Self-Regulation in a BYOD class

A study of the enablers and barriers to students' self-management

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This thesis is for examination purposes only and is confidential to the examination process.

Abstract

Schools throughout New Zealand are adopting digital technologies as a mechanism to enhance students' learning and to facilitate the advancement of 21st century literacies. The development of digital literacies and future focused learning for all students, is a vision New Zealand's Ministry of Education holds firm. The successful implementation of learning via the utilisation of digital devices remains a major priority throughout New Zealand schools (Ministry of Education, 2015).

Despite the assumption that students learning with their own digital device will promote individualised, independent learning; research focusing on the factors that affect students' efficient use of digital technologies has largely been limited to the employment of specific software applications, teacher adoption and the support of a technology efficient school infrastructure. According to some researchers, students' ability to self-regulate is of paramount importance in order to be able to use digital technologies effectively for learning. This study aims to address an important gap that currently exists within supporting literature, by using a self-regulation lens to explore students' self-management when learning with their own digital device.

To answer the research questions this study has explored the perceptions of students, teachers and parents to identify enablers and barriers to students' self-management in a Bring Your Own Device class. The context for this study is a Year 10 class at a secondary school in the far north of New Zealand. Utilising a mixed methods approach involving surveys and interviews, the resulting data highlighted three dominant themes: the importance of task relevance to students to enable intrinsic motivation, the need to develop parent/teacher relationships to support students' self-management and the need for ongoing professional development for teachers that specifically focuses on digital integration and student centred learning. In addition, there was a perceived need to develop a shared language between students, teachers and parents that related to the key competency of

Managing Self which would enhance the overall interpretation and acquisition of effective self-

management in such a BYOD class.

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Chapter one: Introduction

One of the Key Competencies of the NZ Curriculum (2007) is Managing Self.   The purpose of this research is to profile students' self-management in a Bring Your Own Device (BYOD) Secondary School class.   In an educational context BYOD refers to students bringing their own digital device to school for the purpose of learning.   The researcher explored the perceptions of students, parents and teachers to identify the factors that act as enablers and barriers towards students' self-management in the BYOD classroom.   This introduction provides a background to the rationale for the research and gives a summary outline for the proceeding chapters.

1.0 BYOD in a New Zealand context

In the 1990's, digital technologies within New Zealand schools equated to standalone desktop computers in computer labs. Students had scheduled classes "in the computer room" and much of what was learned focused on the utilisation of technically adept computer skills, for instance the application of a word processor or the creation of a spreadsheet.

Two to three decades on and some schools in New Zealand (particularly those in rural areas) have hardly progressed from the standpoint of digital integration or programme delivery. Some schools still have minimal resources, and struggle with limited digital access while teachers booking classroom time in computer labs remains an everyday occurrence.   In an effort to provide an equitable education for all, BYOD offers an affordable solution to schools. BYOD provides schools with an alternative route to enabling all students the opportunity to learn with their own digital device. Financial solutions are not the only reason behind the transition to BYOD, more importantly digital devices in the hands of students are said to give them the agency to develop skills considered necessary for living in a 21st century environment (Boldstad & Gilbert, 2008; Bolstad, Gilbert, McDowall, Bull, Boyd, and Hipkins, (2011).   In a world where utilitarian knowledge can be accessed at the click of a button, students' ability to capitalise on the skill-set needed to exploit the benefits of

digital technologies is of paramount importance, not just as an enabler for learning but in order to prosper and live a successful life.   If students are unable to benefit from using and learning with digital technologies, they run the risk of being "cut off from job opportunities and [may] be unable to take part in the full life of the community" (New Zealand Ministry, 2006, p.8).

The pervasiveness of digital technologies and ease of access to knowledge via the internet has altered the structure of our societies, our workplaces, the way we communicate, our schools and communities. Gilbert (2005) claims we have entered a "knowledge era", where knowledge is the new currency and value is placed on an individuals' ability to find knowledge, interpret it, validate and synthesise it. To live in a knowledge society, people will need new competencies (Ananiadou & Claro, 2009; Rychen & Salganik, 2003). They will need skills that can be applied to a variety of contexts, skills that enable them to adapt to new technologies and be of a mind-set of continuous learning where fluidity and a window on constant change provide a tangible credibility. Essentially individuals will need to have the confidence and ability to re-learn with a view to seeing themselves as autonomous lifelong learners (Salganik, 2001).

1.1 Managing independent learning

Managing self is a key competency of the New Zealand Curriculum NZC (2007) and a developmental phase of autonomy that involves a crucial set of skills that help students learn independently. Digital technologies are said to develop independent learning (Alberts, Murray, & Stephenson, 2009; Boldstad & Gilbert, 2008; Nicholas & Ng, 2009). Add to the mix 21st century teaching and an education which promotes personalised, self-directed, student centred learning and it would appear that the environmental foundations for autonomous learning are in place. However, critics are divided on whether or not digital devices are aiding students' performance as well as they could be (Livingstone, 2012).   Some claim there is a need for ongoing professional development to equip teachers with the right pedagogical skills in order to facilitate students' learning with digital

technologies (Wang, 2008), others claim students' performance is determined by their ability to effectively use digital technologies (Winters, Green & Costich, 2008; Greene & Azevedo, 2010)

1.2 Gaps in the literature

On an international stage, much of the literature surrounding BYOD has focused on the effectiveness of specific web tools to enhance students learning (Chen, Looi & Tan, 2010; Chandra & Fisher, 2009; Wheeler, Yeomans & Wheeler, 2008), academic success and faculty utilisation (Demb, Erickson, & Hawkins-Wilding, 2004), teachers' use (Inan & Lowther, 2010; Plopper & Conaway, 2013), changes to teaching practice (Bebell & Kay, 2010; Rosen & Beck-Hill, 2012) and subject specific use of technology (Song, 2014).   While literature is available on the specific use of digital technologies for student achievement there is scant acknowledgement (in terms of cited literature) to the process of self-management through a lens focussed on the usage of digital technology which translates to autonomous learning as a key competency.

International literature that forwards inquiry into students' ability to manage their learning comes under the heading of self-regulation. Writers in the well-established field of self-regulation have investigated the reasons behind students' motivations for learning and what strategies they use to help them learn. Students' ability to self-regulate their learning has been linked to determining their academic performance (Martinez-Pons, 2000b; Zimmerman, 2002) and more recently with their ability to effectively use computer technologies (Winters et al. 2008, Clarebout & Elen, (2006).

1.3 Aim of the study

This study aims to address the research gaps that exist in secondary school BYOD classes that pertain to students' self-management when using their own digital device.   The research goal is to provide some insightful findings for the school involved in order to highlight potential enablers and

barriers to students' self-management in BYOD classes. This study also aims to contribute to the growing body of international literature on self-regulation and students' effective use of digital devices.

1.4 Rationale

The significance of being able to manage oneself while capitalising on the effective usage of digital technologies cannot be underestimated in a 21st century environment. To be personally and professionally successful in a world shaped by digital technologies, individuals need to be competent efficient and autonomous learners.   Therefore, it would be useful for teachers to know how to support students' use of digital technologies so that they might be effective (Greene & Azevedo, 2010; Winters et al. 2008) particularly in terms of students' ability to manage themselves when learning with digital technologies.

Additionally, understanding the factors that affect students' self-management in digital environments would benefit teachers, students and their parents by providing them with an insight into how they can counteract barriers and cultivate enablers.   Finally, knowledge gathered from this study could be useful for other schools who may be considering integrating BYOD.

A self-regulation lens has been used to unpack the mechanics behind students' motivation and learning strategies which has helped to expose the nuanced behaviour and actions that contribute to students' self-management.

The following questions formed the basis of the enquiry and provided a structure for the literature review. Investigating students' current state of self-management helped to place the research in context and anchored the enquiry to a practical outcome applicable to the school involved in the study.   Research questions two, three and four enabled the perspectives of all participants to be explored in detail and thus provided a comprehensive overview of the situation.

1.   What is the current state of students' self-management in the BYOD class?

2. What do students perceive are factors that act as enablers and barriers of developing Managing Self in the BYOD class?

3. What do teachers perceive are factors that act as enablers and barriers of developing Managing Self in the BYOD class?

4. What do parents perceive are factors that act as enablers and barriers of developing Managing Self in the BYOD class?

1.5 Thesis Outline

There are five chapters in this thesis all of which are focused towards understanding and identifying key issues associated with the development of students' self-management in a BYOD class. Chapter one is the introduction and provides a background to the study. Chapter two presents international literature pertinent to understanding the necessity for key competencies and the significance they play in today's society. The focus is then narrowed to providing a background to the situation in New Zealand and to placing the study in context. An explanation of BYOD follows accompanied by a discussion on the literature that examines the pros and cons of integrating BYOD. The self-regulation literature which informed much of the methodology is reviewed and the theoretical framework underpinning the lens of self-regulation is presented.

Chapter three explains the methods and methodology of the study. Explanations are given to quantify the research design decisions with reference to the supporting literature that guided the study. The research setting, participants, processes for data collection and analysis are explained along with ethical considerations taken.

The findings of the study are presented in chapter four beginning with six short case studies from the students' perspective. The case studies help to contextualise the findings by presenting a summary of students' nuanced opinions in relation to the enablers and barriers that aid or hinder their self-

management in the BYOD class.   The participants' definition of Managing Self is then discussed which highlights irregularities and determines common ground between the participants. This is followed by a detailed discussion from the results obtained through the quantitative and qualitative measures.

Chapter five presents the discussion, which deliberates the main themes in relation to cited literature and establishes some important links that aim to address the research questions. The discussion further helps to define the issues present in this study and provides some useful insights into potential enablers and barriers to students' self-management. Signposts for possible action to be taken are highlighted by examining the implications for practice. Chapter five is followed by a conclusion, noting implications for future research.

Chapter Two: Literature Review

Introduction

The literature review begins with a discussion on the development of key competencies and why they are considered necessary for living in a 21st century society. To place this study in context a background to how the key competencies are interpreted in a New Zealand context is then explained with a particular focus on the Managing Self key competency from the New Zealand Curriculum (2007). The implications of BYOD as a tool for learning are discussed along with some clarification on why schools have introduced BYOD. To understand potential enablers and barriers to students' self-management in a BYOD context, international literature from the field of self-regulation literature is examined. This section is followed by an investigation into literature about pedagogies that support BYOD integration. Finally, literature that pertains to parents' involvement in their child's education is reviewed to understand possible enablers and barriers to students' self-management.

International literature concerned with BYOD integration has been discussed using a variety of terms. Terms like "one to one laptop" (Hatakka, Andersson, & Gronlund, 2013) "blended learning" (Snart, 2010; Verkroost, Meijerink, Lintsen, & Veen, 2008), mobile technologies (Looi et al., 2010), tablet PC (Dündar & Akçayir, 2014), tablet devices (Montrieux, Courtois, , De Grove, Raes, Schellens & De Marez, 2014) and laptop use (Demb et al., 2004) often refer to similar settings found in BYOD classes. For this reason literature that views the inclusion of digital technologies for learning in a face-to-face teaching environment which is representative of a BYOD class, has been included.

2.1 Why are competencies so relevant to contemporary education?

Since the turn of the 21st century, educational bodies around the world have been undergoing a massive transformational shift (OECD, 2015). Global discussions have populated education forums with a dictum advising the need to move away from traditional education systems that have long served an industrial era when the specialisation of skills, stored knowledge and years of service (usually in one organisation) were held in esteem (Fadel & Trilling, 2009).

With the advancement of the internet and digital technologies our economies, communications, societies, social structures and educational facilities have been changing. Schools need to prepare students for living in a knowledge era, a time when "knowledge [is valued] in economic terms" (Gilbert, 2005). Knowledge is seen as something to be shared, developed, mixed and reformatted to form new knowledge and the ubiquitous nature of the internet is increasingly forwarded as the conduit to all knowledge. Lundvall and Johnson (1994) believe these knowledge economies should also be seen as "learning economies" because individuals need to be in a mind-set of continuous learning to remain current in a dynamic and constantly changing society. According to Fadel and Trilling (2009) young people can expect to have up to eleven different jobs by the time they reach the age of forty-two so the ability to upskill will be paramount. Predicting and preparing young people for a future filled with constant change in a globally connected, 21st century environment will not be easy (Hipkins, 2007).

Identifying prerequisites for living in these challenging times sparked an international research based initiative called *Defining and Selecting of Key Competencies* (DeSeCo), a subsidiary of the Organization for Economic Cooperation and Development (OECD). New Zealand was one of twelve countries who contributed to the DeSeCo project. Its purpose was to identify key competencies that would enable individuals to live meaningful and successful lives in a 21st century society (Rychen & Salganik, 2001).

The key competencies identified by DeSeCo are considered to be "universal" as they can be applied to a number of wide and varied contexts, as opposed to domain specific competencies which are limited to a defined context (Rychen & Salganik, 2005).   They were also recognised as competencies that extended beyond curricular bound knowledge to include skills and knowledge learned outside of school and should be "viewed…as preparation for life rather than achievement in school" (Salganik, 2001, p.19) to enable lifelong learning.   One of the key competencies of the DeSeCo model is "Acting autonomously".   This competency involves individuals developing self-awareness, learning about their identity and understanding their environment. The pinnacle of "Acting Autonomously" is for individuals "to be empowered to manage their lives in meaningful and responsible ways by exercising control over their living and working conditions" (Rychen & Salganik, 2005, p.14). Educating students to live in knowledge societies involves foregrounding these competencies to help students cope with situations they may encounter in their future lives that will, quite likely, be full of complexities and uncertainties (Bolstad et al., 2012).

2.2 Key Competencies in the New Zealand Curriculum

New Zealand has five key competencies in the NZC (Ministry of Education, 2007): Thinking, Using Language, Symbols and Texts, Managing Self, Relating to others and Participating and Contributing. Each of the key competencies is comprised of an ability to do something that involves a combination of skills, knowledge, attitudes and values (Rutherford, 2005). These key competencies are seen as essential elements of the NZC (Ministry of Education, 2007) because a) they can encourage effective participation in society, b) cultivate a culture of lifelong learning and c) equip students with the necessary prerequisites for the development of 21st century skills (Bolstad et al., 2012). Together they form one part of a wider vision for New Zealand's education system which is to develop "young people who will be confident, connected, actively involved, lifelong learners" (Ministry of Education, 2007, p.7).

2.3 Managing Self

To reiterate, the primary focus for this study is to identify the enablers and barriers to students' ability to manage themselves according to the key competency "Managing Self" in the New Zealand Curriculum (2007) in a BYOD class.   This section discusses where Managing Self sits within the NZC (2007) and unpacks the definition to explain the associated characteristics.   Understanding how young people interpret Managing Self in an online gaming situation is also discussed because the author is interested to establish if students identify any connection between Managing Self in an educational context and Managing Self in an online gaming environment.

Managing Self, one of the key competencies of the New Zealand Curriculum (2007) includes aspects of the key competency 'Acting Autonomously' found within the DeSeCo model (Boyd & Hipkins, 2011).   Adapted to fit a New Zealand context, 'Acting Autonomously' is woven throughout the curriculum at varying stages of a child's development. The author has represented this visually as shown in Figure 1 (p.11). In early childhood it is observed as children having a sense of "Well-being" (Ministry of Education, 1993) At primary and secondary school it is recognised as the key competency "Managing Self" and at tertiary level it is expected students will be "Acting Autonomously" (Hipkins, 2006).
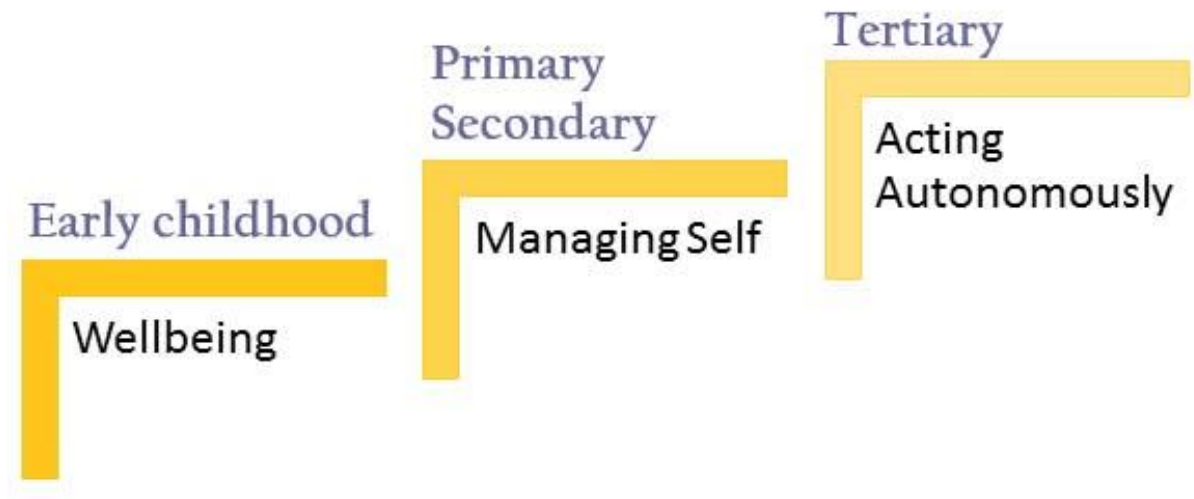
Figure 1: Visual representation of the developmental stages of Acting Autonomously as described by Hipkins (2006)

By understanding where Managing Self sits within the curriculum it becomes clear that this key competency is an important and valuable developmental stage towards Acting Autonomously. Managing Self in the New Zealand Curriculum (2007) for primary school and secondary students is broad and comprehensive:

> This competency is associated with self-motivation, a "can-do" attitude, and with students seeing themselves as capable learners. It is integral to self-assessment.
> Students who manage themselves are enterprising, resourceful, reliable and resilient. They establish personal goals, make plans, manage projects, and set high standards. They have strategies for meeting challenges. They know when to lead, when to follow, and when and how to act independently. (p. 12)

By definition, Managing Self has a number of aspects that relate to students' organisational abilities however, Hipkins (2007) points out that Managing Self is more than being organised, having goals and practicing independent learning.   While these traits are crucial to the concept of Managing Self, there is also a focus towards individuals adapting self-awareness to know their own strengths, how they can maximise on those strengths and how to strategically traverse weaknesses along the

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continuum towards autonomy.   Students, who reflect on how they learn and then use this knowledge to inform their learning, develop cognitive and metacognitive strategies that are essential to their self-management (Hipkins, 2012; Charteris, 2013). Rutherford in an earlier paper (2005) noted Managing Self was also about students having the ability to make good decisions which would ultimately lead to more responsibility and independence.   Hipkins (2006, p.33) expanded on this by stating independence or 'autonomy' does not simply mean "doing it by yourself without help" but rather it's about being able to autonomously collaborate with others whilst still being responsible for your own learning.

Learning self-management skills will help young people develop the ability to learn independently and will serve individuals well beyond their years of compulsory schooling.   Learning self-management skills will help young people develop the ability to learn independently and will serve individuals well beyond their years of compulsory schooling.   A report issued by the New Zealand Government in 2015 asserted the goal for the Ministry of Education was to increase the proportion of students leaving school with the National Certificate of Educational Attainment (more commonly known as NCEA) Level 2 from 81% to 85% for all students and from 71.6% to 85% by 2015, (Ministry of Education, 2015). An additional focus of the New Zealand Government is to continually reduce the number of young people who are not in employment or some form of education.

Aside from young people missing out on formal qualifications when they leave school early, they are more likely to have problems with task and achievement motivation (Hyndman & Evans, 1989), depriving themselves of the opportunity to learn how to manage themselves or identifying themselves as competent, capable learners. This could become a potential barrier for future learning prospects in terms of studying capabilities regarding tertiary education or retraining for employment. Add to this the competitive complexity of living within a 21st century, knowledge based economy, possessing the ability to manage oneself with the attributes this discipline entails, will produce a required life-skill for ensuing employment.   Students who do complete their compulsory schooling should (by all intents

and purposes) be on the path to learning autonomously through the development of self-management. However Hipkins (2005; 2006) advises much will depend on how the competency is interpreted by teachers and their students.

A study conducted by Hamilton, Farruggia, Peterson and Carne, (2013) involving seven senior school leaders from New Zealand secondary schools investigated how they interpreted and implemented the Key Competencies within their schools. The authors drew attention to the fact that individual schools are "responsible for integrating the key competencies into their school curriculum and practice" (p.47). They also highlighted that while the New Zealand Curriculum (2007) provides a framework for schools to date there is no specific "best practice" model or standard assessments available in terms of the assimilation of key competencies. All of the senior school leaders involved in the study believed assessing the key competencies either in isolation or as a whole would be difficult due to the fact that they are woven throughout the curriculum and would be open to subjectivity.

As no national guidelines exist for assessing the key competency "Managing Self" the researcher turned to the literature of self-regulation as a tool for analysis and review. Additionally self-regulation literature informed much of the development of the original key competency "Acting Autonomously" in the DeSeCo project (Haste, 2001; Salganik, 2001; Weinert, 2001). Using self-regulation literature as the lens to view students' self-management also helps position this study internationally.

Computer based learning environments (CBLE) are said to provide opportunities for individualised, independent (Alberts et al., 2009; Boldstad & Gilbert, 2008) and self-directed leaning (Proske, Narciss, & Körndle, 2007; Winters et al., 2008). This would suggest the ability to manage oneself in a technology rich environment is important. However, researchers state the effectiveness of CBLE's lies with students' ability to self-regulate their learning (Azevedo, 2005; Winters et al., 2008). According to Winters, et al. (2008) the selection of information, interacting and manipulating information requires "careful, considered engagement [which is] indicative of a self-regulated learner" (p.430). The authors advise teachers learn how to support students in CBLE by investigating and

understanding students' self-regulation processes. Lajoie and Azevedo (2006) agree, adding self-regulation literature is a useful framework for the development and assessment of students' computer use as metacognitive tools (thinking about thinking).

2.3.1 Do students self-manage in online gaming?

In the last decade or so the popularity of online gaming with young people has led educationalists and researchers to investigate whether or not there is educational value (via the utilisation of gaming) in terms of the development of 21st century learning skills. According to Gros (2007) online games have the potential to develop "learning that is characteristic of the culture of the information society" (p.28) also known as knowledge based societies.   Research commentators have argued over the pros and cons online computer games can offer educationalists and whether or not they can help develop self-regulation. According to Dede (2004) online gaming with its immersive interface has the potential to do more than motivate individuals to engage. Dede believes online game-play shapes participants' learning styles because the experience is one of active participation.   There has been an inconclusive debate about whether skills learned in an online games environment are transferrable (Gros, 2007) however Romero, Usart and Ott (2015) argue in support of virtual games claiming they have the capacity to promote self-regulation with students because players must take an active part, players must "choose and plan their goals and adapt their behaviour to achieve goals" (p.159).   Likewise Dede (2004) claims the affordance of situated learning, synonymous with virtual environments, can promote the transfer of skills because they provide frequent and structured feedback in authentic real world contexts.

