges of equity for both students of low socioeconomic families and low decile schools are currently a barrier to successful integration of digital technology into the classroom.
- The lack of devices in the classrooms of BYOD schools, due either to equity or apathy on the part of students, parents and teachers is also a barrier to integration of digital technology into the classroom.
- Lack of teacher understanding of the concepts of 21st century learning and their consequent resistance to change is inhibiting the changes in pedagogy required for 21st century learning.
- The need for effective leadership at both the senior and middle leadership levels is also inhibiting the development of teacher pedagogy.

This research concludes that both teachers and middle leaders from all three schools in this study, from low, mid and high decile areas, expressed concerns around equity. Key to the development of 21st century learning is access to the global community and this cannot be achieved without access to the internet. Teachers in this study highlighted issues with families unable to afford devices for their children, or even access to the internet at home. These concerns were also noted in the recent surveys carried out by Johnson et al. (2017), and Wylie and Bonne (2016). Although the Ministry of Education has put initiatives in place such as ‘Computers in Homes’ (Hartnett, 2017), as one teacher in a low decile school pointed out, it worked well for the limited number of students who were part of the initiative, but it was only for one year and did not reach all the students who needed help. If all students are to be able
to access the global community through the internet, there needs to be sustainable assistance put in place for those of lower socioeconomic families to be able to afford both devices for students and internet at home.

Another conclusion that is also a part of the equity issue, comes with school infrastructure. There were definitely issues with access to Wi-Fi in the mid and lower decile schools that took part in this study, from reliability to large ‘blind spots’ where not even teachers could access Wi-Fi. If teachers are to immerse themselves in the changes in pedagogy identified when devices are brought into the classroom, they need to be certain that it is going to work for them when they need it. This unreliability in infrastructure often lead to inconsistent use by teachers and students alike. A general lack of devices in the classroom was also found in schools, where students who did have devices still did not bring them because they weren’t being used in all classes. As Hartnett (2017) points out, although teachers have improved their understanding of uses for technology, uptake of use in classroom practice is still limited. A number of teachers interviewed in this study were willing to try new things and could articulate benefits of having devices in the classroom, but could not take advantage of the benefits themselves as they were unable to rely on access to the internet for their students, either through students not having devices or the unreliability of the school infrastructure. Reliable internet access and a consistent infrastructure is needed to further the development of the uses of digital technology in teaching.

A further conclusion that this study has highlighted is issues around teacher understanding of how access to digital technology in the classroom could improve the learning experience for students. Although a number of teachers showed awareness of the TPACK (Harris et al., 2009) and SAMR frameworks (Puentendura, 2010), most were unable to align what they were doing in the classroom with them. A general lack of confidence in using devices was shown. This lack of confidence came about through various means. Some teachers and middle leaders described a lack of confidence in either themselves or other teachers in using the technology, while others were not confident that students would be able to cope with the distractions provided by internet access and felt that the devices would detract from learning. Some teachers did not
feel that there were any advantages to having devices other than to provide access to classroom resources and present assessments. Findings of this study agree with Johnson et al. (2017), who suggest that teachers are at the stage of gaining familiarity and confidence with using devices in their teaching, adaptation to other contexts and creative application to new contexts. There is, however, still much development needed for teachers to fully understand the implications of having devices in the classroom and how this can change their pedagogy to provide a more student-centred approach to 21st century education.