Developing the ability to manage oneself in a variety of settings, particularly those that involve technology use is an essential skill for anyone living the developed world of the 21st century and the focus of this study.   As technology becomes simplified, affordable and more readily available, mobile devices are becoming more prevalent especially within our schools.

2.4 BYOD

In recent years the term BYOD has become commonplace in schools in an attempt to integrate digital technologies into students' learning. A digital device might take the form of a laptop, tablet or smart phone. Some schools may stipulate what type of device it should be and regulate students' use of the device through their school network; other schools are more accepting of any device and its infrastructural management provided they have the ubiquitous capability of accessing the internet (Sweeney, 2012). Laptop rental programmes are also in place in some schools Barbarck (2012).

2.4.1 Why the move to BYOD?

There are a number of reasons why schools are adopting BYOD initiatives. In part the adoption of BYOD provides a financial solution to the costs associated with delivering 1:1 digital learning[1] but according to Janssen & Phillipson (2015), BYOD has additional advantages for schools because they do not have to concern themselves with purchasing, maintaining and upgrading the devices. Conversely, schools and teachers will have to accommodate a diverse range of software applications that may exist on students' devices. Teachers may also need to relinquish a certain amount of control over what students can or cannot do with their devices due to the independence of student usage and diversity of internet accessibility (Janssen & Phillipson, 2015).

Financial and technical logistics aside, the potential benefits of BYOD in schools stem from the educational advantages digital devices can provide. Through the use of their own digital device, students will be able to access information anytime, anywhere, provided there is an internet source available. The technology-rich environment is said to raise academic achievement (Rosen & Beck-Hill, 2012), improve student engagement (Bebell & Kay, 2010) and increases motivation (Passey,

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[1] 1:1 learning refers to students being able to use a device by themselves as opposed to having to share one.

Rogers, Machell, & McHugh, 2004). Instead of being passive consumers of knowledge, digital

technologies give students the tools to become inventors, creative directors and producers of their

own content (Vesisenaho, Valtonen, Kukkonen, Havu-Nuutinen, Hartikainen, & Karkkainen, (2010);

Wheeler et al. 2008).

Research studies have indicated the inclusion of digital technologies can promote the development of

21st century skills (Boldstad & Gilbert, 2008; Bolstad et al., 2012) by encouraging collaboration and

problem solving (Wright, 2010), allowing students to self-pace their learning (Rhode, 2009) and

providing authentic learning opportunities (Lombardi, 2007) all of which can lead towards autonomous

learning (Somekh, 2000).

Despite the potential benefits that exist within theoretical literature advocating for the use of digital

technologies, some researchers argue there has been little empirical evidence of improved learning

outcomes for students (Azevedo & Cromley, 2004; Roschelle, Pea, Hoadley, Gordin, & Means, 2000).

Livingstone's (2012) independent meta-analysis of studies conducted in Europe, the UK and America

showed that some studies found beneficial gains associated with digital technologies and their effect

on learning, while others did not. Livingstone interpreted the results as more anecdotal and

inconclusive adding that, whether or not digital technologies had the ability to transform education and

support students learning by raising academic achievement was deemed to be debatable. However,

Livingstone's (2012) summary indicated an overriding benefit to students' learning was shown in

terms of their engagement and motivation. There was a similar finding with Lai & Pratt's (2008) study

of digital technology integration within 24 New Zealand secondary schools. Although results for

raised academic achievement were inconsistent across the schools, teachers noticed students were

significantly more motivated to learn because they were more engaged. Understanding what

motivates students to engage is important in learning what potential enablers and barriers exist to

students' self-management which brings us to unpacking the literature of self-regulation.

2.5 Self-Regulation

This section begins by outlining what is meant by self-regulation and how it is defined for this study. A detailed discussion of the self-regulation literature used to inform this study follows: divided into two main categories, Motivation and Learning Strategies. These categories have been used throughout this study and are useful to differentiate particular aspects of students' self-regulation.

2.5.1. What is self-regulation?

Self-regulation is a universal human trait whereby we process our thoughts, feeling and actions to bring about the realisation of personal goals and desires (Duncan & McKeachie, 2005; Pintrich, 2004; Zimmerman, 2002). Academic ability is not a requirement for self-regulation nor is it limited to those with a special talent (Zimmerman, 2002). It is a complex process that involves students' choices, their motivations (Brophy, 1999; Linnenbrink & Pintrich, 2002; Pintrich, 2004) self-efficacy (Bandura, 1978), social influences (Boekaerts, 1998) and students' ability to adapt to different contexts (Pintrich, 2004). Students will be able to interpret information, act on tasks, set goals and exercise strategies when faced with challenges (Pintrich, 2004; Zimmerman, 1986). Self-regulation is context specific (Boekaerts, 1998; Martinez-Pons, 2002a) for example a student may be a good self-regulator in maths where he/she feels confident but less so in a Physical Education class where they feel physically challenged. Consequently, the ability to self-regulate changes, depending on the circumstances at any given time. According to Duncan and McKeachie (2005) the motivation to self-regulate is "dynamic and contextually bound" (p.117), this in turn will affect the level of self-regulation required.

Educational researchers agree the ability to self-regulate is a useful predictor of academic performance (Martinez-Pons, 2002a; Zimmerman, 2002). While all students exercise some form of self-regulation (Zimmermann, 2000), those considered at the high end of the spectrum are proactive in their efforts, pursue avenues to further their learning and have a number of learning strategies to

draw on (Zimmerman, 1989). They know how to plan, set goals and systematically work towards those goals. High self-regulating students are capable of monitoring their actions, they have high levels of self-efficacy (Zimmerman et al. 1992) and they understand the importance of self-evaluation (Zimmerman, 2002). They may be more inclined to arrange their physical environments to optimise their learning (Schunk & Zimmerman, 1989; Zimmerman, 1986) and they see their learning practice as something they can influence or exercise control over (Pintrich, 2004). They know who to ask for help and what questions to ask. It is as if they have a 'tool kit' of help seeking strategies at their disposal Newman (2002). Similarly, high self-regulators have the dexterity to strategise when faced with challenges or problems and they accept more responsibility for their outcomes (Zimmerman, 1990).

In comparison, students with low self-regulation skills have fewer learning strategies at their disposal (Paris & Paris, 2001). According to Zimmerman (2002) their self-regulation efforts are often an afterthought, they do not set specific goals and they are not good at monitoring themselves. Zimmerman explains inactions on a part of the student, result in them comparing themselves to others. This has an adverse effect on their perceived level of competency and they interpret their less favourable results as a lack of ability rather than inefficient self-regulation. In this situation students become discouraged easily.

Just as students can employ self-regulation strategies for positive outcomes they can also inadvertently employ behaviour that impacts on their learning in a destructive way. This type of behaviour often referred to as self-handicapping may include the use of aversion tactics, for example by pretending to be unwell and missing homework completion dates or exams (Boekaerts & Corno, 2005; Panadero & Alonso-Tapia, 2014; Wolters, 2003).

2.5.2 Defining self-regulation for this study

Self-regulation literature is vast and dates back as far as the early 1950's (Zimmerman, 1989). The sheer breadth of the literature is testament to the importance self-regulation is given in educational spheres. Importantly students' abilities to exercise self-regulation skills have been linked to academic success (Pintrich, De Groot, Calfee, & Schunk, 1990; Zimmerman, 2002). More recently, the quality of students' self-regulation has been linked to their effectiveness in utilising digital technologies for learning (Winters et al. 2008, Clarebout & Elen, (2006).

Self-regulation theorists have identified and debated many different theories about the diverse modus-operandi students use to regulate their behaviour, efforts and thinking. Operant theorists for example propose students' motivations derive from factors outside of themselves, for example their learning environment and the actions of their teachers or peers. Students' actions depend on antecedent and consequential stimuli combined with self-control (Mace, Belfiore, & Shea, 1989). Vygotskian theorists say self-regulation is based on individuals' inner speech which has developed overtime through social interactions (Zimmerman, 1989). Volitional theorists attribute self-regulation to students' ability to exercise their will regardless of external, environmental or capability beliefs (Corno, 1989). Despite the many theories surrounding self-regulation, most agree that a self-regulated student is an active participator in their own learning and that some form of self-initiated control will be involved.

The predominant self-regulation theory that underpins this study is taken from a social cognitive viewpoint (Bandura, 1978; Bandura, 1995; Pintrich et al., 1991; Pintrich et al., 1990; Pintrich, 2004; Zimmerman, Bandura, & Martinezpons, 1992; Zimmerman, Bonner, & Kovach, 1996; Zimmerman, 1986). From a social cognitive point of view, self-regulation is not a quality inherent at birth or by gene pool. Instead we learn aspects of self-regulation through watching the actions of others, just as young children attempt to emulate the behaviours of their parents and those around them (Bandura, 1997; Zimmerman, 1986). Varying degrees of self-regulation will be required as tasks become more

sophisticated and consequently students will require regular feedback, support and encouragement particularly if the concept is abstract or covert in context (Martinez-Pons, 2002a). Interactions of interest in social cognitive theory involve students' motivations, their goal orientations plus students' perceptions of competence and learning values. Of equal importance are students' learning strategies related to their effort, organisational skills, environmental factors and cognitive or thinking strategies (Schunk & Zimmerman, 1989).

The work of Pintrich, et al. (1991), Pintrich (2004), and Duncan and McKeachie (2005) have helped inform the subsequent structure for this overview on self-regulation literature. Adopting this format has assisted with the categorisation of self-regulation elements and highlighted the distinctions between two major themes in Pintrich's work; motivation and learning strategies. These two themes form the focus for the following two sections and provide a theoretical framework which is represented throughout this study.

2.5.3 Motivation

This section discusses possible reasons behind students' motivation and how they affect students' ability to exercise self-regulation. It is broken down into four sub-headings as shown in Figure 2, (p.21)

Motivation	Task Value	
	How much students value their learning	

	Goal Orientation	
	Extrinsic and intrinsic motivations	

	Self-efficacy	
	Students belief in themselves pertaining to their level of competency	

	Control of Learning Beliefs	
	How much students feel they can affect their learning outcomes	

Figure 2: Key aspects of motivation adapted from Pintrich (1991)

Social Cognitive theorists take the view that students' motivation stems from diverse avenues and varies depending on the context, learning environments and students own beliefs surrounding their learning capacity (Duncan & McKeachie, 2005; Pintrich et al., 1991; Pintrich, 2004). Linnebrink and Pintrich (2002) state "teachers….should not label students as motivated or not motivated in some global fashion" because students' motivation is "not a stable trait of an individual" (p. 314).

The creative aspect of CBLEs combined with the ease for which content can be manipulated, makes the creation of personalised content an attractive and motivating element for students. In Lai and Pratt's (2008) study they found teachers perceived the greatest impact Information Communication and Technology (ICT) made in their classes, in terms of student's learning, was with the presentation of their work. Evidence suggested students' work was more accurate, comprehensive and had a more professional appearance to it. This created a feeling of pride for many students, as they aesthetically valued their work more and as a result, became more motivated. Bebell and Kay's (2010) study on a new 1:1 laptop programme carried out in five middle schools in Massachusetts, found 83% of teachers believed the use of digital tools significantly improved students' engagement and motivation.

2.5.3.1 Task Value

The value students place on their learning also affects their degree of motivation. Brophy (1999) advocates for the necessity of ensuring learning are relative and authentic in order to engage and motivate students. When students can see connections between what they are learning and how it relates to their own lives, they are much more likely to engage (Pintrich et al., 1991) and take responsibility for their learning (Schuitema, Peetsma & Van Der Veen, (2012).

A study by Thoonen, Sleegers, Peetsma and Oort (2011) involving 750 primary school teachers and 3,677 primary school students found teachers who made an effort to relate class lessons to real life scenarios that were representative of students' lives, positively influenced students' motivation to learn. Wolters (1999) also found that students who valued a task were most likely to succeed and had the resilience to stay focused when confronted with periods of tedium, learning difficulties or external distractions. Developing students' capacity to see the relevance in their learning is according to Assor, Kaplan and Roth (2002) a step towards autonomous learning. They add that teachers can "foster relevance" by firstly understanding their students' goals and interests, then by giving students choices and finally by explicitly showing how their learning will help them achieve their goals.

2.5.3.2 Goal Orientation

Academic researchers claim one source of motivation for students to be engaged in self-regulation is attributable to their goal orientations (Pintrich et al. 1990; Zimmerman et al. 1992). Literature pertaining to self-regulation suggests students who set goals considered by them to be of significance will engage in metacognitive and cognitive strategy use (Pintrich et al., 1990). Additionally, setting specific and attainable proximal goals (well defined short term goals) that are attainable can help motivate students (Zimmerman, (2002). Brophy (1999) says it is important for teachers to find a 'motivationally optimal match' to engage students' motivation. To find that match, teachers need to consider student's individual characteristics, interests and prior knowledge. Tasks should not be too

challenging, suggesting that the student would feel it is unobtainable; nor too easy, suggesting that the student quickly lose interest. Hatlevik, Ottestad, and Throndsent (2015) support these ideas, as their study into students' digital competence found teachers can nurture students' motivation to learn with computers, by helping them to develop realistic and attainable goals.

Adding to the discussion of goal orientation Newman (2002) claims teachers need to motivate students to develop an appreciation for the value of learning by setting long-term mastery goals as opposed to *performance* goals. Performance goals are when teachers attempt to motivate students by focusing on grades or credits and the competition that is associated with the earning of grades. In these situations low self-regulating students may be less likely to ask for help for fear of exposing their lack of ability.

Extrinsic motivation

Motivational reasoning which exists outside of the student is categorised as extrinsic motivation. Students' who exhibit extrinsic motivation may try to impress their peers or family, compare themselves to the merits of other students and are driven by rewards, such as grade attainment or teacher recognition. Teachers' actions can also produce extrinsically motivated outcomes for their students, for instance when they remind students of looming deadlines or when they communicate required guidelines and expectations.

The BYOD environment lends itself to external factors beyond the classroom by giving students the ability to create their own content for authentic and credible audiences who are relative to the students. Kearney and Schuck (2006) conducted a study of five primary and secondary schools across Australia, to investigate the effects of authentic learning with digital technologies. One of the schools studied involved Year 10 students who created a film about historical issues in Australia. Their results showed students were notably motivated and they took pride in their work because they knew it was going to be seen by their peers and online. Kearney and Schuck attributed the

relationship between 'author and audience' and the perceived 'use value', as key factors in motivating

students (p.204). Blogs and collaborative Wiki's are another way of engaging with authentic

audiences especially if students are showcasing their work online for their families or peers to see.

Wheeler, Yeomans and Wheeler (2008) advise that students may feel initially anxious about having

their work critiqued and viewed by a wider audience. They recommend teachers support students'

confidence by having a period where students blogs or online work is only visible to individual

students or class members before going public.

Intrinsic motivation

When students are intrinsically motivated their interest is enlivened and learning is self-initiated.

Students who are motivated to do something out of curiosity or to attain mastery for their own

personal satisfaction are said to be intrinsically orientated (Lynch & Dembo, 2004). They are

engaged in their learning as "an end in itself" rather than completing "a task as a means to an end"

(Pintrich et al., 1991).

Teachers can encourage students to become intrinsically motivated by giving students choice

(Pintrich et al., 1990) with their learning and by providing opportunities for students to see the

relevance of what they are learning (Pintrich et al., 1991). Activities that spark intrinsic motivation

need to be relative to students' interests, their life outside of school and encourage a sense of

ownership (Paris & Paris, 2001). According to Hipkins (2006) teachers can get students started using

extrinsic motivations with a view to moving students' motivations to being intrinsically focused which

"could lead to…dispositions of lifelong learning" (p.51).

2.5.3.3 Self-Efficacy: An Expectancy Component

Another factor that contributes to students' motivation is self-efficacy. Self-efficacy results when an

individual makes a judgement based on their own ability to perform a task or complete an activity. It

is not to be confused with self-esteem which is based on opinions of self-worth (Woolfolk, 2014).

Students who perceive themselves as confident and capable learners are more likely to work harder,

persevere and apply more effort (Bandura, 1997; Zimmerman, 2000). Bandura (1978) talks about two types of expectations, outcome expectancy and efficacy expectation. Outcome expectancy refers to an individual predicting or preconceiving the likely future outcome as a result of their actions. Whereas efficacy expectation is the underlying belief that an individual holds on to their own ability to carry out a certain task or action.

Zimmerman, Bandura and Martinez-Pons (1992) claim the ability to be self-motivated is dependent on a student's perceived level of self-efficacy combined with their determination to achieve defined goals. Studies have shown students' self-efficacy increases significantly when students have short term attainable goals but decreases with long term non-specific goals (Bandura & Schunk, 1981). Additionally self-efficacy beliefs impact on individuals ability to self-regulate and will likely influence how motivated they are in their efforts (Woolfolk, 2014; Bandura, 1978; Pintrich et al. 1990).

In a BYOD environment students need to feel confident in navigating through online learning resources not only to investigate the source of information but also to consider their confidence in assessing the most pertinent or correct information (Lemley, Schumacher, & Vesey, 2014).
A study by Arnone, Reynolds and Marshall (2009) of 1,270 eighth grade 13 year olds in America, found there was a positive relationship between students' self-efficacy beliefs and their levels of motivation when searching the internet. The more successful their search results, the more confident they felt in their efforts and the more motivated they became in pursuing their research enquiry.

 Another study by Hatlevik, et al. (2015) involving 1,793 7th grade Norwegian students, established self-efficacy beliefs are directly related to their ability to learn with technology.   They found that students who felt confident using a computer were more likely to persevere when faced with learning difficulties, than a student who did not feel so competent.   Hatlevik et al. (2015) recommended teachers should spend time encouraging students to become competent computer users in order to raise their self-efficacy beliefs and thus, increase their motivation to learn. The higher a students'

self-efficacy the more likely they are to employ metacognitive and cognitive strategies which leads to more resilience and applied effort (Pintrich et al., 1990; Schunk, 1989).

2.5.3.4 Control of Learning Beliefs: An Expectancy Component

Students' motivation concerning how much control they perceive they have over their learning is also viewed as an expectancy component. Similar to the expectancy component of self-efficacy, students' expectations or perceptions exposes whether or not they feel they can manipulate their efforts to bring forth their desired result (Bandura, 1978).   A student who believes their actions and efforts will have a positive effect is more likely to employ strategies and look for solutions when problems arise. According to Pintrich et al. (1991) "it concerns the belief that outcomes are contingent on one's own effort, in contrast to external factors such as the teacher (p.12)

In a CBLE there are potentially lots of opportunities for students to manipulate their learning outcomes independently of their teacher. The development of Web 2.0 interactive tools, that enable user-generated content, place students in a position of self-control. Examples include Wiki's, blogs, image editing sites and social media platforms. However according to Winters, et al. (2008) self-directed use of Web 2.0 tools comes with some cautionary advice for teachers of low self-regulating students. They recommend teachers encourage students to work collaboratively with their peers and to provide tutored support as low self-regulating students struggle to work independently in these environments. Hatakka, et al. (2013) studied the positives and negatives associated with students' choice and learning in a 1:1 laptop initiative in 26 schools in Sweden. They reported many positives for students; learning was considered more fun and less time sensitive by not having to write and draw everything by hand. Further, having access to a wider and richer pool of information through the internet was deemed to be of benefit and preferable to textbooks.   Most students felt that having more choice gave them greater control over their learning which they enjoyed. However, those students with fewer self-regulation strategies found they were easily distracted with the ease of access to social media.

The authors recommend schools ensure strong leadership and pedagogical support is available to teachers to help identify and manage solutions.

In summary, there are a number of diverse factors that contribute to students' motivation and their ability to self-regulate. The discussed literature suggests how important it is to understand students' motivations and how their motivation varies between contexts (Pintrich, 2004) in order to be able to appreciate how to support students' self-regulation.

2.5.4 Learning Strategies

Learning strategies, pertaining to self-regulation literature (Pintrich et al., 1991; Pintrich, 2004; Zimmerman, 2002) involves students' cognitive and metacognitive thought processes. Students' cognition is defined by how they think, organise and develop knowledge. Metacognition involves students' awareness about how they learn and think (Zimmerman, 2002). Learning strategies are interchangeable, they can be adapted for different environments and are valued for their ability to give students more control over their learning. This section discusses learning strategies using five sub-headings as shown in Figure 3, (p.27)

Learning Strategies	Effort Regulation The amount of effort students apply
	Metacognitive Self-Regulation Students ability to reflect on their actions and strategy use
	Organisation Students ability to plan and organise resources
	Environmental Structuring Students ability to structure their learning environment
	Being Resourceful/Help Seeking Knowing when, who and where to ask for help

Figure 3: Key Learning Strategies adapted from Pintrich (1991)

2.5.4.1 Effort Regulation

The amount of effort a student can apply when encountering distractions or uninteresting tasks will directly impact on their self-regulation (Pintrich et al., 1991). Although students' efforts will fluctuate depending on the situation their capacity to persevere and exercise resilience, will according to Corno (1989), depend on their volitional control or their willingness to do so. Corno proposes effort regulation comprises of two distinct processes, firstly an internalisation by the student to recognise what needs to be accomplished and secondly the ability to execute the appropriate action to achieve a given task.

In any class, a student will be faced with distractions but in a CBLE environment students will have an array of digital media distractions they will have to learn to ignore. According to Sana, Weston and Cepeda (2013) the ease of access to online entertainment will make it difficult for teachers to keep students on task if their subject content is not intrinsically motivating for students. The likelihood of students being distracted by their peers who could be off task playing online games or watching irrelevant YouTube videos, will also impact on the distracted students' ability to exert effort regulation. A controlled experimental study involving 39 university students conducted by Sana, Weston and Cepeda (2013) explored the effect on students' comprehension when sat in view of a student who was involved in multi-tasking activities on their laptop. Their findings showed comprehension reduced by 17% for those students in view of a multi-tasking peer. This was in spite of students efforts to actively learn. Their recommendations included discouraging laptop use when technology was not required, discussing the consequences of multi-tasking with students and giving students opportunities to actively contribute to lessons.

Hatakka, et al. (2013) found that students and teachers were equally concerned about the distractions of social media and interruptions to students' learning caused by the use of electronic games. Highly motivated students coped with this distraction by recognising the adverse consequences that impacted their learning but for students who were less motivated, multi-media distractions only

provided more opportunities to become disengaged. Recommendations from the study included the

equipping of students with strategies to help manage these distractions and enlisting schoolwide

policies that clearly explains to students what they can and can't do with their device.

2.5.4.2 Metacognitive Self-Regulation

Exercising awareness, thinking about thinking and cognitively deciding what strategies to use or

action to take, is often referred to as meta-cognition. When students are cognitively engaged they are

said to be involved in "meaningful and thoughtful approaches to tasks" (Paris & Paris, 2001)

Metacognitive regulation involves students' self-monitoring and planning (Pintrich et al. 1991).

Students need to know when, how and where to use various strategies (Boekaerts & Corno, 2005).