A final conclusion that can be drawn from this study is that both professional development and teacher self-efficacy is needed to achieve this, however it should be guided by leaders. The final, and perhaps most pressing issue identified in this study is the importance of effective leadership and change management. Research has shown that effective school autonomy depends on distribution of leadership, training and development for school leaders, and appropriate support, incentives and education systems that promote leadership at all levels, from principal to teacher (Robinson et al., 2009; Schleicher, 2012; Schleicher, 2015). A common challenge expressed in this study was the lack of vision, consistency or consultation by senior leadership. Lack of vision left teachers without a clear direction and consequent apathy about making efforts to investigate the possibilities brought about by the presence of digital technology in the classroom. The digital platform used in two of the schools had changed repeatedly over the past few years, meaning that those who were not confident using the technology were left confused and unwilling to learn any new system as they felt that change was likely to occur again. In one case, the platform encouraged by senior leadership was completely different to that used by the teachers and students. This highlights the problems of lack of consultation between senior leadership and teachers, and in some cases even between those in charge of infrastructure and those in charge of curriculum and pedagogy. Senior leadership in schools needs to provide a shared vision of how digital technology and 21st century learning can be incorporated into their school, however they themselves need professional development to fully understand the impacts of this. It is the middle leaders who are the go between for senior leadership and teachers. Middle leaders drive the changes to achieve the vision of the school, however this study showed little
support for them to develop the skills required to be successful in leading change of this proportion.

The one curriculum area in this study that has reached beyond the substitution or augmentation stage of the SAMR framework (Puentendura, 2010) reached this stage because of effective distributed leadership by the middle leader, promoting a collaborative team with a shared vision and the resulting enthusiasm to spend the time developing units of work and courses that take advantage of student access to devices. This view is backed up by my own experiences of working in a curriculum area lead in a similar fashion, with a team that has developed digital courses that encourage student autonomy in learning. This was achieved through middle leaders with leadership training, and the building of a team who were willing to spend the time necessary to fully research and develop flexible units of work and willing to change their pedagogy. As Grootenboer et al. (2014) and Snehi (2011) point out, it is the middle leaders who have the greatest impact on this teacher development, and the development of middle leaders is imperative to bring about the change in pedagogy required to enhance 21st century teaching practice (Grootenboer et al., 2014) and the integration of digital technologies to the classroom. The New Zealand Ministry of Education has also identified the need for development of leadership at all levels in schools, but currently support is only in place for principals and aspiring principals, with little professional development for the middle leadership level (Bassett, 2016; Cardno & Bassett, 2015). The lack of integration of digital technology and development of 21st century pedagogy found in this study highlights the need for professional development for all members of the teaching and leadership staff of a school to enhance their understanding of 21st century learning and the advantages brought about by digital technology in the classroom, with a specific need for leadership training for middle leaders (Bassett, 2016).

**Recommendations**

Based on the findings and conclusions of my research there are a number of recommendations that could potentially aid in the effectiveness of middle leaders in
leading the changes required for successful integration of digital technology into classrooms to develop 21st century learning.

Recommendations for the Ministry of Education

Equity of access to digital technology is necessary for all students to succeed in education in the future. This is a wider issue that is not easily solved at school level since, as Johnson et al. (2017) and Wylie and Bonne (2016) suggest, this is a socioeconomic issue. While the Ministry has put some initiatives such as ‘Computers in Homes’, these have been ineffective (Hartnett, 2017). Schools need to be resourced so that they can ensure student access to digital technology in the way that best fits their school population. Families from lower socioeconomic areas need assistance with access to the internet to allow students to use digital technology at home.

Teachers also need adequate access to the internet at school. Poor infrastructure meaning that there was inconsistent access to Wi-Fi was suggested by those interviewed in this study as causing limited uptake of digital technology in teaching, as suggested by Hartnett (2017). The Ministry of Education has introduced the Schools Network Upgrade (SNUP) initiative, however this only provides network to the school and not within the school. Those schools from lower socioeconomic areas struggle with finances and the need to upgrade their infrastructure is not seen as a high priority. Schools need resourcing to be able to provide the infrastructure needed for successful use of digital technology by all students.

Schools also need resourcing to be able to provide adequate professional development and time to best suit their teachers. Issues around the patronising nature of in school professional development and the lack of time to be able to collaborate were commonly expressed by those interviewed.

Recommendations for Senior Leadership

Provision of professional development is critical (Saavedra & Opfer, 2012; Schleicher, 2012), and needs to be addressed by senior leadership. The findings of this study
suggest that, up until now, professional development has been based on basic skills, while a number of those interviewed felt it was patronising and of no use to those who were already digitally savvy. Professional Development needs to be focused on 21st century teaching and learning rather than on how to use digital technology in the classroom.