Developing students' use of metacognitive strategies can be enabled in CBLE contexts by using

digital support aids like highlighting tools, tutorial videos and tools that promote creativity.   Hannafin,

Land and Oliver (1999) found metacognitive scaffolding enabled students' self-regulation by providing

"guidance on how to think during learning" (p.133). This included reminders for students to reflect on

their goals or learning outcomes periodically and prompting inquiry thinking that encouraged students

to link new ideas with prior knowledge.   Inquiry thinking activates students' curiosity by providing

authentic learning experiences that encourage students to continually ask and find answers to their

own questions (Harada & Yoshina, 2004).

A study by Azevedo, Guthrie and Seibert (2004) about 24 undergraduate students' metacognition

while using hypermedia, found students who had some background of subject knowledge and were

competent in directing their own learning, benefited from setting a number of individual learning goals.

Setting goals helped these students plan their learning, they also exercised almost twice as much

self-monitoring as opposed to students who demonstrated less competency in directing their own

learning   Students who lacked prior subject knowledge and had few metacognitive strategies

struggled with multiple goals. These less competent students also benefited from having a global

learning goal prescribed by their tutor, along with helpful resources either posted online or provided in discussion with their tutor.

2.5.4.3 Organisation

One factor that facilitates students' self-regulation is the ability to be organised and to categorise information.   Being organised helps students select the right information plus it helps develop students' abilities in making connections within and across their learning (Pintrich et al., 1991). Organisational strategies like planning and time management can help students achieve their goals. Azevedo, Guthrie and Seibert (2004) emphasise how important it is that teachers support students' learning when studying complex concepts by helping them to plan and organise information.

In a CBLE context teachers can support students' organisational strategies by utilising an online course calendar and sending electronic prompts (Dabbagh & Kitsantas, 2004).   Additionally teachers can share these calendars with students who can customise them to their own liking. Some online calendars like those powered by Google Docs also provide reminders in the form of text messages which can be sent directly to students' mobile phones. Besides Google Docs there are a multitude of readily available web-based, interactive planning tools that are useful for helping students organise their learning.

2.5.4.4. Environmental Structuring

Environmental structuring, in the context of self-regulation models, refers to students' capacity to arrange either a physical or mental space, in order to optimise their learning (Zimmerman & Pons, 1986). In today's context this would include personal devices and the management of those devices so that they might be an enabler to student's learning.

When students actively adapt and enhance the structure of their learning environments by either removing themselves from distractions or regulating their behaviour towards them, they are presenting an ability to take responsibility for their learning. Further, environmental structuring acts as

an aid to shifting the perspective of a learning environment as being 'fixed' and one that is predetermined by the teacher (Zimmerman & Pons, 1986) to one that students can take some ownership for. This ownership extends beyond physical boundaries to include students' ability to be resourceful and ask for help.

2.5.4.5 Being Resourceful/Help Seeking

Knowing when and who to ask for help are important aspects of self-regulation. A study of high school students by Ryan and Pintrich (1997) found that students' with a low self-efficacy belief and a lack of social confidence were less inclined to ask for help through a fear of drawing attention to themselves and perhaps highlighting their incompetence's. Additionally, students who focused on external rewards or "relative ability goals" for example, the showing off of their ability to others, were more likely to perceive help seeking as a lack of personal ability. Conversely students with high self-efficacy beliefs did not associate their need for help with a lack of personal ability and thus felt more comfortable asking for help. Ryan and Pintrich (1997) recommend teachers try to foster students' intrinsic goal motivations by encouraging students to pursue personal mastery goals.

In a digital environment, being able to use the internet adds another dimension of help seeking not previously available in traditional classroom contexts. In today's modern context students are just as likely to seek help online via the internet as they are to ask their peers or teachers. Web-based environments may indeed provide students with a plethora of information (Dabbagh & Kitsantas, 2004) but a significant aspect of students' self-regulation is associated with selecting the right information which is often left to students' discretion (Winters et al., 2008). In the networked world, exercising self-regulation skills are the key to becoming fully immersed and the director of one's own learning.

2.6 Pedagogy in support of BYOD

Teaching in a BYOD class offers some new challenges for teachers who are unfamiliar with integrating digital technologies. This digitally immersive environment will inevitably present teachers with new scenarios surrounding the ability to support students' self-management. Researchers claim the incorporation of digital technologies encourages a more student centred learning environment (Nicholas & Ng, 2009) which in turn supports co-construction teaching styles (Wright, 2010) and moves away from traditional didactic teaching methods (Conrad, 2007).   In a student centred learning environment a teachers' role is more about facilitation and guiding the student with their learning (Palloff & Pratt, 2000) rather than directing students through structured tasks.   Student centred learning comprises of students taking responsibility for their learning and adopting a more active role (Nicholas & Ng, 2009; Spooner, 2015).   Consequently, students in a student centred learning environment will require a significant amount of self-regulation skills (Hannafin et al., 1999; Spooner, 2015), the same can be said for web-based learning (Dabbagh & Kitsantas, 2004).

A combination of student centred learning and digital technologies, provides the right environment for open-ended tasks where students can have more control over the direction of their learning. According to Wang and Hannafin (2005) open ended environments are synonymous with student centred learning and Technology Enhanced Learning Environments. Hannafin, et al. (1999) explain in open-ended learning environments students decide how they will tackle a given problem or predetermined goal, this may be done in isolation or in collaboration with peers or their teacher. Unlike teacher centred models that are predetermined by the teacher, students will need to make decisions on what tools to use and what aspects to focus on. Students' perspectives and their previous experiences will guide students in assigning relevance to tasks and content and with the guidance of their teacher they can map out a pathway to achieve their learning outcome.   This type of environment gives students a great deal of autonomy and encourages students to take responsibility for their learning but (as detailed in the preceding literature) for these environments to be effective students will need to exercise good self-regulation (Winters et al., 2008). Teachers and

students need to become partners in learning, in this way teachers can encourage students to share the responsibility and direction their learning will take (Galloway & Lasley, 2010).

It is likely that digital technologies will have some impact on students' self-management but whether it does so negatively or positively depends in part on how technologies are used by both teachers and students. Teachers' beliefs play a crucial role in determining the implementation of what, when and how the delivery of learning utilising technologies will be initiated (Chen, Looi & Chen, 2009; Inan & Lowther, 2010). Somekh (2000) argues teachers and students will need to work in new ways if they are to reap the benefits of learning in CBLEs. Findings from a study by Bebell and Kay (2010) would support Somekh's position with the teachers from five middle schools in Massachusetts reporting significant changes to their teaching practice when they integrated 1:1 laptop teaching.   A lot more time and effort was required on their behalf to make classes effective and relevant to students but their efforts paid off resulting in noteworthy increases in student engagement, motivation and independent learning.   Initially students will need extra support and clear guidelines to understand what is expected of them in a CBLE (Brophy, 2010; Smith, 2005) and how to manage themselves in these environments.

A research project that investigated tablet integration in a secondary school in Belgium conducted by Courtois et al. (2014), found two styles of teaching emerged, "instrumental teaching" and "innovative teaching". Instrumental teachers viewed the laptop as useful because they did not have to book computer rooms and had easy access to information via the internet. Their teaching practice was relatively unchanged, the textbook had in effect been replaced with the tablet. Comparatively, teachers who had adopted "innovative teaching" styles saw their primary role shift from a didactic teaching style to more of a facilitation role.

Teachers will need support too with the implementation of digital technologies in terms of how to support students' self-management. In Bebell and O'Dwyer's (2010) meta-analysis of schools

introducing 1:1 initiatives; the effectiveness and success of their implementation largely rested with

teachers. Therefore, the amount of support teachers receive in the early stages of BYOD integration

will significantly impact on the pace and effectiveness of technology adoption (Demb et al., 2004).

Rogers (2003) claims for a new practice involving innovation to be successfully adopted, individuals

will need to be able to identify with a relative advantage to themselves, have a sense of compatibility

with what they already know, feel comfortable within themselves to negotiate some complexity

pertaining to the practice and advance through a period of trial and error, followed by a period of

observing the subsequent outcomes.

2.7 Parents factors that contribute to individuals' self-regulation

Understanding how parents can contribute to the development of their child's self-regulation is an

important focus of enquiry (Clinton & Hattie, 2013; Zimmerman, 1986).   According to Martinez-Pons

(2002b) parents' ability to self-regulate directly influences their child's ability to self-regulate.   From a

young age children observe and emulate the actions of those around them (Bandura & Schunk, 1981;

Martinez-Pons, 2000b). Zimmerman (1986) concurs with this proposal stating "self-regulation is not

an idiosyncratic product of a child's own discovery experiences, but…a culturally transmitted method

for optimising and controlling learning events (p. 311).

Grolnick and Kurowski (1999) claim parents who are highly involved in their child's school life will

have a positive impact on their child's self-efficacy and self-regulation.   Martinez-Pons (2002b) says

there are many benefits to students' self-regulation for those who are exposed to a "hidden

curriculum" at home. He is referring to learning that happens between parent and child where parents

are proactively modelling, encouraging, facilitating and rewarding their child's efforts.   Students who

miss out on this type of learning at home are at a disadvantage and will require extra support at

school. Martinez-Pons (2000b) recommends schools should actively communicate with parents about how they can support their child's self-regulation.

Literature summary

To fully appreciate the enablers and barriers to students' self-management, the literature of self-regulation not only helps to unpack and isolate areas where educationalists can affect positive change to students' self-management but also highlights areas and instances where students' self-management are being impeded.

The main ideas presented here involve the recognition of importance attached to students developing skills identified with the key competency Managing Self (Ministry of Education, 2007), particularly when learning with their own digital device.

Understanding what motivates students and identifying learning strategies they may or may not possess, helps to examine potential enablers and barriers to students' self-management. Pedagogies that support the integration of digital technologies while facilitating student ownership have the potential to provide students with opportunities to develop self-management.

Developing the attributes associated with Managing Self will serve students well beyond their compulsory schooling and help them develop lifelong learning skills necessary for being fully participant in a 21st century environment.

To date little research has investigated Managing Self looks in computer based learning environments. This study aimed to address this research gap.   The next chapter presents the research methods and methodology used.

Chapter Three: Methodology

Introduction

This chapter outlines the research process and methodology.   The chapter begins by defining the rationale for the study followed by a detailed explanation of the process followed.   The research setting and participants are described along with measures employed to investigate the research inquiry.   A discussion of the collection and analysis of data is given followed by validation and ethical considerations.

3.1 Purpose

The purpose of this research was to profile the self-management of students through a self-regulation lens, in a newly formed Year 10 BYOD class. The research was motivated as a response to concerns expressed by teachers about the ability of students to manage themselves in a class where they had continual internet access and their own personal device to learn with.   For both the students and the teachers this would be the first time either party had participated in a class dedicated to enhance students' learning with the aid of a digital device.   The question forwarded is; can digital devices promote self-regulation or are they just another distraction for students to manage?

The perceptions of students, their parents/caregivers and their teachers were explored to identify enablers and barriers to students' self-management. According to Schuitema, Peetsma and Van Der Veen (2012) it is important to explore the perspectives of students individually because it's likely their opinions will differ based on their previous classroom experiences. The opinions of students' teachers and parents were also included to provide a broader perspective of the situation and to help reduce researcher bias (Cohen, Morrison, & Manion, 2007).   It was further anticipated that investigating the opinions of all three parties would provide insight into the unique circumstances within the Year 10

BYOD class. Thus, it was envisaged that this study would inform the body of research while providing

a practical template for teachers to consider when integrating digital technologies.

3.2 Research Design

The focus of this study was to investigate students' self-management across their core subjects,

Maths, English, Science and Social Studies and Physical Education in a BYOD environment. It was

crucial to this study to understand the factors present that were aiding and/or hindering students' self-

management. This key aspect informed the main research questions:

What is the current state of students' self-management in the BYOD class?

What are the enablers and barriers to student's self-management from the perspective of

students, teachers and parents?

The design was mixed methods, specifically an explanatory sequential design, where quantitative

data was collected first in the form of a student survey, followed by a collection of qualitative data in

the form of semi-structured interviews. The rationale for collecting data sequentially over two phases,

was to firstly capture a general picture of the situation and then refine and elaborate on these results

to give a more detailed and comprehensive overview of the whole situation (Creswell, 2009; 2012).

Although utilising a mixed methods approach, the research design was primarily weighted towards a

qualitative, interpretative case study that involved the interviewing of participants. The use of an

interpretative design allowed the data to be viewed inductively without a predetermined theory

(Creswell, 2012). According to Creswell (2009) case studies provide an opportunity to explore

detailed information that is "bounded by time and activity" (p.13). Foregrounding the qualitative

process was the preferred choice to allow for the emergence of themes to occur naturally amongst

the participants and to reflect a more accurate representation of the situation (Smith & Osborne, 2008).

As is the case with explanatory sequential designs there were two distinct phases involved in the collection of data (as shown in Figure 4, p.38).   Quantitative measures used in the first phase involved a student and parent survey. They were used to provide a general overview of students' current self-management skills from the perspective of the students and their parent/caregivers. One advantage of using surveys was that it allowed the collection of data from a number of people in a relatively short time frame. According to Cohen, Morrison and Manion (2007) and Creswell (2009) the numerical analysis required of surveys also helps the researcher view the data more objectively. Further justification for the use of this quantitative measure is provided in the Measures section 3.5.1.1 and 3.5.2 Data gathered at this initial stage was analysed and the results used to inform the second qualitative phase.

Phase One

- **Quantitative Data collection**
  (Provided an overview of the students' current self-management skills)

  - Student Survey
  - Parent Survey

Phase Two

- **Qualitative Data Collection**
- (Provided detailed examples and opinions of the students'
  current self-management skills)

  - Student interviews
  - Teacher Interviews
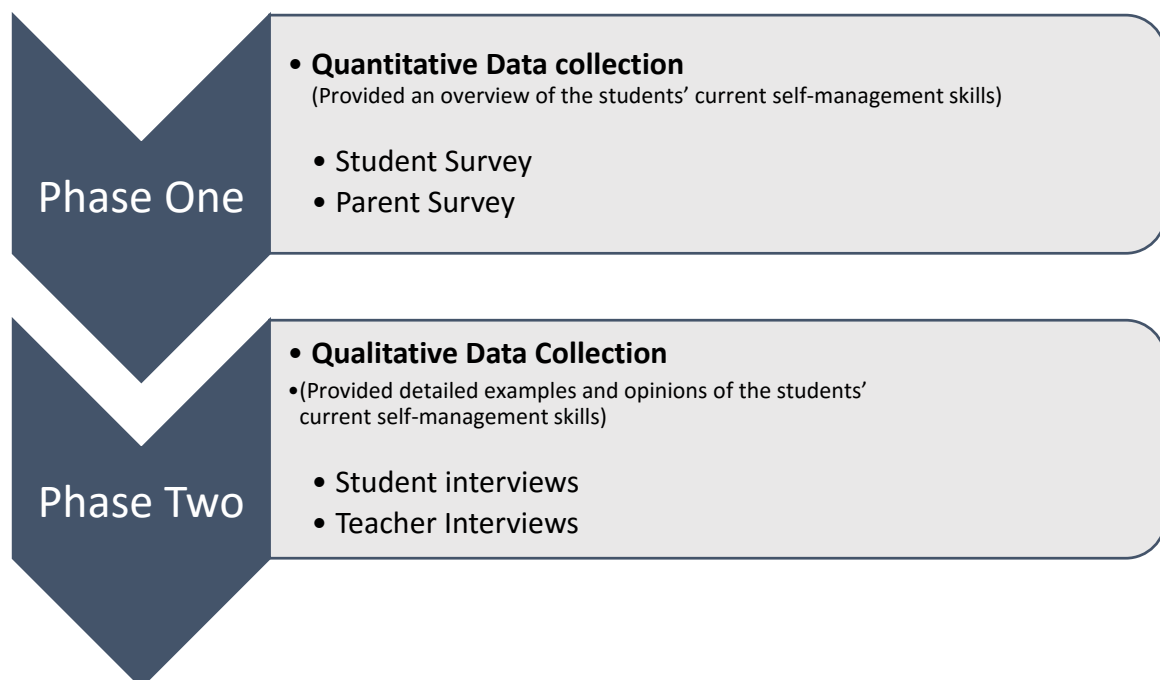
Figure 4: Visual map outlining the two phases conducted in this research study

In the second phase interviews were conducted to investigate students' and teachers perspectives of the enablers and barriers to students' self-management in a BYOD classroom. A qualitative component was included as it allowed the researcher to gather rich descriptions of individuals' experiences with the aim of understanding how participants make sense of their world (Mutch, 2013; Smith & Osborne, 2008). This mixing of methodologies where one method informs another promotes a robust analysis of the data (Ivankova, Creswell, & Stick, 2006).

Overall, this study collected data in two different ways and from three groups of participants, students, teachers and parents. Known as triangulation, this multiple means of collection and data analysis helped to build a broad picture of students' self-management from different perspectives and gave a means to cross-check results (Creswell, 2012).

3.3 Research Setting

This study took place in a secondary school with a predominantly Māori roll in the far north of New Zealand.

In the latter part of 2014 the Year 9 students and their parent/caregivers were given the opportunity to opt in to a new BYOD class to be introduced at the beginning of the 2015 school year. There were no requirements imposed on students in terms of their academic ability, aptitude or behavioural patterns. Students were free to bring a digital device of their choosing. The only stipulation was that the device must be capable of accessing the internet.

Although the school has had a BYOD policy in place for three years, there had been little uptake for the use of digital devices by either teachers or students. By 2014 however, some of the surrounding primary schools students (who were in the residential zone to attend the high school) were used to working with digital devices in their lessons. Feedback from incoming parents suggested that they

wanted their children to be able to carry on learning with this technology. Additionally, students from within the school had reported that they wanted to learn with their own device but, up to that time, barriers outside of their control existed that prevented them from doing so. These barriers included issues with security, an incomplete infrastructure regarding Wi-Fi connectivity and affordability.

Coinciding with the introduction of the BYOD class, a professional wireless broadband connection had been activated and student lockers provided to minimise security issues. The school's decision to move forward with one BYOD class was a way of trialling the integration of digital devices before the school fully committed to the concept. For those students who could not afford their own digital device, the school had rental programmes in place at a minimal weekly cost to students.

At the start of the 2015 school year, all of the subject teachers who taught this BYOD class were given their own 'Google Classroom' followed by a brief instructional workshop on how to use it. Google Classroom is an online application designed for teachers to integrate all of the Google Apps, Google Docs, Gmail, and Google Calendar. The virtual classroom is private to the teacher and their students. Being online, students can access schoolwork from home or any location with an internet connection.

3.4 Participants

The participants invited to be involved in this study were all 25 students from the Year 10 BYOD class, all parents/ caregivers of the 25 students and the six core subject teachers. The class consisted of 20 Māori students and 5 NZ European students. Students ranged in age between 14 and 15 years old.

3.4.1 Sampling

All the students, parents and teachers from the Year 10 BYOD class were invited to participate in the study.   Purposive sampling (Creswell, 2012) was applied to select the students for interviewing. Items from the student survey were scored according to a self-regulating framework which allowed students to be classified into three groups of high, medium and low self-regulators. Six students were invited to take part based on their scores, to represent two highly self-regulated students, two with moderate self-regulating abilities and two students who scored with low self-regulated scores. Within each group, the students with the highest and lowest self-regulation scores were selected. The self-regulation literature which informed the development and scoring of the student survey is outlined in the Measures section 3.5.1 which follows later in this chapter. The grouping of students (i.e. high, moderate, low self-regulators) also informed the second phase of the data collection and provided the basis on which students were selected to be interviewed.

3.4.2 The First Phase

The first, quantitative, phase used in this study included a student and parent survey as shown in *Figure 4*, (p.38).   Data were collected from two confidential online surveys, one for students in the BYOD class and one for the parents or caregivers of those students.   The parent surveys provided a general overview of parents' perceptions of students' self-management tendencies, whilst the student surveys investigated students' motivation for managing themselves and their applied learning strategies.

3.4.3 The Second Phase

The second and qualitative phase was carried out directly after the student and parent surveys (undertaken in Phase one). It involved one-on-one semi-structured interviews with the students and the teachers.   Open-ended questions were used to allow participants to tell their own story and to build a more comprehensive picture of students' self-management.

3.4.4 Student participants

The student involvement in each of the two phases of the research is shown on page 43 in *Figure 5*: Outline of flow of student participants. Nine of the 25 students (36%) accepted the invitation to participate in the study. Because students were under the age of sixteen at the time of the study parental approval was required. Parents and students received hardcopy letters that invited them to participate and outlined the processes involved. All nine students completed the online confidential student survey

Six of the nine students were invited to participate in the student interviews (see Figure 5, p.43). They were selected using purposive sampling and were chosen to explore students' self-regulating strategies. The final selection included students referred to as Ashley, Rimu, Sarah, Tane, Nikau and Matai. Parental approval for the students was sought at the time of the initial invitation to participate. Pseudonyms have been used to protect students' identities.

Phase one

Students invited to participate

Online survey

Phase two

Interview

Analysis

Potential Year 10 participants
(n=25)

Excluded (n=16)
- Did not respond to invitation
- Did not obtain both parent consent and student assent

Participants volunteered to participate in online survey
(n=9)

Excluded (n=0)
- All responded
- All completed survey

Participants sent link and completed online survey questions
(n=9)

Excluded (n=0)
- All responded
- All provided assent

Participants volunteered to participate in interview
(n=9)

Excluded (n=3)
- Did not meet selection criteria
  o Highly self-regulating (top and lowest regulator in this category)
  o Medium self-regulating (top and lowest regulator in this category)
  o Low self-regulating (top and lowest regulator in this category)

Participants selected and participated in interview
(n=6)

Figure 5: Outline of flow of student participants.

This figure is based on the CONSORT Participant Flow Diagram (2010) commonly used in scientific research

3.4.5 Parent Participants

Four parent caregivers agreed to participate in the parent survey which represented 16% of the total number invited *(n=25)*. Parents were included to investigate possible influences from students' life at home which may be contributing to students' self-management. The four parents who volunteered to participate also agreed for their children to participate in the study, as shown in Figure 6, (p.44).
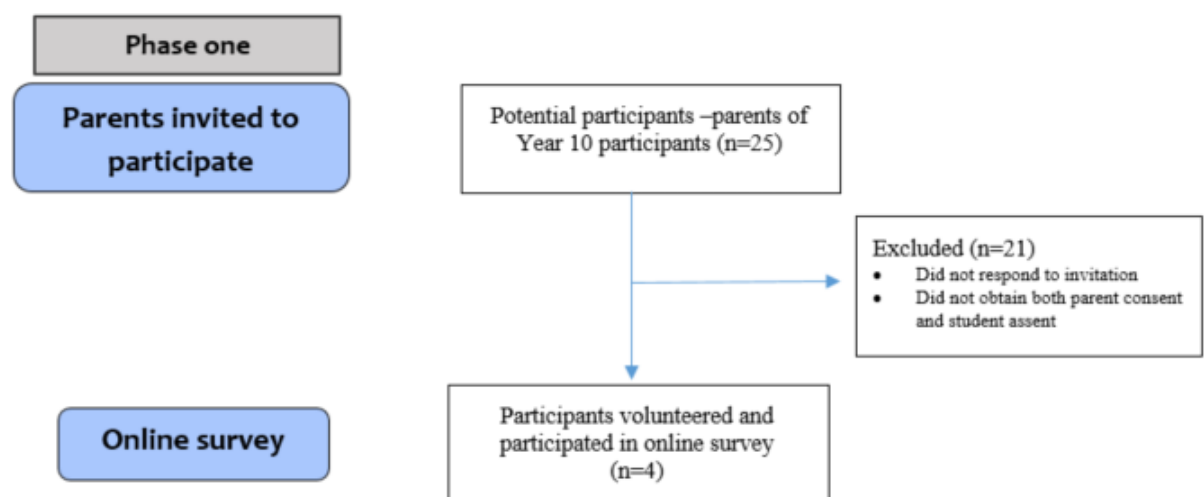
Figure 6: Outline of flow of parent participants.