Middle leaders, themselves need professional development to assist them in leading their teachers through the changes brought about by the introduction of digital technologies into the classroom. As Bassett (2016) and Cardno and Bassett (2015) suggest, leadership development for middle leaders is lacking. On the other hand, according to Wylie and Bonne (2016) professional development in digital fluency is a national priority for the Ministry of Education in 2017.

Another area that was highlighted by these findings is the lack of vision within schools. To lead any change vision is important. Voogt et al. (2013) suggest research has indicated a gap between the vision of how technology is used in a 21st century capacity, and actual practice. Many of those interviewed in this study indicated that they felt confused and frustrated as there was no direction from senior leadership. The lack of collaboration and consistency by senior leadership has made leading change very difficult for middle leaders. Senior leadership needs to develop a shared vision about how digital technology and 21st century learning should look in their school to provide direction for staff to develop professionally.

**Recommendations for Middle Leaders**

There were few examples of successful integration of digital technology into teaching found in this study. Those that worked included a shared vision for the curriculum area, clear and consistent communication and collaboration, and an environment that encouraged innovative practice. Effective leadership within a curriculum area is key to leading these changes and reducing the insecurities of teachers as they move through this time of change. Effective leaders make evidence-based decisions, and provide the instructional leadership teachers require in a collaborative environment, thereby creating a modern 21st century learning environment (Schleicher, 2015). Taking the
time to gather evidence, research and inquire into practice around digital technology and 21st century learning allows teachers to feel secure in making the changes for 21st century learning and integration of digital technology.

**Limitations of this study**

Due to the complex nature of human behaviour, it is difficult to capture the full spectrum of a situation using only one research method, thereby adding possible distortion to findings (Cohen et al., 2007). For the purposes of this research, interviewing both middle leaders and classroom teachers allowed the researcher to obtained different viewpoints of the same research problem. This study is limited by the number of teachers and middle leaders interviewed and the types of schools that took part. The small number of interviews carried out in research such as this did not allow generalisations to be made or replication of the study, but represent a snapshot of the state of integration of digital technology into classrooms and how middle leadership is coping with the resulting changes in schools at this particular point in time. Because of this, the inferences made from the data gathered from these interviews provides a contextual understanding of the current situation (Bryman, 2012). However, the small sample size did increase the chance of the researcher having the ability to get close to participants and have the time to discuss the issues in greater depth (Bryman, 2012).

Even though a random sample of the target population was taken, there is no guarantee that the target sample is representative of middle leaders and teachers as a whole, or that the sample size was big enough or not influenced by interactions between myself and those interviewed, the setting or even the timing of the interviews (Keeves, 1997).

Although the three schools were coeducational and from low, mid and high decile areas, they were still medium to large size urban schools. Most students that attend these urban school have the availability, if not the income to access the internet at home, unlike those students from remote rural areas, meaning that interventions can be put in place to assist these students. Students also have ready access to facilities
to maintain their devices or replace them when necessary. Teachers also had more opportunities to network with other teachers in their curriculum areas, even though many did not take advantage of these opportunities. The larger schools also have more teaching staff to work together to develop pedagogy, even though this did not always occur. Despite these limitations, many of the findings from this study agree with those of the recent surveys carried out by Johnson et al. (2017) and Wylie and Bonne (2016), indicating that the issues identified highlight areas that school leaders can improve on as they work towards developing pedagogy and curriculum to take full advantage of digital technologies to enhance 21st century student learning.