This figure is based on the CONSORT Participant Flow Diagram (2010) commonly used in scientific research

3.4.6 Teacher Participants

Four of the six core subject teachers volunteered to be interviewed for the study (as shown in *Figure 7,* page 45).   Their time employed at the school varied between two and ten years. All of the teachers had five years or more teaching experience.
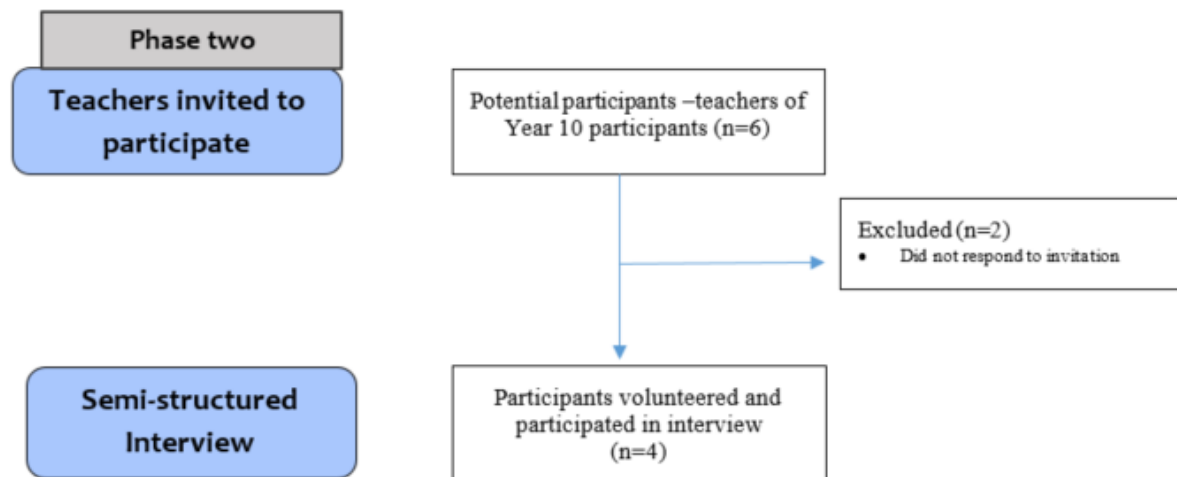

Figure 7: Outline of flow of teacher participants.

This figure is based on the CONSORT Participant Flow Diagram (2010) commonly used in scientific research

3.5 Measures

The measures used in this study were designed to explore the different behaviours and activities in terms of enablers and barriers that affect students' self-management in a BYOD class.

The measures chosen for this study were a student survey, a parent survey, student interviews and teacher interviews

3.5.1 The student survey

Because this study was concerned with students' self-regulation abilities in general, it was important to understand what motivates students to enact self-regulation and equally what prevents them from

doing so. A self-regulation instrument that includes the assessment of students' motivational orientations is the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich, Smith, Garcia, and McKeachie (1991). The MSLQ has been used in its entirety or subscales in a variety of contexts throughout the world (Duncan & McKeachie, 2005).

The original MSLQ framework was divided into two categories, *Motivation* and *Learning Strategies.* The Motivation category included three subscales: (i) Task value including intrinsic and extrinsic motivations (ii) self-efficacy and (iii) control of learning beliefs. The Learning Strategies category was aimed at exploring what cognitive and metacognitive strategies students were applying. It included rehearsal (preparation for an exam), elaboration (paraphrasing, summarising), organisation, critical thinking, meta-cognitive self-regulation, time and study environment, effort regulation, peer learning and help seeking (Pintrich et al., 1991).

The authors stated the MSLQ and its subscales were created to be modular by design, allowing researchers to pick and choose components to fit their needs and context (Duncan & McKeachie, 2005; Pintrich et al., 1991). Questions were reworked to ensure they met the needs of these New Zealand participants. Questions referring to rehearsal, critical thinking and memorisation for test preparation were omitted because these strategies were not a characteristic of Managing Self as outlined in the NZ Curriculum (2007).

Winne and Perry (2000) claim the self-reporting questionnaire is a useful measure for capturing students' inclinations to initiate self-regulating strategies because participants need to actively recall past experiences. Pintrich (2004), Pintrich, De Groot, Calfee and Schunk (1990) agree, arguing in support of self-report style questionnaires to measure student perceptions of motivation and cognitive engagement provided they are backed up with other measures as in the case of interviews. Schwarz (1999) however, disputes the reliability of self-report style questionnaires because participants may interpret questions differently. He suggests further, that the wording, placement and

formatting of questions are all noteworthy factors which can alter results indeterminately.   For this reason, three pilot surveys were conducted prior to the actual survey and one mock interview. Minor modifications were made in the process to ensure any ambiguity was removed and to help participants interpret the questions as accurately as possible. This included splitting item 7 into two questions. Item 19, *I think I am a self-motivated person* was removed because it was considered too general. It was replaced with *I am much better at self-management because I am in the BYOD class.* Item 21, *I think our classes are more fun because of the technology used* was omitted because the word 'fun" was not a word that aligned well with the self-regulating literature. Item 40. *I like to achieve mastery in computer or Xbox games* was omitted because its meaning was too ambiguous.

The final version of the student survey (see Appendix D) consisted of 40 multi-choice items and two open ended questions.   Within the student survey there are two categories, Motivation and Learning Strategies. Within each category statement items are divided into sections similar to the subscales of the original MSLQ.

3.5.1.1 Student survey: Motivation category
The Motivation category of the student survey was made up of 20 items categorised into five sections. Items aimed to explore students' goal orientations in terms of being intrinsically and extrinsically motivated. Other questions were designed to identify what value students were placing on their learning in the BYOD class.   Also under this section were items pertaining to students' beliefs around their self-efficacy and to what extent they felt in control of their learning. The item sections were:

- Task Value

- Intrinsic motivation

- Extrinsic motivation

- Control of Learning Beliefs: An Expectancy Component

- Self-efficacy for Learning: An Expectancy Component

3.5.1.2 Student survey: Learning Strategies category

The Learning Strategies component was directed towards identifying students' cognitive and meta-cognitive use of resources and applied strategies. Twenty items were used and organised into six sections. Items aimed to uncover how students motivated themselves when tasks were perceived as difficult or were judged by the student to be boring. Other items related to whether or not students could set goals, create optimal learning environments and how they went about finding help. The item sections were:

- Effort Regulation

- Elaboration

- Metacognitive Self-Regulation

- Organisation

- Environmental Structuring

- Being Resourceful/Help Seeking

The student survey served a number of purposes:

i. To give an overview or snapshot of the current situation of students' self-management

ii. To score and rank students' responses so they could be grouped according to their self-regulation tendencies. This process informed the selection of students for interviewing.

iii. Some student responses were used as conversation starters during the interviews to check for validity (Creswell, 2009) and to gain a more in-depth understanding of the student's experiences.

iv. To provide some triangulation to the data

The first three points determined the reason for placing the surveys before the interviews. This provided a logical process and entry point to understanding the current situation and served to answer the first research question; *what is the current state of students' self-management in the BYOD class?*

3.5.2 The parent survey

The parent questionnaire was made up of 30 multi-choice items plus three open ended questions (see Appendix E). The questions were divided into three sections, two sections Motivation and Learning Strategies were designed to align with the same two sections in the student questionnaire. The third section was adapted from the work of Martinez-Pons (1996) whose study looked at the effect parents had on their children through encouragement, rewarding, facilitation and modelling.

3.5.3 Semi-structured interviews

The one-on-one semi-structured interviews were designed to explore influences on students' self-regulation. The interviews were conducted in an informal and conversational style. Open ended questions were used which gave some flexibility to the interview dialogue while encouraging participants to share their perspectives. It was anticipated that this relaxed manner would help put participants at ease and allow them to express their own opinions as the 'experiential expert' (Smith & Osborne, 2008) Robinson and Lai (2005) also claim the exploratory type of questioning encourages participants to convey their own ideas using their own language which leads to an opportunity to explore what is not visually obvious (Kolb, 2012).

The following open ended questions asked of the students were:

a) What things do you think help you manage yourself in the BYOD classes?

b) What things do you think stop you from managing yourself in the BYOD class?

c) What do you think it means to be self-managed?

The key questions asked of the teachers were:

Can you tell me about factors in the class that you think support and/or hinder students' self-management with relation to the following?

a) Student factors

b) Parent/home factors

c) Teacher factors

d) Classroom technology factors

In addition to the common questions asked to all participants the student's survey responses were used as conversation starters and to gain a better understanding of students' situations relative to their self-management. Harris and Brown (2010) recommend keeping the interview prompts aligned as closely as possible to the questionnaire, to provide more validation when it comes to the comparing of quantitative and qualitative data so this was taken into account.

The student and teacher interviews took place in a private conference room regularly used by teachers and students. The location for the interview can affect participants' responses so choosing an environment familiar to students would hopefully ensure students felt at ease (J. A. Smith & Osborne, 2008). Times for the interviews were negotiated with each participant to minimise disruptions to students' learning. Forty five minutes was allocated for each interview. If the interview reached 45 minutes the participants were given the opportunity to end or continue with the interview.

All interviews started with a brief introduction reiterating the purpose of the interview. Reassurance was given to participants that their identity and answers would remain confidential. Participants were provided with light refreshments and given a short explanation of how the interview would proceed. Interview schedules can be found in the appendices.

3.6 Procedures of Data collection

Collection of the data was conducted in a methodical manner which at times included the support of a third party, an independent research assistant who was not involved in the development or analysis of the research study. The data were collected during June and July 2015.

3.6.1 Student survey data collection

An administrative staff member of the school agreed to undertake the role of research assistant. This role included:

- The mailing of all participant information sheets and consent forms

- Collection of consent forms

- Creation and collation of unique participant identifier codes (as specified by the researcher)

- Facilitation of the online student survey

A computer room was booked at the school to ensure all student participants would be able to access the online survey. The research assistant facilitated the student survey which took around 10 – 15 minutes to complete. Students were provided with a link to the online survey and given a confidential code to enter on commencement.   This code aligned with their parents or caregivers. The research assistant took responsibility for the coding of parents' and students' information and data to keep participants identity confidential from the researcher. This was important in order to avoid selection bias (from the researcher) for the second stage which involved the interviewing of students. The research assistant matched student and parent/caregiver consent and assent forms to ensure that both parents and students had given consent and assent before being provided with survey links.

3.6.2 Parent questionnaire data collection

When the research assistant received consent forms to participate they were issued with a code which corresponded to their child's.   This unique participant identifier code ensured their identity remained confidential.   They were then emailed a link and the code by the research assistant. If parent/caregivers preferred they could participate using a hard copy of the survey but none of the participants requested to do so.

Student and parent surveys were created using Survey Monkey, https://www.surveymonkey.com/, owned by Survey Monkey Inc. an online cloud based company. Once analysis of the data had occurred the data were removed from Survey Monkey.

3.6.3 Interview data collection

The interviews were digitally recorded and transcribed verbatim. This process provided a familiarity with the data which enabled an insight into the issues at hand within the BYOD class. Participants were made aware they would be able to site the transcribed recording and make any changes they felt necessary. Randomly selected sample transcribes were also checked by an independent research assistant for accuracy. The selected samples were found to be an accurate account of participants' responses.

3.7 Data Analysis

Phase one involved student and parent surveys which were analysed first. This was followed by the phase two interview results.

3.7.1 Quantitative analysis

Prior to analysing the surveys, responses were prepared by scoring the data. Item responses were scored from 1 – 5 using the Likert scaling responses strongly disagree, disagree, undecided, agree to strongly agree.   Positive item responses were orientated towards affirming the attribution of self-regulation skills. For example item 38, *I set myself learning goals and make a plan to achieve them* scores were ascribed accordingly strongly disagree 1, disagree -2, undecided-3, agree-4, strongly agree-5. Most of the items were framed positively however, negatively-keyed items were also used to avert acquiescence bias from participants. Acquiescence bias is a term used to describe survey responses from participants that generally agree with all the items (Creswell, 2012) .   Negatively worded items were reverse scored.

The mean of each category was calculated by adding all the items in that category and then dividing it by the number of items within the category. This was an important procedure designed to ensure all the categories had equal weighting, because section categories had different numbers of items assigned to them. Evidence of the applied process is shown in Table 1.

Table 1

Example of scoring process

Control of Learning Beliefs

Student ID	Item 14	Score	Item 15	Score	Item 19	Score	Total Score	Mean Score
		A		B		C	*n=A+B+C*	*n=Total Score/3*
SN1	Agree	4	Agree	4	Disagree	2	10	3.3
SN2	Agree	4	Agree	4	Undecided	3	11	3.7
SN3	Agree	4	Agree	4	Agree	4	12	4.0
SN4	Agree	4	Strongly agree	5	Strongly agree	4	13	4.3
SN5	Agree	4	Strongly agree	5	Strongly disagree	1	10	3.3
SN6	Disagree	2	Agree	4	Disagree	2	8	2.7
SN7	Undecided	3	Agree	4	Disagree	2	9	3.0
SN8	Undecided	3	Strongly agree	5	Disagree	2	10	3.3
SN9	Disagree	2	Agree	4	Strongly disagree	1	7	2.3

Results from the survey were analysed firstly by the two main categories, Motivation and Learning Strategies. Items within each section were added together for each student then divided by the number of items to give an overall mean score for the student relative to the associated section Means were also calculated to give an overall mean score for the each section by adding all of the students' scores (within a section) and then dividing it by the number of students. Finally, students'

mean scores from all the sections in the motivation category were totalled to give an overall motivation score. The same was applied to the sections within the learning strategies category.

3.7.2 Qualitative analysis

The student and teacher interviews were analysed using a constant comparison process involving the systematic steps of open, axial and selective coding as described by Creswell (2009). Open coding requires the researcher to categorise parts of the text, breaking it down into sections that can be assigned a relative code see Table 2, (p.56). The text was then examined in detail through an iterative process (the repeating of steps) whereby the codes were checked again to find similarities and differences. Axial coding involves finding connections across the codes and regrouping them again to develop themes (Corbin & Strauss, 2015). Finally selective coding was applied to ensure assigned codes are consistent, validated and exhausted (Creswell, 2012) the outcome of this process is evidenced in Table 3 (p.58) and Table 4 (p.60). Any changes to participants' quotes included in the findings were purely grammatical. Alterations to participants' quotes are distinguished by the insertion of square brackets for example; I check that [Google Classroom] most nights just to make sure I haven't missed anything in class.

This "disassembling and reassembling of data" (Cohen et al., 2007) was an iterative process that used inductive and deductive analysis. This helped to shape a bigger picture of students' self-regulation from the perspectives of both the teachers and students and was considered fundamental in order to prepare the data for analysis (Creswell, 2009).

The first (and inductive) stage of analysis initially involved highlighting a passage of text and assigning a code (category which represented the key idea) see Table 2, (p.56). Items could then be separated out further into segments of text to identify when a change of topic occurred.   Annotations were made alongside the segments of text, to paraphrase participants' comments in order to keep as close to the raw data as possible.   In vivo codes (Creswell, 2009; Smith & Osborne, 2008) that is, repeated

words or phrases from the participants' comments informed some of the codes directly, words like 'guidelines and expectations' for example.   The data were then organised into categories and sub-categories as is the case with axial coding (Kolb, 2012) which helped the researcher to identify and validate connections between the categories. Colour coding was also applied to provide further visual cues to define categories and weighting as shown in Table 2 (p.56).

Table 2

Example of initial process of open coding

Extract from interviewee transcribe	Annotations	Assigned open codes
the parents can actually access the Google classroom so, apparently, I don't know if any have but um I tell the kids all the time to show the parents and I give them work back so they can take it home	Teacher tells the students to show parents their work but is unsure if any of them do	Parents – Communication
Interviewer: What sort of things do you think teachers need to do to help students manage themselves? Just set clear expectations firstly about what they're going to do. I think the ones that have been in the class with me before know that I'm expecting them to work reasonably hard most of the time so they've got that expectation	Teacher believes it's important to students self-management that they give clear expectations to students	Expectations

The first transcript was examined in detail before moving onto the next transcript. The second transcript would then be coded and compared against the first transcript. A flow chart was developed (see Figure 8, p.57) to demonstrate the steps used. This iterative process, termed 'theoretical sampling' was repeated with all the other transcripts until a point of data saturation (Kolb, 2012) developed.   Periodically throughout the coding process, findings were shared with another researcher to provide validation of prescribed codes.

```
                    ┌─────────────────────┐
                   ( Transcribe           )◄──────────────┐
                   ( participant interview )               │
                    └──────────┬──────────┘                │
                               │                           │
                               ▼                           │
              ┌────────────────────────────────┐           │
              │ Annotate participant interview  │           │
              │           data                  │           │
              └───────────────┬────────────────┘           │
                              │                             │
                              ▼                             │
              ┌──────────────────────┐    ┌──────────────────────┐
              │ Assign codes to      │───►│ Repeat steps with next│
              │ participant          │    │ participant interview │
              └──────────┬───────────┘    │        data           │◄─┐
                         │                └──────────────────────┘   │
                         ▼                                           │
              ┌──────────────────────────────┐                      │
              │ Compare participant x and     │                      │
              │ participant y                 │                      │
              └──────────┬───────────────────┘      ┌──────┐         │
                         │                           │  No  │         │
                         ▼                           └──────┘         │
                      ◇ All transcribes ◇───────────────────────────┘
                      ◇    coded?      ◇
              ┌─────┐     │
              │ Yes │     ▼
              └─────┘
              ┌──────────────────────────────────┐
              │ Removed redundant codes, reduced  │
              │ to 37                             │
              └──────────┬───────────────────────┘
                         ▼
              ┌──────────────────────────────────┐
              │ Codes reduced to 2 categories, 4  │
              │ themes and 8 sub-themes           │
              └──────────────────────────────────┘
```
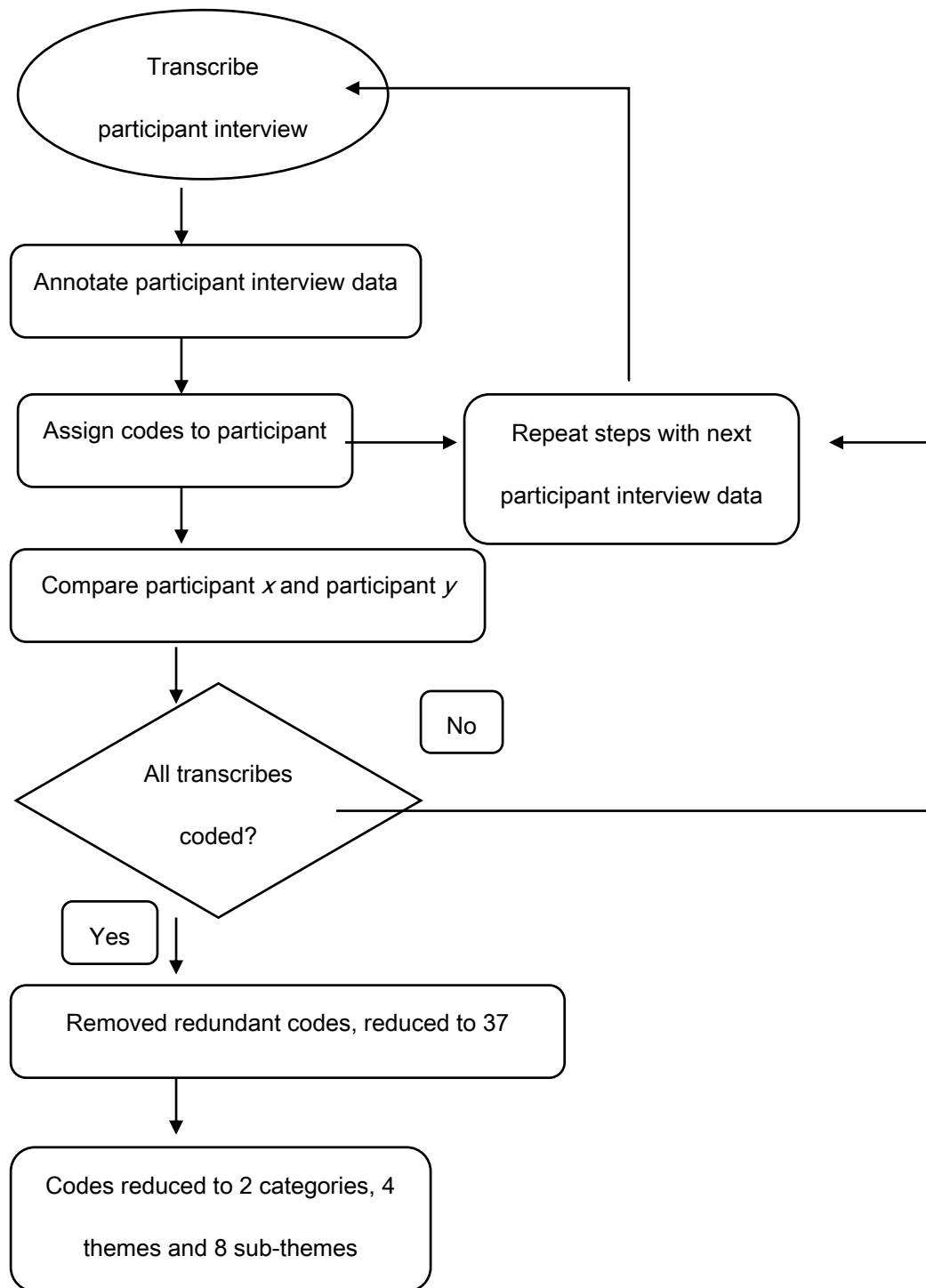
Figure 8: Flow chart showing inductive analysis used for coding

Having read through the transcripts a number of times and using open coding it became apparent there were two key categories of consideration:

I.   *Indicators of students' self-management*

II.   *Factors that affect students' self-management*

3.7.2.1 Indicators of students' self-management

Comments that reflected students' current state of self-management were coded as indicators. The codes applied during the first stage of open coding analysis can be seen in Table 3, in the right hand column titled 'Initial Codes'. Once these initial codes had been identified they were grouped according to the categories in Pintrich's (1991) MSLQ framework. This provided an alignment to the literature and also a direct link to students' responses in the survey. Answers from the student interview participants were checked for verification between both measures.

Table 3

Indicators of students' self-management

MSLQ Theoretical Framework (Pintrich, 1991)		Initial Codes
Motivation	Task Value Activation	Interest
		Utility
		Importance
	Intrinsic/Extrinsic motivation	Feedback/Reminders
		Teacher or parental monitoring
	Expectancy Component	Self-efficacy
		Control of learning beliefs
	Organisation	Organisation of resources

Learning Strategies	Metacognitive SR	Goal setting
		Planning
		Monitoring
	Effort Regulation	Managing Distractions
		Time/study/homework
		Persist/give up
	Environmental Structuring	Device/equipment preparedness
		Study environment
	Help Seeking	Use of resources
		Peer support
		Teacher support

3.7.2.2 Factors that affect students self-management

Any participant comments which did not fit the first category were reread and checked to see if they related to the second category ii) *factors that affect students' self-management.* Items coded for this category were done so through an iterative and open coding analysis. This process formed the basis of four main themes that affected students' self-management either negatively or positively:

1. Student factors

2. Teacher factors

3. School factors

4. Parent factors

The development of these themes helped to answer the second research question, '*what factors are affecting students' self-management?* Participants' comments showed there were a number of variables affecting students' ability to exercise self-management. All participants' comments relating to student factors reflected their use or lack of use in exercising learning strategies. Teacher factors

were defined into five sub-themes that reflected pedagogical implementation. Factors attributable to

the schools' infrastructure were to do with technical issues, technical support and the systems in

place for dealing with such issues. Parental factors had two sub-themes, i) *what parents did or didn't*

do that impacts students' self-management and ii) *the school/parent partnership and associated*

communications (as shown in Table 4).

Table 4

Factors that affect students' self-management

Main Themes	Sub-Themes	Initial Codes
Students	Learning Strategies	Environmental Structuring
		Effort regulation
		Pre-requisite knowledge
		Student absence
Teachers	Relationships	Choice
		Co-construction
		Classroom environment
	Co-construction	Mixed Abilities
		Facilitation
		Individualised Learning
	External motivation	Feedback
		Monitoring
	Guidelines/Expectations	Aiding organisation
		Teacher expectations
		Instructions/Exemplars
	Digital Resources	Technical Ability
		Google classroom

		Google Chat
School systems	Infrastructure	Internet Access
		Printing Accessibility
		Technical support
Parents	Parent factors	Communication
		Being informed
	School/parent factors	Parents Role

3.8 Validity and Reliability

A range of approaches were taken to maximise validity. Survey scores were checked twice by the researcher and then by an independent research assistant for consistency and correctness. Extra care was taken with reverse coded questions. One purpose for the quantitative approach was to mitigate personal bias on the part of the researcher because it promotes a more objective analysis of the data (Creswell, 2009).

Conversely qualitative measures require researchers to bring their own perspective and make an interpretative analysis of the data (Creswell, 2012).   To support validation during the qualitative analysis process, findings were shared periodically with two other researchers to check they agreed with the coding of transcripts and developed themes. Clear definitions for each category were assigned to ensure consistency and to ensure every coding decision carried as little inference as possible.

This multiple means of collection and data analysis helped to build a broad picture of students' self-management from different perspectives which according to Cohen, Manion and Morrison (2007, p.141) has the added advantage of providing concurrent validation through triangulation.

3.9 Ethical considerations

Ethics approval was granted by the University of Auckland Human Participants Ethics Committee on the 4th June 2015 for a period of three years. Reference number: 014493.

Prior to receiving ethics approval and because the research was conducted in a predominantly Māori school. The researcher first sought advice from the school's Principal (who is Māori). The Principal requested the researcher speak at a Te Ropu Whakatoki meeting to outline the research proposal and to give potential participants an opportunity to ask any questions. Te Ropu Whakatoki meetings are held regularly to interface with community members, parents and interested persons of the proceedings and happenings within the school.   All measures were taken to ensure the proposed research process would be respectful and consistent with the provisions of the Treaty of Waitangi and any associated Māori protocol.

As stated in section 3.4 Participants, Participant Information Sheets (PIS) (see Appendix A) student assent forms (see Appendix B) and Consent Forms (see Appendix C) were mailed to the students, parents/caregivers and teachers involved in the Year 10 BYOD class along with the school's Board of Trustees.   Because students were under the age of 16, students received assent forms and parental approval was sought prior to commencement.   Participants were also informed they had the right to withdraw at any stage of the research project and any information given could be withdrawn until the time of analysis.

The researchers' relationship with the school was outlined in the PIS and care was taken to ensure all participants knew that their participation was completely voluntary and that non-participation would not affect relationships within the school in any way.   The Principal (on behalf of the Board of Trustees) confirmed this by signing a consent form clearly stating that participation or non-

participation would not influence participant's relationship with the school or their access to school services.

A potential ethical issue was that teachers and the school might be identifiable through the reporting of results. It was explained to participants in the PIS, that reports or results from this research would not directly identify the school or any individual participants, as the source of outlined information. Also stated in the PIS was that it may be possible for some readers of the final thesis to guess the participating school, however teachers and students would remain unidentifiable.

Methodology summary

The Methods chapter sought to describe the methodological approach used in this research and to provide justification for the decisions applied throughout. The rationale for using a mixed methods framework has been explained along with supporting reasons for the development of phases, data collection and data analysis. The research setting and description of participants has been given to locate the study in context. The next chapter presents the key findings from the study.

Chapter Four: Findings

Introduction

This chapter presents key findings from the study including data from the student and parent surveys and data from the student and teacher interviews.   The findings are divided into seven main themes:

I.   Case studies of students

II.   Teachers and students' understanding for managing self

III.   Student survey results

IV.   Teacher factors affecting students' self-management

V.   Student factors affecting students' self-management

VI.   School infrastructure factors affecting students' self-management

VII.   Parent factors affecting students' self-management

The chapter begins with a brief introduction to each of the six students involved in the interviews drawing on both their quantitative and qualitative data. This is followed by an outline of teachers' and students' understandings of students' self-management. The quantitative results from the student surveys are presented in two categories, Motivation and Learning Strategies.   The qualitative data from the student and teacher interviews were analysed to answer the following research questions:

1. What do students perceive are factors that act as enablers and barriers of developing managing self in the BYOD classroom?

2. What do teachers perceive are factors that act as enablers and barriers of developing managing self in the BYOD classroom?

It became apparent from the open coding of student and teacher interviews that teachers, students, school and parents identified numerous factors affecting the self-management of students. These factors formed the basis of four main themes, each of which will be discussed separately.

4.1 Case Studies

In the following six case studies, pseudonyms have been used to protect the identity of the students involved.

Ashley – A high self-regulating student

Ashley identifies as a New Zealand European student. Her survey results put her as the highest self-regulator in the class. Examining the results from the student survey, Ashely was the highest scoring student on eight of the eleven sections which included i) task value ii) control of learning beliefs iii) self-efficacy iv) effort regulation v) elaboration vi) meta-cognitive self-regulation vii) organisation viii) environmental structuring. Comments from her interview would suggest she is motivated by earning good grades:

> Interviewer: Do you usually aim for high marks?
>
> Ashley: Yeah, it kind of gets me going and I really want to finish it on time so that it's not late. I've always been quite academic not really sport[y]….I just do it so that I know I can achieve something, I know that I've done something that's really good and yeah , it makes me feel good inside.

Ashley had good self-monitoring strategies and was in the habit of using Google Classroom frequently to help her manage her learning:

> Ashley: I check that [Google Classroom] most nights just to make sure I haven't missed anything in class.

> Ashley: They (teachers) put up…documents on the assessment [and] how they're going to assess it. So you can read through that and see, ok I need this and I need that and you can make sure that you've got it in your writing or your project.

When asked how she managed distractions she replied:

> Ashley: I don't really find that a problem…when I'm on my computer it's normally just to do my homework and I know I have to get it done…because I do lots of other things after school ….I don't really have that much time to just muck around, and so I just kind of do it.

Ashley's parent strongly agreed with the statement '*My child is good at managing things that distract her/him from their learning'.* Responses from the parent survey also suggested Ashley's parent believed Ashley was a capable learner and able to persevere when faced with learning difficulties. Other responses intimated Ashely was well supported at home and encouraged to do her best.

Rimu– A high self-regulating student

Rimu identifies as a NZ European/Māori male whose overall student survey score also put him in the high self-regulating student bracket. Rimu's parent/caregiver did not participate in the study.

He appeared a focused and diligent student who had a number of different learning strategies that helped him manage distractions and discipline himself to stay on task. One of those strategies was aided by having two devices, his laptop which he used solely for school work and an ipad which he used for Skyping his friends and watching YouTube. Keeping the two devices associated to different tasks helped him compartmentalise his activities and exercise a degree of self-discipline to keep him focused:

> Rimu: I just get on with the work and put my ipad away, turn off the Wi-Fi and just get on with my work… I only use my laptop at school, I just turn off my ipad because I usually use that for YouTube.

He had a strategy for helping him to plan his work:

> Rimu: well first of all I would see what we're trying to do and….then I open up my computer and look at all this information and….I try and write it out in my own words all that I've learnt and ….then [I} am pretty much able to do all my work while researching at the same time.

Rimu believes technology enables him to manage himself better, and he feels more organised using his own laptop for school work which means his work is kept tidy and orderly:

> Rimu: I think it's just more organised….I… get a lot of work done….and [with Google Classroom] you're able to get all those assessments done either at home or here. At home you can just send it over, no issues, rather than having to print it out here and give it to the teacher the next day whether you're sick or not sick.

> Rimu: usually all my paper work gets a bit ripped…or scrunched up, I like to type it out, especially my notes…. so that I can actually keep all of it safe.

Rimu thought what he was learning was useful and that it would help him in the future. However there were some topics that didn't interest him and on those occasions he drew on external motivations:

> Rimu: trying [to] make my family proud of me…is my motivation…I just hate the subject but I think to myself…think about the marks, think about your future and when I think about that, it motivates me to try and accomplish this task.

Sarah – A moderate self-regulating student

Sarah is a NZ European female who enjoys being creative with her writing and likes using imagery to express her ideas. Out of all the participants, she scored second highest on the Motivation section but was in the bottom three on the Learning Strategies section. She feels she is a capable learner, a confident computer user and expects to do well in the BYOD class. Answers from the student and parent survey would suggest she has adopted matching values to her parent/caregiver in terms of how important it is to do well at school.

Sarah has limited learning strategies to help her compensate for technical learning disruptions:

> Sarah: [When} the Wi-Fi doesn't work we don't really get to do our work because we can't get onto it until we get home or the Wi-Fi is fixed…Most of us don't….have Microsoft word …so we have to have the internet to do it… there is only about one or two of us who can actually send [an electronic file] to the teacher so she can print it off.

> Sarah: I'm not really that organised, because sometimes we have to charge our laptops, sometimes we forget to bring our chargers to school, sometimes I forget to charge it, and so you come to school without a charger and it's only half way through.

Another barrier for Sarah was managing online distractions that didn't have any relevance to the lesson:

> Sarah: I can be distracted really easily, we'll have to go and watch a video on YouTube and I'll go oooo I'll have to watch that one later and that one…I like, need someone there to keep me on track.

Her comments (see Help Seeking later in this chapter) suggested she made good use of online resources.

Nikau – A moderate self-regulating student

Nikau is a Māori male whose motivation stems from doing something hands-on:

> Nikau: I like to be more interactive with things, like learning by going out and doing something,
>
> but you can't really do [that] at school.

He gave the impression he was limited in terms of learning strategies that he could call upon to help him manage his learning and was not in the habit of planning or setting goals:

> Interviewer: When you have a long term project…do you [make a] plan?
>
> Nikau: No, I just remember it

> Interviewer: do you make learning goals?
>
> Nikau: No

Perceived barriers for Nikau's self-management also existed with seeing the relevance in what he was learning:

> Nikau: I feel we're learning things in maths and science that I'm not really ever going to use in
>
> life.

He also found it harder to manage social distractions in the BYOD class, especially when his peers were playing games on their devices:

> Nikau: I think it is a bit harder to manage yourself in this class because you're going to have
>
> more distractions…. I see other students playing games on their devices and stuff. I don't play
>
> games in class though but I don't usually stay on task.

At home it was a different story, away from his peers he felt he could discipline himself and did so by breaking his schoolwork into half hour sections. Afterwards, he'd reward himself with something that he likes doing:

> Nikau: I do a bit of homework and then go on a bit like check your messages then go back watch a video then go back…homework's always more important than other things so I do [this] before [I] do that.

He felt more organised with his laptop but thought it would be better to have everything in one place, on the device rather than using both his books and the laptop:

> Interviewer: Do you think having your laptop helps you to be more organised?
> Nikau: It….doesn't [really]…it should be more organised but we still have to always carry around our books and stuff so it's kind of hard to keep track of all your stuff….you should just have your laptop and…have different files…so it's like really organised….there's missing information in-between things so it's not really organised, it's just jumbled up.

Tane – A low self-regulating student

Tane is a Māori male whose survey score placed him in the low self-regulating group.   He identifies as a polite and quiet boy who feels discouraged by a number of constraints he is experiencing within the BYOD class. These constraints appeared to be imposing some barriers on his ability to manage himself.

Firstly, Tane perceives the work to be harder in this class and the workload overwhelms him at times, particularly the amount of homework:

Tane: We get heaps of homework it just stresses me out sometimes. The amount of

homework is ok but we get heaps from every single class….like we had to do a 300 word

piece of writing in English and then we had something else in Social Studies that was

important, we had to study for like a test and then, there's just heaps of homework.

Tane scored the lowest of all students on the self-efficacy section of the questionnaire and his next

comment suggests a similar outcome:

Tane: We get like a minute and it's like a whole page of work and I can't do that, they think

that we're all like smart but I'm not very smart really.

Secondly, a poor relationship with his teachers and the lack of rapport he experiences with them

appears to impact his self-efficacy beliefs and makes him reluctant to ask for help:

Tane: I feel capable in social studies and my options but I just don't like science and maths.

It's the teachers that I don't like….I don't enjoy it anymore. I used to love maths but now I

don't. I don't really like asking the teachers [for help].

Comparatively, with another teacher from the BYOD class Tane does feel a good rapport exists

between the two and attitudes are different. He also enjoys the fact that he gets some choice in this

class:

Tane: It's like he's our friend. We get a choice in social studies and yeah that's it. We were

doing government and we could choose which type of government what we wanted to do and

yeah, it's pretty cool in there. I like the teacher…he's crack up.

Another time that Tane mentioned feeling motivated was when he was allowed to choose what he wrote about in English for a creative piece of writing. There were some guidelines but he got to choose the topic and he found that by having a choice, the process rendered him free of distraction:

> Tane: I was too focused, if they told us to do it again, I'd do it again; it would be fun. Tane's peers are a great support to him and he feels more inclined to ask them for help than his teachers. They like to talk and help one another but they often end up being admonished for talking. Outside of school time Tane enjoys working collaboratively with his school friends playing online games and feels that self-management in the game environment is about 'sticking together'.

Other barriers that appear to prevent Tane's ability to manage himself have to do with social factors:

> Sometimes I can work but [it] really depends how I feel…when I go to the class. One time I remember I was angry and I just didn't want to do any work and I got in trouble heaps cause I was angry… sometimes I might just be angry, because I think my sister's going to get into a fight.

Aspects that are enabling Tane's self-management are the motivations and reminders he receives from his whanau/family. He feels supported and encouraged to do his best. Responses from the parent survey back up Tane's comments and intimate his parent/caregiver gives him lots of encouragement to persevere and do his best. However when asked to comment on aspects that were not helping their child in the BYOD class, Tane's parent/caregiver responded:

> Parent C: Not sure as he sometimes says it's too hard or he misses using books, I think he doesn't ask for help when he doesn't understand.

Matai – A low self-regulating student

Matai identifies as a Māori student. His answers from the survey suggested he was the lowest self-regulator in the group.   On the face of it, it would appear he had relatively few learning strategies for regulating his behaviour in the BYOD class, but as the interview progressed it became evident that his lack of motivation probably stemmed from the disillusionment he felt within the class. This lack of motivation could be a real barrier to Matai's self-management:

> Matai: I thought we were just going to use laptops and no bookwork [but] we don't really use them.

Although this comment suggests Matai is not very competent with computers, he purports to being an avid and competent online gamer which would indicate his level of computer competency is context specific.   When asked if he thought he had to manage himself in a games environment Matai replied that he did.   He thought managing himself in a games environment had a lot to do with knowledge and knowing what was expected of you in the game:

> Interviewer: What do you think self-management is in the game?
>
> Matai: I just know what I'm doing [and it's about] knowing what you're doing, knowing what to buy, knowing what to get. Learning your abilities, where to go [and] what to do.
> [Understanding] the person you're facing, what's their combos (combinations) and stuff.

Matai perceived few activities in the BYOD class that enabled his self-management.   Positive relationships with his teachers were important to him but he felt like he only had such a relationship with two of his five core teachers.   He also gave the impression that he could be determined in his efforts but his engagement hinged on whether or not he was interested and he commented that he often felt bored in class:

> Matai: In certain classes….all we do is copy down stuff off the board that's not fun.' Sometimes in our classes we never use our laptops…probably three quarters of the class we do bookwork.

Matai's family's expectations were a big motivator for him to do well and he aspired to achieving better marks than the other students in his class. His parent/caregiver strongly agreed with the statements '*My child tells me he/she often feels bored in the BYOD classes* and '*My child does not feel motivated in the BYOD classes.'* He/she thought Matai was very capable with computers but had few strategies to manage distractions or timeframes. There was also an expectation from whanau/family to do well and it would appear Matai has plenty of support and encouragement from home.

4.2 Student survey results

The student survey was used to obtain an overview of students' perceptions about their self-management skills since moving into the BYOD class. It was also used to select a sampling of students for interviewing. Nine students from a class of twenty-five completed the survey which represented 35% of the students in class.

The biggest difference in student survey scores was between the high self-regulating student and the low self-regulating student. Ashely was the highest scoring student at 4.18 which suggests she generally agrees with being a high self-regulating student. At the other end of spectrum is Matai who scored 2.84 overall. His responses suggest he generally disagrees with being a self-regulating student. The other student scores were mixed between the two categories with some students scoring higher in the motivation category than the strategies category and vice versa.

Table 5

Overall Scores from Students' Survey

Students		Motivation	Learning Strategies	Overall Survey Mean
High Self- Regulators	Ashley	4.18	4.17	4.18
	Regan	3.82	4.00	3.91
	Rimu	3.72	3.99	3.85
Moderate Self-Regulators	Kauri	3.68	3.86	3.77
	Sarah	3.90	3.31	3.60
	Nikau	3.37	3.50	3.44
Low Self-Regulators	Tane	3.15	3.71	3.43
	Lucas	3.78	3.01	3.40
	Matai	3.08	2.60	2.84

The results from each category *Motivation* and *Learning Strategies* are outlined in the following section beginning with a brief overview of the differences between the high and low self-regulating students within each category. Then the results for each section are described in detail.

4.2.1 Motivation

Items in The Motivation category were to do with what motivates students to learn, what they value in their learning and the extent to which they think of themselves as capable learners.

The high self-regulators generally valued what they were learning and thought that having a device to learn with was important. Conversely, the low self-regulating students did not consider learning with a device as important. They struggled to find value or relevance in what they were learning and their results also indicated that they often felt bored in class. The low self-regulating students scored the lowest of all the students under the self-efficacy section whereas the high self-regulating students' tended towards affirming the positively worded statements i.e. *I feel like a capable learner in this class*.

Within each category the students' mean scores were totalled and then divided by the number of students to give an overall mean score for the section. Translated, the mean scores equate to 2 = disagree 3 = undecided and 4 = agree on the 5 point Likert scale. No overall means scores rated at 1 = strongly disagree or 5 strongly agree.

Table 6

Overall Mean Scores for Motivation Category

Section	Overall Mean Score
Extrinsic Motivation	3.89
Task Value	3.70
Self-Efficacy	3.69
Intrinsic Motivation	3.50
Control of Learning Beliefs	3.33

4.2.1.1 Extrinsic Motivation

All nine students agreed most strongly with the item "*I want to do well in class because it is important to show my ability to my family*" and all students agreed with "I want to get better marks than most of the other students". The response to the item '*I promise myself some kind of reward if I can get my assignment or homework done on time*' was relatively low with just three students indicated they did so.

4.2.1.2 Task Value

This group of items aimed to explore the value students placed on their learning in terms of the overall importance of their education, how interested they were in the process of learning and how relevant they perceive their learning. All but one student strongly agreed with the item '*I remind myself how important it is to get good marks at school*' this was the highest scoring item in the Task Value questions. Six students felt that what they were learning was relative to them while four students

thought that what they learned was going to be useful to them.   Five students thought their learning was made more interesting because of the technology used and six students felt more motivated by its use.

What was interesting with this set of results was the discrepancy between the high and low self-regulating students.   Responses from two low self-regulating students indicated they failed to see the relevance in what they were learning or how useful it might be for them. Both students disagreed with the statement '*I think it's important to have a device in class to learn with'.* On the other hand the two top self-regulating students strongly agreed that, what they were learning was relevant to them and that their learning was useful. They most strongly agreed with the suggestion that '*it's important to have a device in class to learn with'.*   Students mean scores for this section, Task Value ranged from disagreeing (mean = 2.67) to agreeing (mean = 4.83).

4.2.1.3 Self-efficacy

This section of items aimed to explore students' perceptions of their self-efficacy in terms of their ability to use a computer, how capable they felt in the class, how well they expected to perform and whether or not they felt they could make judgements on their own learning. The section mean for these items translated to students feeling undecided about their self-efficacy in general (mean = 3.6). Eight students indicated that they felt they were competent using computers. Seven students responded positively to feeling like a capable learner in the class while five students felt confident about making decisions to improve their learning.

4.2.1.3 Intrinsic Motivation

Eight of the nine students were in agreement with the statement '*I like to have work that challenges me because I want to learn new things'* and yet only half of these students felt the work in class challenged them.

Students were also asked to indicate how much choice they felt they had in terms of being able to decide what and how they learn. The mean for the item relating to how much choice students thought they had in terms of what and how they learned, was one of the lowest scores out of all the items in the motivation section (mean = 2.56).   On the 5 point Likert scale it translated to students disagreeing with most items. Six students agreed with the negatively worded question '*I feel like I don't have any choice in my class'.*

4.2.1.4 Control of Learning Beliefs

The control of learning belief items sought to discover if students felt they could exercise some control over their learning outcomes through applied effort. All of the students' agreed with the item '*If I try hard enough, then I can understand what we cover in class'* (mean = 4.33). This was the second highest mean score from all the questions in the motivation section.

However, out of all the items in the motivation category, the Control of Learning Beliefs section had the lowest mean score suggesting students generally disagreed (mean = 2.33) and perceived they could exercise little control over their learning.