**Areas for further research**

The focus for this research was to find middle leadership strategies that have been successful in the integration of digital technology into the classroom by middle leaders. The findings of this study highlighted many of the challenges faced by both teachers and middle leaders in managing the changes in pedagogy. However, few successful strategies were identified. Some of the challenges teachers and middle leaders face, such as equity issues, are not able to be overcome at the middle leadership or curriculum level. However, what has become evident is the lack of vision, or even understanding around how digital technology can be incorporated into education, and the basic requirements in terms of infrastructure and support in policy and professional development needed. Further complicating the issue for middle leaders was a lack of teacher autonomy. Many teachers were able to articulate the challenges they face in the integration of digital technology into their teaching, however were unable to provide information on where they could go for help. As such, the two main areas for further study that have been highlighted by the findings of this study are the need for improved understanding of the use of digital technology in education at senior leadership and governance level, and the need for teacher autonomy to make improvements in pedagogy.
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Appendix A

Teacher Interview Questions

How are teachers supported to implement pedagogies for integrating digital technology into classrooms

1a) How long have you been teaching?
1b) When I say device, what does that mean for you?
1c) How long have the students in your classes had their own devices to use during class time?

2a) How has the presence of devices in your classroom impacted on your teaching?
   • Do you / Have you felt pressured into changing the way you teach? If so in what way?
   • What are some of the positive changes has this meant for your teaching?
   • What are some of the challenges you have faced with digital technology in the classroom?

2b) Has the presence of devices in the classroom changed the way you design your courses?

3) What problems have you faced in integrating devices into your classroom?
   • Have you had any technical issues (SNUP, internet access)
   • Has there been problems with device choices?
   • Do all students have access to a device?
   • Is there a problem with off task behaviour?
   • Do you have problems with social media access?
   • Do you feel you still have “control” of your classes?

4) What sort of support have you had in (overcoming the challenges of) integrating the use of devices in your teaching?
   • What sort of professional development have you had to help your integration of devices?
   • Have you done research on the impacts of digital technologies and 21st century learning? If so where have you got your info from? Was it useful?
• Have you had any help designing your course? A framework to work with?
• Have you had help with how you can change the way students approach learning with a device?
• Who has given you the best support?
• What worked well for you?
• What didn’t work well for you?
Appendix B

Middle Leader Interview Questions

What are the challenges faced by middle leaders in managing the changes in pedagogy required by the introduction of digital technology to the classroom?
What strategies are middle leaders using to lead this change?

1a) How long have you been teaching?
1b) How long have you been a middle leader?
1c) When I say device, what does that mean for you?
1d) How long have the students in your classes had their own devices to use during class time?

2a) How has student access to devices in class impacted on teaching in your department / faculty?
   - Do you / Have you felt pressured into changing the way you teach? If so in what way?
   - Has this been the case for your colleagues too? What evidence do you have of this?
   - What are some of the positive changes has this meant for your teaching and that of the teachers you lead?
   - What are some of the challenges you and the teachers you lead have faced with digital technology in the classroom?

2b) Has the presence of devices in the classroom changed the way you design your courses?

3) What problems have you and your colleagues faced integrating digital technology into the classroom?
   - What sort of professional development have you had to help you through this process?
   - Have you done research on the impacts of digital technologies and 21st century learning? If so where have you got your info from? Was it useful?
4) What support have you had as a middle leader to lead your team in the integration of digital technology into your pedagogy and curriculum?
   • Have middle leaders been given any help with how to develop courses that integrate digital technology
   • Have you had discussions around what learning in the future should look like?
   • Is there a vision in the school around how learning should look in the future?

5) What strategies have you used to support your colleagues in integrating the use of devices into your courses?
   • Where has your best support come from?
   • What worked well for you?
   • What worked well for your colleagues?
   • What didn’t work well for you or your colleagues?
Appendix C

Information for Participants

Research Project Title: An investigation into the challenges middle leaders face in leading the integration of digital technology into the classroom.

Synopsis of project
As a middle leader of a large New Zealand secondary school, I have recently been faced with the challenges of integrating digital technology into the classroom and curriculum. The introduction of technology has opened up a world of information for students, yet has led me to examine both my role as a classroom teacher and as a leader of my learning area. I feel I have had to lead the teachers in my team in redefining their own roles, as well as the courses we provide students, with limited support.

This research will identify some of the difficulties facing both teachers and middle leaders who are leading the changes brought about by the introduction of digital technology into their classrooms and the development of their learning areas.

What I am doing
I am conducting interviews to gain an insight into the opinions of teachers and middle leaders faced with introducing digital technology into their classrooms and the curriculum. I hope to gain some insight into their perspectives and some of the successful strategies they are using to manage this process.

What it will mean for you

- Teachers and middle leaders who volunteer to take part in an interview will be asked to meet with me for no more than one hour at their convenience.
If you agree to participate, you will be asked to sign a consent form. This does not stop you from changing your mind if you wish to withdraw from the project. However, because of my schedule, any withdrawals must be done within two weeks after I have interviewed you. You may request to read the transcript of the interview to ensure that I have correctly understood you views.

Your name and information that may identify you will be kept completely confidential. All information collected from you will be stored on a password protected file and only you, the researcher and my supervisor will have access to this information.

Please contact us if you need more information about the project. At any time if you have any concerns about the research project you can contact my supervisor: Martin Bassett, phone 815-4321 ext. 8501 or email mbassett@unitec.ac.nz

**UREC REGISTRATION NUMBER: 2016-1076**

This study has been approved by the UNITEC Research Ethics Committee from 8/12/16 to 8/12/17. 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 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix D

Participant Consent Form

Research Project Title: An investigation into the challenges Middle Leaders face in leading the integration of digital technology into the classroom

I have had the research project explained to me and I have read and understand the information sheet given to me.

I understand that I don't have to be part of this research project should I choose not to participate and may withdraw at any time prior to the completion of the research project. I understand that everything I say is confidential and none of the information I give will identify me and that the only persons who will know what I have said will be the researchers and their supervisor. I also understand that all the information that I give will be stored securely on a computer at Unitec for a period of 10 years.

I understand that my discussion with the researcher will be taped and transcribed. I understand that I can see the finished research document.

I have had time to consider everything and I give my consent to be a part of this project.

Participant Name: …………………………………………………………………………………………………

Participant Signature: …………………………. Date: ……………………………

Project Researcher: ………………………………… Date: ……………………………

UREC REGISTRATION NUMBER: 2016-1076

This study has been approved by the UNITEC Research Ethics Committee from 8/12/16 to 8/12/17. 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 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix E

Participant Confidentiality Agreement

Research Project Title: An investigation into the challenges Middle Leaders face in leading the integration of digital technology into the classroom

Participant’s Name:
Phone number:
Email:

I ____________________________________________________________________________ (full name - please print)

Agree to treat in absolute confidence, all information that I become aware of during the course of participation in the above research project. I agree to respect the privacy of those involved and will not divulge in any form, information with regard to any participating person or institution and agree to not retain or copy any information involving the above project.

I am aware that I can be held legally liable for any breach of this confidentiality agreement and for any harm incurred by individuals or organisations involved, should information be disclosed.

Signature: ..........................................................  Date: ........................................

UREC REGISTRATION NUMBER: 2016-1076

This study has been approved by the UNITEC Research Ethics Committee from 8/12/16 to 8/12/17. 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 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Declaration

Name of candidate: Linda Haycock

This Thesis/Dissertation/Research Project entitled: Ways in which middle leaders support teachers to integrate digital technologies is submitted in partial fulfillment for the requirements for the Unitec degree of Masters in Educational Leadership and Management

Principal Supervisor: Martin Bassett

Associate Supervisor/s: Carol Cardno

Candidate’s Declaration

I confirm that:

- This Thesis/Dissertation/Research Project represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Research Ethics Committee Approval Number: 2016-1076

Candidate Signature: Linda Haycock    Date: 5/9/19

Student number: 1377660
Full name of author: Linda Jean Haycock

ORCID number (Optional): ..................................................

Full title of thesis/dissertation/research project (‘the work’):
Ways in which Middle Leaders support teachers integrate digital technology

School: Green Bay High School

Degree: Masters in Educational Leadership and Management

Year of presentation: 2017

Principal Supervisor: Martin Bassett

Associate Supervisor: Carol Cardno

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Signature of author: Linda Haycock

Date: 5 / 09/ 2019