4.2.2 Learning Strategies Category

The learning strategies category consisted of questions that were designed to explore what strategies students were applying in terms of effort, planning, monitoring and the management of their resources.

Responses for the high self-regulating students suggested they felt more able to sustain their efforts when they felt uninterested or when there was something else they would rather be doing compared to the low self-regulating students.   The low to moderate self-regulating students had more mixed results. Responses suggested they found it difficult to persist when faced with doing something they weren't interested in.

High self-regulating students thought they were better at managing themselves because they were in the BYOD class and having a device to work with helped them to be more organised, whereas the low self-regulating students disagreed with both of these statements.   The low self-regulating students indicated there were also less likely than the high self-regulating students, to find connections across subjects.

Table 7

Overall Mean Scores for the Learning Strategies Category

Section	Overall Mean Score
Environmental Structuring	3.78
Help Seeking	3.78
Effort Regulation	3.59
Elaboration	3.50
Meta-Cognitive Self-Regulation	3.52
Organisation	3.26

4.2.2.1 Effort Regulation

The responses to items in this section pertaining to students' effort regulation had an overall response of being undecided (mean = 3.59). All of the students agreed with the item *I push myself to see if I can do better than I've done before* (mean = 4.33). This was the second highest score for the whole student survey. Seven students were in agreement when asked if they *challenged themselves to complete the work and learn as much as possible.* Five students indicated they felt able to motivate themselves to complete work even when there were other things they would rather be doing.   Five students agreed with the item '*I often feel bored in this class and don't finish what I planned to do'.*

4.2.2.2 Environmental Structuring

This set of questions sought to enquire into students' ability to positively structure their environment by altering external conditions to optimise their learning. In a digital context this would include managing their device. Six students felt they were able to manage online distractions by avoiding extraneous digital media that was not deemed relevant to their learning by their teachers. Eight students agreed that they were capable of keeping their device in good working order by themselves.

4.2.2.3 Help Seeking

Seven students used the internet and online forums to find solutions to problems and eight students sought help from their peers when they were confused about something. The low – moderate self-regulators rated in the top five students for seeking help from peers or the internet.

4.2.2.4 Elaboration

The items relating to this section were designed to find out whether students thought they were making connections across their subjects and to other areas of their lives.

Seven students agreed with the item *I make an effort to connect what I'm learning to my own experiences* (mean = 3.78). The moderate – high self-regulating students were more likely to try and find connections across subjects (mean = 3.11). Results also showed they were more likely to be able to mix digital and traditional tools than the low self-regulating students.

4.2.2.5 Meta-Cognitive Self-Regulation

The school has made it a priority for students to set goals and make a plan to achieve them. Goals range from the basics of coming to school every day, to completing homework on time, working towards developing key competencies or earning good grades. Planning and self-monitoring to achieve goals helps students' organise and comprehend their learning objectives easier (Pintrich et al., 1991). The items asked of students in this section were based on goals in general so the responses are limited to students' perceived understanding of what they define as their goals.

Eight students were in agreement with the statement *'I set myself learning goals and make a plan to achieve them'*, similarly seven students felt they could stick to their goals.

4.2.2.6 Organisation

This section of items sought to discover whether or not having a digital device to learn with made it easier for students to manage themselves. Five students thought their self-management was better because they attended the BYOD class, they also thought having a device to learn with helped them to be more organised.

Student survey summary

In conclusion, areas of commonality emerged revealing that the majority of students were extrinsically motivated by their family, their peers and achieving good grades, more than they appeared to be intrinsically motivated and engaged in learning for their own satisfaction.   All students believed they push themselves to improve and if they try hard enough they can understand what is covered in the BYOD class. However, not all of the students felt like capable learners and were unsure if they could make judgements on their own to improve their learning.

Although there was little variation between students' scores overall, observing the differences between the two categories (*Motivation* and *Learning Strategies)* proved to be a useful check when analysing the student interviews and provided a more comprehensive picture for each individual student.

4.3 Participants understanding of Managing Self

To understand how teachers and students interpreted the key competency of Managing Self each interview participant was asked to give a definition of students' self-management?
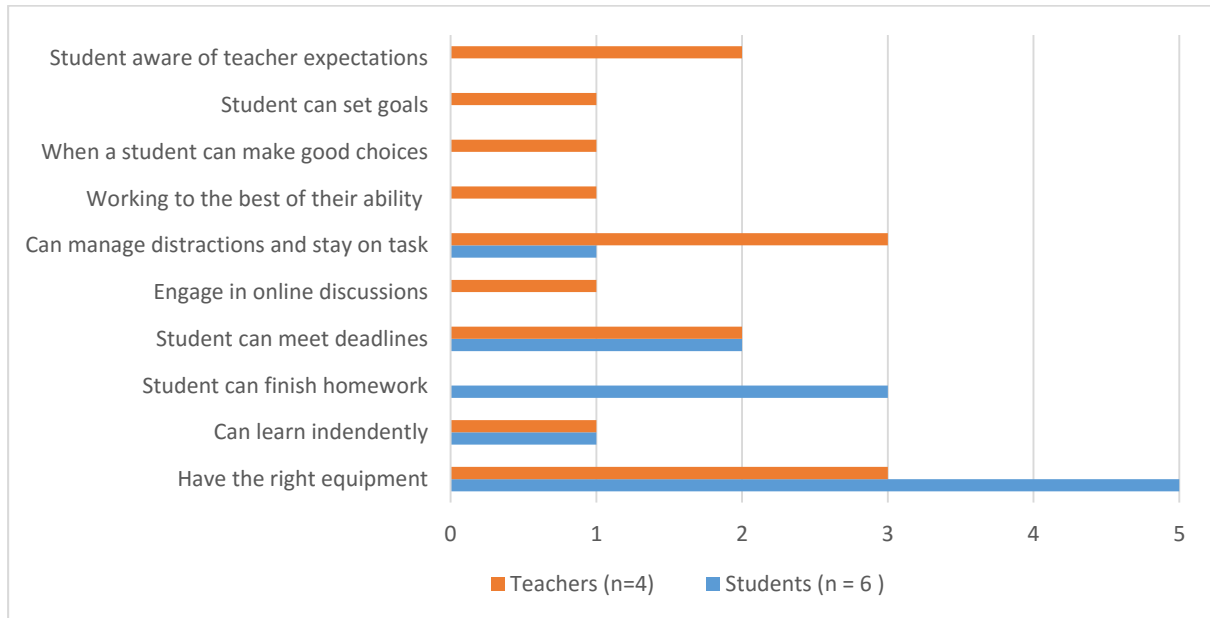
Figure 9: Students and teachers' perceptions of students' self-management

The responses were varied and show a slight mismatch between teachers and students' descriptions. Students' level of understanding for self-management appeared to be quite rudimentary which included meeting deadlines and ensuring they had the right equipment with them.

> Tane: Getting yourself ready for every class, I just know that because the teachers always remind us like every day.

> Ashley: Making sure you've got everything you need for your classes on time and you don't have to rush out and grab something because you forgot it….and making sure you finish all your homework and get all your tasks done on time.

Rimu: Being able to have yourself organised for whatever you're doing and…being able to get it done in an orderly manner.

Sarah: You're always prepared for the subject with what you need and you can do it by yourself without having to ask the teacher every now and then or all the time.

Teachers' believed students' self-management was to do with knowing what was required of them in terms of work output, behaviour and organisational skills.

Teacher C: Students being able to manage themselves, organise themselves to make productive progress with the learning, you know there's physical aspects of it with pens. Mental discipline to be able to get on…get on with the work rather than muck about. Ignoring distractions, being able to put away the sudden….latest exciting rumour or…something out the window….getting on with the learning instead of being distracted.

Teacher A: That they're focused fully on their learning that I come past and they don't suddenly click a button and sit back and look at me like they've just come off something that they shouldn't be doing. I can hear them talking about the work with each other or their asking me questions about what they've found out, I guess those are the main indicators.

Teacher D: Self-management is when students are aware of what they are required to do to manage themselves, their equipment… their books to bring to class, their homework, that they're aware of what's required in the BYOD class and they are able to do it….in a BYOD class to make full use of that device the only way you can do that, is if those children are good self-managers.

Teacher B seemed to have a deeper understanding of self-management evidenced by their comment related towards goal setting:

> Teacher B: When a student can make good choices and they can regulate their behaviour and meet deadlines…work towards expectations set goals for themselves, not just…behaviour wise but manage themselves time wise [too]

Teachers' opinions of students' current state of self-management presented differing viewpoints. Typical responses included varying degrees of monitoring on a part of the teacher:

> Teacher D: I still have to manage and keep or monitor a lot of the children in the class because they are not such good self-managers

> Teacher B: 95% of those kids in that class can totally manage themselves, yep, their fine, there's no problem….I don't have to monitor them, they monitor themselves

4.3.1 Self-Management in a games environment

The student survey included a question which asked students if they liked to play computer games. Eight students agreed that they did like to play computer games. This led to asking students if they thought they had to manage themselves in a computer game and whether or not they transferred those skills to their school learning. Interestingly, their definition of self-management in a virtual game environment was quite different to what they thought was required of them in their school context. When asked how the game involved self-management Matai indicated it meant being knowledgeable about what you had to do:

Matai: Just knowing what you're doing, knowing what to buy and knowing what to get. Learn your abilities, where to go, what to do, the person that you're facing, what's their combos and stuff.

Nikau interpreted self-management in a gaming environment as co-operating with others:

Nikau: just like co-operating and like not going out by yourself and doing things, like cooperating with the team to do it, that's what I usually do and yeah that kind of helps me kind of self-manage myself.

Sarah's comments suggested she was exercising metacognitive strategies:

Sarah: Really it depends on what game you're playing. Because…some games…you have to reach a certain target…you have to find all the things by yourself and create them. You have to remember where you placed everything as well.

4.4 Teacher factors affecting students' self-management

The effect teachers have on students' self-management was a frequently discussed element in both the teacher and student interviews. From the students' perspective teachers' actions, the relationships they had with students and their pedagogical style was impacting on students' self-management with mixed results. Teachers reported that they were aware they could influence students' self-management and they positively tried to do so.

To develop a comprehensive picture of teacher factors affecting students' self-management four sub-themes were identified: i) teacher/student relationships, ii) co-construction techniques, iii) guidelines/expectations and iv) use of resources.

4.4.1 Teacher Student Relationships

To feel engaged and motivated, low self-regulating students needed to have positive teacher/student relationships. Conducive relationships were deemed to support students' self-management.

All of the teachers reported that they recognised the importance of student/teacher relationships and used a variety of approaches to obtain positive situations. Three of the teachers felt it was important to negotiate with students, co-construct lessons and let students have some say on when assignments were due. Co-construction techniques used are discussed under the next heading. Three teachers felt there was generally a good rapport between themselves and the students which had a beneficial effect on students' behaviour. They thought the positive classroom environment aided students' self-management because it encouraged students to support one another and promoted high standards amongst students. Students were encouraging each other to do well, they helped each other and in Teacher B's class celebrated their achievements:

> Teacher B: It's just that…environment that they're in….it's like [a] protective shell…. its ok to be the best and its ok to get an excellence. You celebrate and you high five when you get a Merit.

There was a significant difference between the high self-regulating students and low self-regulating students in terms of how they coped with teachers they did not like. Two of the three low self-regulating students' indicated good teacher/student relationships were paramount. These students described some of their teachers as being unfair and grouchy, for example one student, Matai, referred to some of his teachers as grumpy and said that because of that he didn't want to listen them:

> I don't like some teachers, not all of them, maybe two or three [and] it means that I don't really want to hear what they want to say.

The relationship Matai had with his teachers appeared to impact not only his ability to engage, but also his self-efficacy beliefs and his ability to comprehend what his teachers were saying:

> I don't think I will I do very well in this class. I just don't really like the teachers that we have in this class. I'll do the work [if I like my teacher]…
> It's harder [being in the BYOD class] because the way they explain, it's different to how my other teachers explained it to me. [Last year] in maths I got my old teacher way better than now. I knew what he was saying better.

Comparatively the three high self-regulating students and one moderate self-regulating student were not affected by their teacher/student relationships:

> Ashley: I think I'm able to learn anyway [regardless of the relationship I have with a teacher]

> Nikau: it doesn't affect how I learn really. I just do what I'm told to do.

4.4.2 Co-Construction techniques

Teachers believed co-construction and negotiating with students helped support their self-management in mixed ability classes.

Students in the BYOD class had a mix of differing academic and key competency abilities. To accommodate this diversity, three teachers (A, B and D) mentioned using techniques to co-construct meaningful learning activities with the students rather than the traditional transmission methods of instruction involving teacher directed lectures and note-taking. Teacher D chose to differentiate the

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work according to students' abilities. Students could then choose (in association with Teacher D) what level of work they felt capable of working to. The whole class discussed together when homework should be due.

Teacher D: Very quickly I've found that in this device class, the best way it worked, was for me to differentiate the classroom. If I treated the classroom in a blanket fashion I don't think that top group would have been able to take advantage and be such independent learners.

Teachers A and B also found that by giving students a choice and negotiating with them on what topics they wanted to study aided their engagement and motivation.

Teacher A: We try and sit down and talk as a class about what we want to do… whenever we do something, I'll give them a range of choices about what each choice means and then leave them to vote…when you get the student buy in like that it makes…them a bit more motivated.

Teacher B: They get to make all the decisions…I tell them what we're learning about [and] we negotiate time frames, we negotiate where we're going to do it, do you want to do it in the book [or] do you want to do it in the online stream?

However Teacher D felt students who didn't manage themselves were not as capable of making choices as students who could work independently:

Well I think for students that show…that they are quite able to choose the next step and be innovative I think choice is very important but for those that don't manage themselves so well they don't tend to make those choices, they tend to sit and wait there and need teacher direction more.

Comments from the low-moderate self-regulating students concerning their ability to choose what they learned about were mixed. Tane believed he could exercise some choice in one class and that motivated him to want to learn:

> Tane: We get a choice in social studies and yeah that's it. We were doing government and we could choose which type of government what we wanted to do and yeah, it's pretty cool in there.

However Nikau and Sarah, both moderate self-regulating students felt their choices were limited:

> Nikau: No we don't get to choose, it's just like put up there…[instead teachers should] get the students to say what they want to learn and do it…that way

> Sarah: Sometimes we don't get a choice on how we present our work and when we do have to present it in a certain way. Most of us don't…have Microsoft word…so we have to have the internet to do it.

Teachers A and B said they negotiated with students hand-in dates for their homework. Missed homework deadlines were often seen as an excuses by Teachers A and B because they considered the whole class had agreed. Students were also made aware of the consequences if they did not put the effort in. On those occasions teachers preferred to have a one-on-one conversation with the students to see where they could help. Missed deadlines sometimes resulted in lunchtime detentions to get the work finished or a phone call home to parents.

Despite the efforts of Teacher B to co-construct homework hand-in dates, students appeared to lack the self-management skills to effectively get their work done.

Teacher B: In general I've found the class quite slack on deadlines there's a few students that hand in work on time every time.   The majority have to be chased.

4.4.3 Guidelines/Expectations

Teachers believed setting clear guidelines and expectations was important to help students manage themselves because it would help them to set high standards and work towards their goals.

Setting high standards, making plans and managing projects are part of the New Zealand Curriculum (Ministry of Education, 2007) key competency of Managing Self. Three of the teachers (A, B & D) mentioned that giving clear guidelines and expectations to students was one of the key enablers to helping students manage themselves.   By setting high expectations and holding students accountable, these teachers felt able to focus students towards meeting set deadlines:

Teacher B: Setting up the rules at the beginning…really clear rules, really clear expectations…..If they know what they're doing and they're engaged and that there's no problems with their self-management.

Teacher A had built a relationship with some of the students from the previous year so foundations had been laid for students already on what was required:

Teacher A: Just set clear expectations firstly about what they're going to do. I think the ones that have been in the class with me before know that I'm expecting them to work reasonably hard most of the time so they've got that expectation.

Teachers A and B mentioned they made use of exemplars to show students what they were aiming for and to develop the skill of self-assessment:

> Teacher B: I've had kids handing work in and wanting me to give feedback on drafts…these
>
> are Year 10 kids and they're wanting feeding back on it because they…want to get to Level 1
>
> standard…they're constantly asking for feedback and feed forward so that they can improve.

4.4.4 Resources

Aside from internet websites, the predominant digital resources used were Google classroom,

YouTube and Mathletics. Teachers B, C and D used a mix of digital and hard copy resources which

impacted on students' self-management with varied outcomes.

4.4.4.1 Google classroom

Google classroom was the most discussed item of the digital resources and its use (or lack of)

impacted directly on students' self-management. All teachers and students agreed that Google

Classroom had many positives that aided students' self-management, especially as a class resource

repository. The main barrier identified by both parties was with their lack of use of Google

Classroom either in terms of frequency or with certain features.

Two teachers made frequent use of Google Classroom to post their learning intentions, as a resource

repository and to remind students when work was due. The two remaining teachers used Google

Classroom less extensively, one teacher struggled to use it at all:

> Interviewer: Do you think Google Classroom supports students' self-management?
>
> Teacher C: It probably does, it would be better if I used it, if I was more efficient and proficient
>
> in its use…it's not something I use all that much.

The need for ongoing professional development (PD) on how to use Google Classroom more

effectively was a comment made by all of the teachers with one teacher adding that any PD should be

non-intrusive of teachers' time:

Teacher D: It would be really good if you are a teacher of BYOD that we…have some

infrastructure in terms of ways that we can gain PD that is not intrusive upon our time.

All of the students enjoyed using Google Classroom and wished the teachers would use it more. They thought it helped with their self-management because they could check when things were due and whether or not they had completed everything. The moderate – high, self-regulating students were the most frequent users of Google Classroom:

Ashley: On Google classroom they can put up an assignment and say that it's due on a

certain date. You [can] get that from home as well and you can finish it at home. [You can

also] send it in even if you're sick, so you can do your work at home as well.

Nikau: It's easy, it was quite easy to use early on in the year because the teachers always put

stuff up but now it's like they're not really putting stuff up as much as they use to.

Four of the six students found Google Classroom easy to navigate, however, the two low self-regulating students occasionally experienced issues with finding the appropriate information:

Matai: [At times] it's confusing, because, if there was something that was said ages ago that

we have to do, you like have [to search the] post it's just ho haa, going all the way back down

to look for it.

4.4.4.2 Google Chat
Just one of the four teachers was in the habit of using Google Chat; an interactive online chat system within Google Classroom. The remaining three teachers had a number of reasons for not using it,

ranging from it being too time consuming in its set up and execution, to issues with students' not using appropriate language in the discussions.

Alternatively, the single teacher who was regularly using Google Chat found it was another way of communicating with students which was particularly helpful if students wanted to privately message the teacher. This teacher had also observed students positively talking to one another through Google Chat. At the onset students had been provided with some guidelines by the teacher so they knew what was expected of them in terms of how to comment appropriately in a class environment. This teacher and their students also made use of Google Chat outside of class time, not only for discussions but as an alternative way to answer students' questions. In terms of aiding self-management, Google Chat meant students could check with the teacher or other students if they understood something correctly, what was required for assignments and when they were due. Students' remarks suggested they enjoyed using Google Chat. Sarah liked the fact that they could ask the teacher questions from home or send a private message to the teacher for clarification on work in progress:

> Sarah: We can just type [in]…queries we might have about how to do it…and when the teacher looks at it you can see it and reply [to them]…then you can finish it off or whatever for homework.

Another student liked the immediacy of the feedback he received through Google Chat

> Nikau: I reckon it's quicker, it's like straight away as soon as you upload it. It gets refreshed and they can comment on it, [it's] instant really.

There was no clear difference between the high and low self-regulating students on the use of Google Chat.

4.4.4.3 Digital versus traditional resources

Teachers included a mix of digital and traditional delivery in their classes. Teacher A administered all students' lessons through their digital device. For teacher B it was about giving students a choice over whether they wanted to use their device or book. Students' books were also used for practicing handwriting skills. Teacher C favoured bookwork but students could use their devices to look up information most of which was largely student directed. Teacher D had students use their books for writing specific notes to help them prepare for tests. Switching between students' digital devices and bookwork impacted on students' self-management in different ways. Adapting to working on their device or a book was not too much of a problem for the moderate -high self-regulating students although they preferred to use their laptop. These students thought that having their own device helped them to be more organised because it meant all of their learning resources were in one place:

> Ashley: Well everything is on it so you don't have to worry about… how you saved it… because you can get it from your house as well, so you don't have to email it to different computers trying to get it from the school computers to your home computer, you just have it on that one device.

> Nikau: In books you have to flip through pages and pages of things to find the one thing you wanted to remember. On my laptop I feel like everything's organised but…having books in there [as well] there's missing information in-between things so it's not really organised it's just jumbled up.

However for Sarah, a moderate self-regulating student, Tane and Matai two low self-regulating students their experience was not so positive.

Tane: I forget if it's in my device or in my book and sometimes, I have heaps of books because I keep losing them and so I might lose it or see if it's on there and then it won't be and yeah it's just a hassle.

Matai: I don't like it all, using the technology. Because most of the time we're just doing bookwork….technology doesn't help me to learn at all, I like bookwork better really…I've just grown [used] to that and the technology, when we use it, is just confusing.

4.5 Student factors affecting students' self-management

All of the teachers identified three major issues that they believed affected students' self-management in the BYOD class. They were student absence, environmental structuring and help seeking. Two teachers also suggested the need for students have some pre-requisite knowledge would help with their self-management.

4.5.1 Student Absence

Students need to exercise high self-management during times of student absence. A critical concern from the teachers' viewpoint were the learning gaps that occurred when absence was more than a couple of days.

All of the teachers felt it was up to students to make sure they caught up with school work missed through absence. They could do that a variety of ways depending on the teacher's approach:

Teacher A: I would be expecting them to catch up by talking to other students. I don't write stuff up as to what we've done, I don't sort of make a record of that ….usually they're working in a group so they should be kept up to date [by] the rest of the group.

Teacher C: I could…scan it and send it home that way…[or use] Google Classroom…but I do find talking to people [about their homework]easier [and] I…find being able to target stuff specifically to kids works better when they are away long term.

Teacher D: I put up their whole week's homework and all the learning intentions for the whole week…so if they've been away, they have the opportunity to go up into Google classroom and see what they've missed.

During times of absence, students were expected to check Google Classroom regularly to keep up with their school work. All the interviewed teachers commented that this was seldom the case apart from students who were regularly high achievers.

These comments were mirrored by the students. The two highly self-regulated students stated they frequently accessed Google Classroom in their absence from school, whereas the low self-regulating students like Tane said they referred to it occasionally if at all.

Tane: It's pretty good [Google classroom] they tell us to check it at home but I don't know anyone who actually checks it at home except for like the really good people.

4.5.2 Motivation

Students' motivations were mostly focused around external factors like receiving feedback or monitoring from their teacher and wanting to please their family by earning good grades.

In the classroom teachers' external motivations for students were an everyday occurrence. These ranged from monitoring students (which at times included monitoring device use) to reminding students of their target goals, looming homework deadlines and ensuring they were using the right

resources.   Teachers also used negative consequences like lunchtime detentions to motivate students:

> Teacher D: I control the time that they spend on their device and what they're going to do on it and I'm quite strict on that because otherwise they will wander off and do Facebook and stuff like that….In terms of managing self some of the middle to bottom set group, I… have to extrinsically motivate them, you know encourage them or push them sometimes just to get some of the stuff done.

> Teacher B: constant monitoring and…asking them all the time what do you mean by this or what do you mean by that so it's that questioning all the time.

Accordingly this monitoring and checking was something one student commented on and had come to expect from their teachers when asked '*what role do teachers play in your self-management?*'

> Ashley: Just to come round and check make sure that everyone's still doing their work and their not on some random website or having things that you have to have finished by the end of the lesson. It gives people a bit more motivation to get it finished.

Feedback that was positive and frequent was another motivating factor that teachers were using to help foster students' self-management.

> Teacher B: They're actually quite keen to just be told oh that's amazing…it's that praise that they want.

> Teacher D: Walking around the classroom and it's face to face because I find that it's easier to ask those questions and give them feed forward.

However, one teacher felt the time constraints involved in giving students one to one feedback was difficult to manage:

> Teacher C: There's just not enough time in a lesson to be able to do that, go round one to one like that, so there's always some students who don't get the help that they that they probably need and…that…doesn't encourage them to push on.

Aspects that motivated the high self-regulating students related to external factors like earning good grades, their future and personal mastery:

> Rimu: I sort of just hate the subject but I think to myself think about the marks, think about your future and when I think about that it motives me to try and accomplish this task…. [Because] it will benefit me in the future [and] just trying make my family proud of me I guess is my motivation.

> Ashley: it can kind of get a bit boring but just wanting to do it as best I can keeps me doing it….it keeps me wanting to achieve.

Low self-regulating student, Tane commented he was motivated by his peers:

> Tane: my friends, they motivate me. Sometimes it's like a competition [between us and] that [helps] me to get motivated.

4.5.3 Learning Strategies - Environmental Structuring

Teachers and students believed an important part of students' self-management was making sure they had the right equipment which included having their device updated and ready for learning.

There were mixed opinions from the teachers concerning how many students had their device in class and ready for learning. One teacher said all of the students consistently had their devices in class, two other teachers thought roughly two thirds of the class were organised with their devices. Teacher A believed some students were making excuses for not doing their work by claiming that their device couldn't access the internet or that they couldn't charge it:

> It's just whether they have a charge plug or not and some of them don't remember their charger which just comes back to self-management again if they bring the stuff they should be able to fix any problems that they've got.

All nine of the students who participated in the study believed they were capable of managing their device.   Three students suggested it would be useful to have more charging points around the school for their devices because some classes had just one or two accessible plugs.

4.5.4 Learning Strategies - Effort Regulation

Both teachers and students acknowledged the effect online distractions had on students' self-management.

There was a general consensus with the teachers that an essential component of students' self-management was with their ability to regulate their behaviour and manage distractions. In the digital environment this also meant ignoring off task activities like gaming or watching YouTube videos during class time, that were not relevant to the lesson on hand.

> Teacher C: There's always things that have taken people off task whether it's themselves or other distractions. The internet's just another one…getting distracted with what's on the device is just another one…they've still got to have the self-management the self-discipline to get on with whatever the task is [that] they're meant to be doing.

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One teacher talked about having a trusting environment within the class:

> Teacher B: I think firstly with the BYOD class there is a high trust model and that all has to do with and comes back to self-management because I have to trust that when they're sitting at their desk that they're not actually playing a game or on Facebook or on Trade Me or anything like that.

Three students spoke of strategies that helped them to manage online distraction. Rimu, a high self-regulating student, was in the habit of separating the use of his digital tools for different tasks. He would only use his laptop for school work and his ipad for playing around online.   Similarly Ashley, also a high self-regulating student believed she could exercise self-discipline and stay on task when she had a deadline to work to.

> Ashley: I know I have to get it done so because I do lots of other things after school and when I go to do my homework I don't really have that much time to just muck around, and so I just kind of do it

4.5.5 Learning Strategies – Help Seeking

Teachers observed students seeking help in a number of ways but the immediacy and ease of access to the internet gave students an avenue that encouraged more independence. This promoted resourceful thinking, a key component of Managing Self in the NZ curriculum (Ministry of Education, 2007).

A particularly interesting finding that became apparent during the student interviews was how students were using online resources to help deepen their understanding. Sarah appeared particularly resourceful with her use of the internet.

Sarah: I've noticed there are lots of good videos that could teach you about certain subjects, and instead of the teacher getting us to look it up she just puts it up on the big screen for us all to see which kind of limits us… [Also] certain web sites can explain things better, better than the teacher explains it.   [Plus] you can always use an online calculator if you don't have a calculator at home and that really helps… There's lots of apps that can help with …certain subject[s] or topic[s] [too] that we're learning.

Rimu: Mathletics and this new one nz.ixl.com it's pretty good for math [and] it gives you a bit more of an idea of what the teacher's trying to say, of how to work out a problem.

As might be expected, highly self-regulated students frequently asked teachers for help, whereas three of the four teachers indicated the lower self-regulating students may not be asking for help enough:

Teacher C: If they are not proactive [seeking help] they just get further behind. If they don't know enough about the topic to realise where their gaps are, you know that's a big self-management issue.

Teacher A: Some of them leave it too late to ask, they sort of dig themselves into a big hole and then just before it's due in [then] they start asking for help…It's just….saying look when you start struggling ask for help then rather than waiting.

Students' comments were consistent with the teachers' comments. The two highly self-regulated students felt confident when asking their teachers for help and frequently did so. On the other hand, two of the low self-regulating students appeared less likely to ask their teachers for help particularly if they didn't have a good rapport with their teacher:

Tane: I don't really like asking the teachers because I don't like them.

Although students did turn to their peers for help it was not always the best solution:

Tane: [My] peers….can be struggling as well so I can't really ask them.

A comment from Tane's parent/caregiver also suggested Tane struggled with asking for help:

Parent C: Sometimes [he] says it's too hard [being in the BYOD class] or he misses using

books, I think he doesn't ask for help when he doesn't understand.

Three of the teachers actively structured learning opportunities to encourage student collaboration. These teachers believed facilitating peer sharing opportunities positively impacted on students' self-management by allowing students to learn from one another:

Teacher D: They can talk about things and they can help each other. That's why I put them in

groups because they…can…chat and support each other….That collaborative learning is

quite important for those students because that's the way it motivates them.

Teacher B: You know [they're]…not just reliant on…the teacher…it's more we can teach him

how…They don't want me to…give them the information they want me to set up an

inquiry…so that they can go off and do it.

4.5.6 Pre-requisite knowledge

One teacher made the comment that suggested students needed to be able to learn autonomously to

be in the BYOD class:

> Teacher D: They've got to be more independent learners and they've got to keep up with the work each lesson.

Teacher C commented on the need for students to have a certain level of literacy to be able to access useful information:

> Teacher C: there's a lot of literacy involved because there's explanations on those computer programmes and I think a lot of the literacy that's on there is above what our kids are at....if they can't answer the question then to follow...the explanation and writing on there...they do find that hard

4.6 School Infrastructure

The wireless infrastructure at the school had allowed a more ubiquitous learning environment in this BYOD class which both students and teachers alike reported they were enjoying. Unfortunately technical problems were often a common occurrence which caused frustrating disruptions to classes and posed significant self-management issues for low – moderate self-regulating students.

4.6.1 Wireless Accessibility

Prior to the initiation of the BYOD class the school had invested in developing their technical infrastructure so that a broadband wireless interface would be accessible throughout most of the school buildings. Teachers and students in the BYOD class were enjoying being able to access online resources more freely from their classroom. In spite of the satisfaction experienced by both parties with constant internet access there had been regular disruptions to lessons caused by poor wireless connection issues. Students who had did not have an offline office suite of tools like Microsoft Office or Open Office (where they could write and prepare their work) were most at risk because they depended on the internet access in order to use Google Docs. Sometimes this

affected one or two individuals and other times it affected the whole class. Technical support had

been available at the start of the year but as time progressed it was often difficult to locate the

technician.

Students' experiences of how to cope with the wireless issues were mixed. Ashley who demonstrated

high self-management skills managed to navigate around this problem without too much issue:

> Ashley: It depends what projects and stuff we're doing. If I know what I'm doing or I've
>
> downloaded the instructions it wouldn't really matter but say for the maths programmes you
>
> need the internet to do them so yeah it depends on what we're doing.

Tane (who depended on the internet for Google Docs) would try and find an alternative programme by

using Notepad to write up his work. Notepad is a basic text editing programme that comes as part of

a Windows package but is limited as an office application because there are no layout functions:

> Tane: I use notepad [when I can't access the internet], I guess that's ok but sometimes it's
>
> annoying having to print something out because I can't print it properly or if I need to print out
>
> a picture for something I don't have colour.

Another issue which seemed to be compounding the wireless connection problem was with students

not asking for help from the technician. At the start of the year and during the first term students were

shown how to access the internet via the school proxy.[2] If students experienced issues after that

time they were expected to fill out a request form for assistance from the Information Technology

Technician and leave the completed form at the office. The technician would then come and find the

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[2] The school proxy consisted of at least one other computer which regulates internet access in and
out of the school.

pertinent student(s) in class when he was next available. Of the students interviewed it would appear they seldom if ever used this facility preferring instead to wait:

> Nikau: It [the internet] just usually fixes itself, and we just along with it until it gets fixed
>
> Interviewer: Is there nothing you can do until it's fixed?
>
> Nikau: Nah
>
> Interviewer: You don't go and see anyone about it?
>
> Nikau: No, we don't usually

> Tane: Usually the teacher will probably go get him, [the technician] if everyone is having problems.

All of the teachers felt they didn't have the time or expertise to help students with their wireless connection problems so were heavily dependent on technical support.

> Teacher D: It is difficult to get that seen to without causing a whole lot of extra time that the teacher has to put in to get it sorted….As a teacher in that class I don't have the knowledge to fix up their laptops or fix up their access.

4.7 Parent factors that affect students' self-management

The teachers commented on how important it was to students' self-management that they have supportive parental involvement, parents who were interested in what they were learning about. Parents' survey results also indicated they wanted to be involved in their child's education but judging by teachers' comments parental communication was limited.

All of the teachers agreed that parents play an important role in supporting student's self-management. Teachers' suggested students need regular parental praise, a commitment to their

child's learning and to have regular conversations with their child about what they were doing at school.

> Teacher A: I think having conversations with them, just little things like what are you doing in class at the moment then if they say we're doing creative writing you know a week later say…how did you get on with your creative writing?

> Teacher C: Parents with an interest, parents who have a look and see what they're doing.

To support students' self-management teachers concurred it was crucial that parents kept in touch with what their child was learning at school and that they sighted their child's work on a regular basis. One way parents could do this was via the Google Classroom login. Early in 2014 the school set up parental access for all students' parents/caregivers so that they could log onto Google Classroom and view their child's work.   Although this facility was available none of the teachers knew for sure whether parents using this service.

For the most part communication between teachers and parents happened once or twice a term at the school's Academic Counselling conferences which involved the student, parent and teacher or with students' school reports. Outside of these times teachers would initiate contact with parents if their child was falling behind in schoolwork, if homework wasn't completed or if their child was exhibiting consistent disruptive behaviour. However, all of the teachers felt there was a need for greater communication with parents and their comments suggested the need to explore other opportunities for connecting with parents to support students' self-management:

> Teacher B: making sure the kids know there's that communication [between teachers and parents].

Teacher D: The parents who aren't there [at the parent/teacher evenings] there's no other avenue to contact in bulk.

From the students' perspective, three students' comments suggested their parents were playing a supportive role, either by incentivising them to achieve their goals or by checking up on their schoolwork:

Ashley: They [my parents] will always ask me if I have homework so if I'm busy that night they'll makes sure that I get it done. Sometimes they'll come and check in on me that I'm still doing my work.

Nikau: I had to get an achieved in like all of my classes….but it hasn't played out correct because I wasn't here for a two weeks and I missed out on a couple of tests which meant I got marked down.

Interviewer: Is that an arrangement that you made with Mum or Dad?
Nikau: yeah like if I did that they would give me something
Interviewer: does that help you motivate yourself?
Nikau: It did until I missed out two weeks [work]

Results summary

The results of this research showed there are a number of factors that have the potential to impact students' abilities to manage themselves in a BYOD class. The low self-regulating students depended on their teachers to help them manage themselves so it was important for these students' to perceive a positive relationship with their teacher.

Students' motivations generally stemmed from external sources as opposed to students being intrinsically motivated.

Teachers believed co-constructing lessons with students helped students to take some ownership over their learning which benefited their self-management. Teachers also believed that they gave students' choices but in reviewing students' comments concerning choice, they felt the choices given were fairly limiting in terms of topic options and how they presented their work. Teachers felt they were less likely to have behavioural management issues with students, if the students were given clear guidelines and teachers had set high standards.   Teachers' implementation of digital resources to aid students' self-management was limited due to a lack of available professional development that specifically focused on pedagogies aimed at integrating digital device use.

Although teachers perceived parents to be a potential aid in supporting students' self-management, parent/teacher communication was infrequent and time intensive for teachers to implement.   The parents who participated in this study all wanted to be involved in their child's education and were proactive in their efforts at home, to encourage and support their child's learning in whatever way they could.

The research measures used have illuminated some of the factors affecting students' self-management and have provided a body of data which will be elaborated on in detail in chapter five.

Chapter Five: Discussion

The research was concerned with the issue of students' self-management when working with their own digital device. Due to the lack of educational experience with BYOD and the range of differing teacher opinions and pre-conceptions surrounding implementation, this study aimed to investigate the enablers and barriers behind students' self-management by understanding the perspectives of those involved in the programme's educational delivery.

A theoretical framework based on literature from the field of self-regulation was used to identify possible causes that were affecting students' ability to manage themselves. This framework proved to be a useful tool because it separated out what motivates students to enact self-management and what learning strategies they have or do not have at their disposal in order to manage themselves. This framework enabled a transparency of structure which showed that students could be highly motivated but lacked the learning strategies to self-regulate, on the other hand students could have learning strategies in place but were short of motivation. The addition of qualitative measures and deductive analysis fostered a more comprehensive inquiry into the nuances behind participants' perceptions. This helped to demonstrate factors that were affecting students' self-management outside of the self-regulation framework.

The student survey gave a broad overview of students' self-management but it was the student interviews which offered the most interesting data in terms of the reasons behind students' current state of self-management. Students' comments also provided further validation to the quantitative measure applied and provided evidence to ascertain and understand students' self-regulation.

This chapter begins with a discussion relating to teachers and students understanding for Managing Self to position the study in context. This is followed by a discussion that attends to the findings which

help answer the first research question, what is students' current state of self-management. This is followed by a detailed exploration into participants' perspectives to consider their opinions in regard to factors that impact on students' self-management in a BYOD class.

5.1 Teachers and students understanding of self-management

Teachers and students need to have a comprehensive and shared understanding of self-management as it pertains to the New Zealand Curriculum (Ministry of Education, 2007).

Findings in this study showed that both teachers' and students' interpretations of Managing Self in the NZC (Ministry of Education, 2007) were relatively simplistic and focused on behavioural or organisational aspects such as turning up to class with the right equipment, rather than the core levels of students' self-management which emphasise the exercising of resilience and the application of goal setting, while delivering resourcefulness and enterprise. Furthermore, there was no mention from students or teachers about students seeing themselves as capable learners, with a "can-do" attitude (Ministry of Education, 2007, p.12). The lack of a collective and comprehensive understanding of the key competency Managing Self is a potential barrier to the development of students' self-management as the absence of a clear definition could negate an optimising of teachers or students' efforts.

High self-regulating students reported that they frequently monitored themselves, sometimes daily, by checking with their teacher or looking online at Google Classroom to find out what they had to do. When asked, their interpretation of Managing Self was limited to organisational aspects and avoiding distractions. The high self-regulating students were in the habit of setting goals, they used planning strategies to varying degrees and they felt they had reasons to keep themselves motivated when their interest started to wane. Although these learning strategies are all aspects of self-management these students failed to recognise them as such. This lack of acknowledgement on the part of

students and teachers could be a potential barrier to students' self-management because it limits students' understanding of the key competency Managing Self and furthermore omits an opportunity to enhance students' self-efficacy for demonstrating traits they already possess.

Hipkins (2006) draws attention to the fact that we need to view the key competency of Managing Self as more than "organisational matters and self-discipline" (p.33).   Managing self also involves students developing self-awareness so that they are capable of knowing who they are, by evaluating their strengths and weaknesses and understanding how they can capitalise on the positives of these traits. The mismatch of understanding for Managing Self between students and teachers demonstrates how important it is to establish some common ground, for it is their interpretation that will lead to successful implementation (Hipkins, 2006).

Teachers and students basic interpretation of the key competency of managing self, reflected similar findings to research conducted by Hamilton, et al. (2013). Their research investigated the perceptions of senior school leaders at five secondary schools in New Zealand. They found that although Managing Self was the most mentioned of the five key competencies, its interpretation was also relatively superficial and focused on organisational aspects.

Students involved in this study had interpreted managing themselves well, as doing things by themselves.   For example Sarah, a moderate self-regulating student perceived "managing self" to mean doing things by herself without having to ask her teachers, but Hipkins (2006) claims "students cannot learn self-management in isolation" (p,33) and that students who are left to manage themselves bereft of guidance or explanation, can become more dependent on the teacher.   In summary this data supports claims made by Hipkins (2006; 2007; 2012) and Boyd and Hipkins (2011), that teachers and their students' understanding of the key competency Managing Self, will determine the success of its implementation.

5.1.1 Students' self-management is context specific

Students can be low self-regulators in some contexts but high self-regulators in other settings.

Interestingly, two of the low self-regulating students described self-management at school quite differently to how they interpreted self-management in an online computer game. Their understanding of self-management at school was limited to bringing the right equipment, meeting deadlines and ignoring distractions from peers or irrelevant online media. Self-management in their online gaming world consisted of attaining knowledge, identifying their strengths and weaknesses and working in a team. These different interpretations beg the question: does the competitive climate combined with a rewards based system of an online games environment, promote the development of a more holistic view of self-management or is it that students are applying learning strategies because they have the motivation and desire to do so? According to Dede (2004) the virtual games environment with its participatory nature and immersive experience provides an authentic learning context that is motivating, engaging and stimulates 21st century learning attributes like self-management.

It is not within the scope of this paper to explore electronic gaming and its behavioural applications but it does demonstrate students' ability to self-manage is context specific which aligns with support literature centred on self-regulation (Boekaerts, 1998; Zimmermann, 2000). It further suggests that, provided the right conditions are put in place and well communicated, then low self-regulating students are quite capable of developing to become high self-regulating students.

5.1.2 Developing a deeper understanding for managing self – implications for practice

As previously suggested teachers and students definition of self-management in this BYOD classroom is dissimilar in terms of application and interpretation. Further, learning strategies pertaining to Managing Self which were enacted by the high self-regulating students were going unnoticed by both teachers and students. Conversely, the definition given by the low self-regulating

students when in an online games environment appears to be more encompassing and even incorporates other key competencies like relating to others, participating and contributing.

An approach for developing a shared and broader perspective about Managing Self will now be outlined and is further illustrated in Table 8, (p.113).

On a class level students need to be given a more active role to foster their understanding of managing self. Teachers can facilitate this process by having class discussions Hipkins (2007) that invite students to look for opportunities to identify managing themselves in different contexts, at school, in the BYOD class, in an online games environment, at home or in a rugby game.

Table 8 shows a variety of ideas teachers could explore to help them develop a shared understanding of Managing Self. Literature that has helped develop this table is from Hipkins (2007; 2009) and Boyd and Hipkins (2011).

Table 8

Developing a shared understanding of Managing Self

- Students have opportunities to discuss the meaning of self-management and how it applies in different contexts both in school and out of school, in BYOD environments and non BYOD environments.

- The meanings are displayed where students can see them.

- Students and teachers have compiled a shared vocabulary related to managing self.

- There is a process for sharing additions to this vocabulary as students understanding grows.

- Students have opportunities for self- and peer-assessment of their self-management.

- Teachers have planned tasks where students could practice their self-management.

- Students show they can manage themselves in a variety of contexts.

At a whole school level Boyd and Hipkins (2011) suggest recursive elaboration on the subject of key competencies may assist schools to develop their own "shared language" and hence encourage discussion to cultivate a common understanding for Managing Self. Boyd and Hipkins (2011) also suggest schools could develop a visual metaphor that encompasses the "vision, values, principles and key competencies of [the] NZC" (Ministry of Education, 2007, p.77) which could be displayed in and around the school. Further resources for integrating the key competencies can be found on the nzcurriculum.tki.org.nz/key-competencies-and-effective-pedagogy website.

Helping students to develop a deeper understanding of Managing Self (Ministry of Education, 2007) that is comprehensive and applicable to a variety of contexts, is preferable over disparate levels of understanding that are concerned solely with organisational matters (Hipkins, 2006).   Furthermore, involving students in discussions concerning the key competency Managing Self (Ministry of Education, 2007) and providing students with opportunities to practice self-management may encourage students to actively think of themselves as learners (Hipkins, 2006) and consequently develop their abilities to manage themselves.

5.2 Students current state of self-management in the BYOD class

Students were predominantly externally motivated and exhibited little evidence of independent learning.

The data from this study suggested that students were generally more externally motivated in the BYOD class than intrinsically motivated. Students were clearly motivated to make their families proud of their efforts; they were competitive with one another and were generally focused on achieving good grades. External motivations such as the examples given, appear to be potential enablers but Grolnick and Kurowski (1999) state students whose goal orientations are highly associated with external regulation are less likely to exercise independent learning and will require more prompting and "outside encouragement to do their work" (p.5). The findings in this study would support this claim, evidenced by teachers' frustration with getting students to complete their work on time; on occasion they resorted to detentions and phone calls home to motivate students. Boekaerts and Corno (2005) state this approach is likely to result in compliance on the part of the student. Boekaerts (1998) goes so far as to say living "up to the expectations of others may be counterproductive….for the development of self-regulation" (p.98) because it restricts students' ability to exercise autonomy.

In line with literature claiming externally motivated students perceive their learning outcomes to be in the hands of powerful 'others' (Grolnick & Kurowski, 1999; Paris & Paris, 2001), seven of the nine students felt they had little control and choice over their learning. However, this was not such a prevalent finding when students also held personal mastery goals. One teacher believed only the high self-regulating students were capable of making choices which supports Winters, Green and Costich (2008) who stated that high self-regulating students could cope with a high amount of learner control but that it was seldom the case with low self-regulating students. However, Hipkins (2006) argues that all students need to be given the opportunity to exercise choices and Rutherford (2005) agrees, advising that students need to have "manageable amounts of responsibility and choice"

(p.223). . Imparting a sense of control through students with regards to their learning, empowers them to engage more; the very act of choosing and acting on that choice helps to raise students' self-efficacy (Paris & Paris, 2001) which as previously discussed, is imperative to help students learn with technologies (Devolder, van Braak, & Tondeur, 2012; Hatlevik, Guðmundsdóttir, Loi, 2014).

5.2.1 Developing intrinsic motivation - Implications for practice

Literature has shown self-regulation is context specific and that students' ability to self-regulate is not fixed (Pintrich et al., 1990; Zimmerman, 2002; Zimmerman, 1990), which would suggest that if students feel intrinsically motivated to learn they will have more chance of developing learning strategies and thus self-management to help sustain their efforts. The key to facilitating their motivation is to ensure what they are learning is relative to students, valued by students and within their zone of proximal development (Bandura, 1997; Somekh, 2000).   Additionally, Paris and Paris (2001) claim teachers need to promote student ownership by eliciting students' intrinsic interests, communicating high expectations, encouraging collaboration and by the provision of regular support.

The findings in this study support literature that recommends teachers give students opportunities to practice self-management by engaging them in authentic and challenging learning tasks (Hipkins, 2006) both of which can be enhanced by students' devices (Lombardi, 2007; Nicholas & Ng, 2009). An advantage with utilising students' devices is in realising the relative ease by which students can employ metacognitive tools that help them plan, highlight and take notes; and online tools that help them construct concept maps and timelines.   Web 2.0 tools that have an interactive element and are customisable can be engaging for students because they promote personalisation and ownership (Wheeler et al., 2008).

Teachers will need to optimise students' motivation by providing more choice (Pintrich et al., 1990) which is made possible by utilising open-ended learning scenarios (Hannafin et al., 1999) student centred learning (Nicholas & Ng, 2009; Spooner, 2015; Wang & Hannafin, 2005) and by giving

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students relative and authentic tasks (Brophy, 1999).   Learning strategies, the other key aspect of

self-regulation is something that can and should be taught (Zimmerman, 2002). In terms of the

development of Managing Self, learning strategies associated with students' self-management,

especially metacognitive strategies that require students to reflect and self-assess, will also need to

be "taught not caught" (Hipkins, 2006, p.35).

5.3 Student factors

To understand the student factors affecting students' self-management the discussion has been

divided into two sections to show the enablers and barriers for high and low self-regulating students.

This perspective provided some interesting contrasts for discussion and set the scene to discuss

possible implications for practice.   One factor precedes the discussion of high and low self-regulating

students which concerns students' absence. Teachers frequently referred to the impact students'

absence had on their learning which they considered was a consequence of poor self-management.

5.3.1 Student absence

An unexpected finding, and an area of concern for teachers, was the lack of continuity with students'

learning that occurred when students were absent from school. Teachers claimed this was a self-

management issue and that it was students' responsibility to check what school work they had

missed, via the auspices of Google Classroom or by asking for help from peers or teachers.

However, what may appear to teachers as a straightforward process may be a difficult practice for

students, particularly those with few self-management strategies. Not under investigation in this study,

although an area that deserves consideration in future studies, is the collective teacher usage of

Google Classroom. Teachers will need to keep online class resources up to date with whatever

digital platform they choose to use, be it Google Classroom, a class website or any other online

resource management system, if students are expected to find what work was missed on any given

day.

The other option students were advised to use in order to catch up on work missed during absence was to ask their peers what they had missed. While self-regulated learners may feel competent asking for help from their peers, students who lack social competency or feel their self-esteem might be threatened in some way, will be less likely to ask (Newman, 2002). Hence, in terms of this study, the current options available to students to catch up with school work that has been missed while they were away, may in fact be barriers to students' self-management, especially for those who are limited in learning strategies. Likewise, poor attendees are also at risk as they too may lack the self-regulation attributes to sustain their educational development during periods of absence (Sheppard, 2009).

5.3.1 Enablers and barriers for high self-regulating students

Learning with a digital device is a beneficial aid to high self-regulating students but teachers will need to adopt new pedagogies to extend students' self-management skills.

Results showed students with high self-regulating skills had more learning strategies available to them than low self-regulating students. They mentioned learning strategies that helped them manage distractions from disruptive peers and online media. In line with self-regulating literature (Zimmerman, 1989; Zimmerman, 2002; Zimmerman et al., 1996) the high self-regulating students had goals in place which helped to keep them on track and they were able to physically rearrange their learning environment to enhance their learning.

The high self-regulating students also enjoyed the independence that came from working with their own device and not having to use the school computer room. Regan, a high self-regulating student made the comment that his device was "giving me my own way to do things". Findings from these high self-regulating students suggest students were taking ownership for their learning which supports

literature claims that digital learning can promote student ownership (Watson, 2008) and self-directed learning (Proske et al., 2007; Winters et al., 2008).

The high self-regulating students enjoyed the ease of access to the internet and the ability it provided to communicate with students and teachers in alternative ways. Being able to use the same device at home and at school was seen to be a tangible bonus mirroring claims presented by Stavert (2013) and those found in the Horizon Report (New Media Consortium, 2013). Students perceived their own device had made them better at managing themselves because everything was in one place (i.e. digital files) and self-monitoring was easier. Similar findings were found in a study by Hatakka et al.(2013) involving secondary school students in Sweden. Hatakka et al. (2013) reported students described being more "efficient" with their schoolwork feeling more in control of their learning and self-directed. They also enjoyed having all their work in one place.

5.3.1.1 Barriers existed outside of students' control

As might be expected, the high self-regulating students perceived few non-navigable barriers which were under their control for example accommodating their own technical issues and managing a workable teacher/student relationship. Barriers did exist however that were outside of students' control as students' comments indicated they wanted teachers to make use of their devices more and to have more work available for them to do online. This finding concurs with claims by Palloff and Pratt (2000) that the amount of work teachers post online and the frequency has the potential to impact on students' motivation and thus the development of learning strategies in digital contexts.

5.3.1.2 Supporting high self-regulating students - implications for practice

The findings presented here for the high self-regulating students show students' self-management is enhanced by the aid of their digital device. However, findings also point towards the need for ongoing teacher professional development that is specifically focused towards curriculum integration

with digital technologies (Lai & Pratt, 2004) to ensure students are being extended to utilise digital technologies effectively (Winters et al., 2008).

5.3.2 Enablers and barriers for low self-regulating students

Low self-regulating students need positive teacher/student relationships to enact self-management and independent learning.

The data showed low self-regulating students had a number of barriers to their self-management that affected their motivation, including teacher/student relationships, low self-efficacy, a lack of planning and goal setting on a part of the students.

5.3.2 .1 Impact of teacher/student relationships

This study found the most important barrier for the two low self-regulating students interviewed was the relationship they had with their teacher.   When they perceived the relationship they have with their teacher in a negative way their interest levels dropped, their ability to see the relevance in what they were learning was reduced, their confidence to ask for help waned and their self-efficacy levels declined. This would confirm claims by Wentzel (2009; 2004) that teacher/student relationships do indeed play an important role in determining students' motivational levels.   Wentzel (1997; 2004) states that teachers need to foster classrooms where students feel safe, valued and supported in order to affect students' motivation. Likewise being friendly, caring, attentive and responsive to students in a non-threatening manner helps mitigate students' reluctance to ask for help (Newman, 2002).

The idea of teachers promoting positive, warm and supportive relationships applies in all contexts with or without digital technology but a study by Lemley et al. (2014) demonstrated the significance constructive relationships have on the development of independent learning.   Positive teacher/students relationships were the pivotal point in determining how students would prosper in a

21st century learning environment.   The Lemley et al. (2014) study proved students needed a relationship with their teacher that was not only respectful but also connected. It was considered a fundamental component for the development of students' autonomous learning.

5.3.2.2 The spiralling effects of low self-efficacy beliefs

The two low self-regulating students had particularly low self-efficacy. The belief they possessed about themselves and their ability to achieve in different subjects, fluctuated depending on which teacher they were engaged with. These findings are consistent with self-regulating literature which states self-efficacy plays an important role in motivating students (Schunk & Zimmerman, 1997) and has been linked to task avoidance, reduced effort and lowered achievement. According to Schunk, (1985) students' self-efficacy beliefs also play a part in influencing students' choice. Furthermore, low self-efficacy beliefs can often lead to students devaluing their learning (Bandura, 1997; Cleary & Zimmerman, 2004) which could also explain why the two low self-regulating students in this study could see no real benefit to learning with computers, despite their enthusiasm and the dexterity being applied to their online gaming.   Interestingly, digital competence in online gaming did not translate to the same level of competency at school, at least for the two low self-regulating students.   This finding adds further support to Gros's (2007) argument that skills learned in online gaming environments seldom translate to the school learning context.

The two low self-regulating students did not feel particularly confident learning with computers at school and could see no real benefit in their usage, especially in terms of their self-management. This finding was similar to a study conducted by Hatlevik, et al. (2014) which showed high school students were less inclined to develop independent learning skills when they possessed low self-efficacy beliefs and/or when they failed to interpret any advantages for learning with a computer. Other research studies have also shown students' self-efficacy beliefs were associated with their ability to learn with computers (Devolder et al. 2012, Hatlevik et.al., 2014) and their ability to persevere with using a computer when faced with learning difficulties (Hatlevik et al., 2015).

5.3.2.3 Resulting consequences from students' inability to find relevance in their learning

This study also showed the low self-regulators found they struggled to relate to their learning and to see the value in what they were doing. Researchers have indicated how important it is that students identify with what they're learning, they need to see the relevance and translate it to their own lives in order for the subject to be engaging or of motivational value (Brophy, 1999; Pintrich et al., 1991; Zimmerman, 2002). Without this connection students are less likely to monitor their efforts (Schunk & Zimmerman, 1997).

5.3.2.4 Absence of planning and short term goals impacts students' self-management

The data gathered in this study suggests the low – moderate self-regulating students were not in the habit of setting short term attainable goals, or planning. According to Zimmerman (2002) and Pintrich (2004) goal setting and planning tasks assists students' self-regulation because it encourages students to self-monitor. In keeping with the literature these students appeared to measure their efforts against their peers which according to Zimmerman (2002) often results in reduced personal satisfaction, due to the fact that their peers could be progressing at different levels of attainment.

5.3.2.5 Supporting low self-regulating students - implications for practice

Self-regulation literature offers some useful areas for consideration with regards to how to support low self-regulating students in BYOD classes. For the low self-regulating students involved in this study, the need to cultivate positive teacher/student relationships is of paramount importance. The success of their learning especially in terms of their self-management in the BYOD environment depends on it. Teachers will also want to consider ways to increase students' self-efficacy which according to Bandura (1997) and Zimmerman (2002) can be enhanced by encouraging students to set proximal goals that are attainable and that encourage students to "self-observe" by monitoring their progress. This objective aligns with guidelines provided by the NZC (2007):

With appropriate teacher guidance and feedback, all students should develop strategies for self-monitoring and collaborative evaluation of their performance.

(New Zealand Curriculum, 2007, p.38)

Newman (2002) supports this view adding, low self-regulating students should be encouraged to set mastery goals, developed in accordance with their interests, rather than performance goals which will do little to build students' self-efficacy.   The need to emphasise developing students' self-efficacy by providing explicit, proximal and frequent feedback would complement the process (Bandura, 1997).

5.4 Teachers factors

Teachers need ongoing technical support and professional development to be able to fully support students' self-management in a BYOD class.

From the teachers' point of view the technical school support available to them relating to the schools' wireless connectivity and printer access was insufficient to cope with their demands.   This was an area of concern for the teachers because their lessons were frequently disrupted by students who needed lots of assistance in terms of how to manage technical issues and find alternative solutions. Aside from the disruption to teachers' lessons there seemed to be no 'quick fix' solution for students. Additionally, the professional development to support teachers' integration of students' devices was minimal and limited to one or two workshops on how to use Google Classroom. All of the teachers felt the need for regular on-going professional development. A supportive school infrastructure is essential to ensure the successful adoption of digital technologies by teachers and students (Davis, 2010).   As evidenced in other research studies, the full extent of learning with mobile devices will not occur until students' learning environments are considered seamless and bereft of interruption (Looi et al., 2010).

Results from this study showed three of the four teachers tried to positively co-construct classes with the specific purpose of providing students with more choice as a way to foster motivation, engagement and to assist with developing their self-management skills. Encouraging students to make decisions by giving students choices with their learning has proven to be a key motivator and progresses students along towards autonomous, independent learning (Hatakka et al. 2013; Lemley et al. 2014)

Teachers' choice of application impacted students' self-management in various ways. For example a combination of exercise books and student devices were posing barriers for two of the low self-regulating students and one of the moderate self-regulating students. Student perceptions suggested they felt confused about how to organise their work and it led them to question the importance of learning with a digital device. If teachers want to use a combination of books and student devices, they will need to consider developing students' organisational strategies for low – moderate students who may lack the dexterity to switch between different mediums. Moreover, it's important to rethink the purpose of the lesson and evaluate reasons for choosing one medium over another (Powell, 2011). The key point is to consider the appropriate medium, not only for learning but in fostering students' independency through the development of self-management skills in a 21st century digitally enabled environment. As confirmed by other studies much of the responsibility for the uptake of technologies rests directly with the teachers themselves (Bebell & O'Dwyer, 2010). Equally, teachers will likely control "how and when students access and use technology during the school day" (p.48) so their choices will directly impact on students' self-management. A study of 379 K-12 school teachers in the USA (Inan & Lowther, 2010) found teachers' "readiness" is highly influential in determining not only the amount of technological use but also how technologies are used. In considering teachers use for technology integration, they will need to see what the advantages are for adopting new technologies and pedagogies before they are likely to make changes to their teaching Rogers (2003) which further reiterates the need for ongoing professional development (Demb et al., 2004).

Weston and Bain (2010) argue for successful integration to occur, teachers need to view laptops not as technological tools, in isolation [but] as…"cognitive tools that are holistically integrated" (p11). The authors cite an example of a "structural engineer [who] uses computer assisted-design software to simulate the stresses on a bridge…they do not think about technology… [they think] about…the professional transaction" (p. 10) of results over the mechanism. Weston and Bain's (2010) theory suggests optimal learning will occur with a digital device when it is immersed into the pedagogy to such a point that the device is a seamless conduit to the process of learning.

Results from this study showed teachers continued to work in isolation developing their own resources and methods. According to Sherry and Gibson (2002) much can be gained by the sharing of resources and professional practice, it leads to building a school's collective capacity (Jansen, Cammock, & Conner, 2011). Given that Managing Self applies to all learning areas and contexts, encouraging teachers' to work together and share resources could provide some effective continuity between subjects and the development of students' self-management.

5.4.1 Supporting teachers with BYOD – implications for practice

The data lends support to the claim made by Lai and Pratt (2004) that the best way to support teachers in a BYOD environments is to ensure teachers have a technician on hand for technical support and a dedicated Information and Communication Technology co-ordinator who supports teachers' curriculum development for learning with digital technologies. Similarly, Inan and Lowther (2010) state schools that support their teachers by providing them with technical proficiency, enables those teachers to get on with teaching while encouraging them to integrate technologies quicker. Other research studies (Bebell & O'Dwyer, 2010; Demb et al.2004) reiterate the point that teachers will need plenty of support to fully immerse themselves with technologies so that they can help facilitate students' self-management, in order to make the most effective use of their devices (Winters et al. 2008). According to Lai (1999) the effectiveness of one-off Information Communication and

Technology workshops is relatively small and unlikely to provide sustained support for further development.

5.5 Parent Factors

Regular parent/teacher communication has the potential to support students' self-management while developing students understanding for how to implement the key competency Managing Self, (Ministry of Education, 2007).

Results showed that teachers' perceived involvement from parents played an important part in enabling students to manage themselves. Teachers believed parents could support their child's self-management development by regularly viewing their child's work, having conversations with them about what was happening at school and generally remaining in step with how their child's work was progressing.

Results also showed that one parent believed the interests and attitudes of the teacher had an effect on their child's efforts, levels of interest and motivation. Barriers perceived by another parent centred on their child not asking for help when they needed it. A third parent intimated there was a lack of incentives to complete homework.   All four of the parents who volunteered for the study wanted to be involved with their child's schooling in some way and believed they supported their child to do their best.

When this study was conducted in June 2015, parent/teacher communications about students' learning and achievement were generally undertaken three or four times during a school term through school reports and Academic Counselling conferences.   Outside of the formally formatted methods of interactions, most communications with parents were initiated by the teacher through phone calls and occasional letters or emails to the home. The data showed that teachers recognised they could do

more to develop their relationship with students' parents, if they were given more time and opportunities to do so. This lack of communication between parents and teachers is a potential barrier to the development of students' self-management, feasibly so considering students are learning in this instance with their own digital device.

Internationally, studies have shown parent involvement often tends to decline in the teenage years. A study by Simon (2001) involving 11,000 parents and 1,000 Principals of high schools in the US found communication with parents was often limited to parent-teacher conferences. Simon (2001) believes schools hold the responsibility for initiating communication with parents and it is in the facilities interests to do so, as schools have the capacity to modify parental support towards their child's learning.

Involving parents in school life has long been a subject of investigation and there is plenty of evidence in support of the benefits to students' in terms of raising student achievement (Hattie, 2009) supporting students' self-regulation with homework (Hoover- Dempsey, et al. 2001) and contributing towards the development of positive self-regulation skills and self-efficacy. Grolnick & Kurowski, 1999).   An extensive New Zealand research project undertaken by Bull, Brooking and Campbell (2008) for the Ministry of Education highlighted how important the development of relationships between schools and families are, given the emphasis on developing students capabilities for living in a 21st century digitally enhanced environment:

5.5.1 Parent communications - implications for practice

A recommendation for the school involved in this study is to increase the regularity of parental communication between teachers and parents and to consider a variety of ways for increasing accessibility. According to Harris, Andrew-Power and Goodall (2009) parents are often unaware of how important their role is in their child's education and are "an underutilised recourse" (p.29). It would be worthwhile conducting further research to investigate how problematic accessing Google Classroom is for parents and whether or not parents use it; how often they use it and how useful they

find Google Classroom. It may be that parents would prefer regular updates through a Facebook page, via email, text or hardcopy, for those who don't have access to the internet. The creation of student blogs could support the online class resources and would encourage student ownership while giving students an authentic audience (Nicholas & Ng, 2009).

A further recommendation would be to develop a set of resources relating to the key competencies inclusive of managing self. Harris, Andrew-Power and Goodall (2013) recommend schools develop a shared vocabulary to support students' learning, a view also shared by Boyd and Hipkins (2011) on their discussion regarding the implementation of key competencies.   Students, teachers and the wider community of parents could be involved in the development of the competencies, in order to promote a shared language which was meaningful to all participants. According to Hamilton et al. (2013) web-based resources may be a useful way of implementing the key competencies because increased use and familiarity with concepts communicated through resources promotes change. As Harris, et al. (2009) put it, schools need to consider shifting their focus from one of "parental involvement to one of parental engagement" (p. 38), if learning at home is to be fully realised.

Summary of key findings

This research has explored the self-management of secondary school students when learning with their own digital devices in a newly formed BYOD class.   The summary of key findings addresses the main issues that were prevalent in the study and compare, via commonality and contrast, the findings of this study with the literature reviewed. The main issues identified, concerned students motivations, the need to develop positive parent/teacher relationships to support students' self-management and the need for pedagogies that enhance BYOD integration. Teachers also need to be supported through the provision of ongoing professional development and a sustainable technical infrastructure.

In respect of student motivation, the low – moderate self-regulating students involved in this study were largely motivated by external sources like competing with one another, the influence of their parents, and earning good grades.   Students who rely on external motivations are more likely to perceive that they have limited choice in terms of what and how they learn (Grolnick & Kurowski, 1999; Paris & Paris, 2001) which was found to be the case with these students.   The low self-regulating students involved in this study also exhibited low self-efficacy which was compounded by their comparisons of efforts with those of their peers. Students viewed their inadequacies as a lack of personal ability rather than a lack of self-regulation abilities which can be another downside to students being largely extrinsically motivated (Ryan & Pintrich, 1997; Zimmerman, 2002).

Comparatively, the high self-regulating students, although utilising external motivations similar to the low – moderate self-regulating students, also exhibited personal mastery goals (Lynch & Dembo, 2004; Newman, 2002) which helped them stay on track when they encountered learning difficulties. Teachers in this study believed they encouraged students to set learning goals but these goals were typically long term and were mainly associated with earning good grades. Attainable, short term goals have proven to be preferable (Brophy, 1999; Zimmerman, 2002) particularly when working with digital devices (Hatlevik, Ottestad, & Throndsen, 2015).

In terms of the relationship between teachers and parents, both believed they could positively support students' self-management by exercising regular communication. Supplying information pertinent to how parents could endorse support for students' self-management and communicating in a way that was easily accessible for the parents, yet simple enough for the teachers to deliver on a frequent basis, could be a solution.

Considering factors derived from teacher interactions that enabled students' self-management, the data gathered in this study would suggest there is room for more student-centred pedagogies (Nicholas & Ng, 2009; Palloff & Pratt, 2000) that provide students with opportunities to enact self-management through student ownership (Paris & Paris, 2001) particularly for the low - moderate self-

regulating students.   The teachers involved in this study indicated that they wanted more professional development regarding the use and deployment of specific platforms such as Google Classrooms, websites and applications. The data fits well with literature that recommends teachers need to be supported technically and pedagogically (Bebell & O'Dwyer, 2010; Davis, 2010; Inan & Lowther, 2010; Powell, 2011; Sherry & Gibson, 2002) to develop students' effective use of digital technologies (Winters, Greene, & Costich, 2008).

Chapter Six: Conclusion

In conclusion this chapter presents some implications for practice, implications for future research and final concluding comments for the thesis.

6.1 Implications for practice

This section offers some suggestions which may be helpful for schools to consider when integrating students digital devices and their impact on students' self-management. Factors that could enable students self-management in BYOD classes include i) the need to develop a shared language to extend students' interpretation of self-management, ii) teachers and their schools investigating what drives the motivation of students in executing self-management strategies, iii) a focus on the effective use of pedagogies in order to enhance learning strategies within a BYOD environment and iv) a capitalisation on parent/school partnerships to support students' self-management. These four factors could be applied to BYOD settings as summarised below.

   i.   This study showed that one of the fundamental components for schools to consider when investigating students' self-management in a BYOD class, is to firstly establish the participants' interpretations of the key competency Managing Self (Hipkins, 2007; 2009). From this vantage point, the practice of recursive elaboration as described by Boyd and Hipkins (2011), encourages the development of a shared language relative to students and the contexts in which they will be applying Managing Self. Providing students with an opportunity to discuss, contribute and thus understand, the full complexity of Managing Self, would give students the necessary knowledge to reflect on themselves as learners (Hipkins, 2012; Charteris, 2013; Hamilton et.al, 2013).

ii. Literature from the field of self-regulation has proved to be particularly insightful for investigating students' motivations and learning strategies. Understanding students' motivational orientations helps to inform teachers' best practice on how to foster students' self-management in BYOD classes.

iii. Digital devices may have the potential to enhance students' self-management but the key element in determining this outcome rests with students' effective use of their device. Ensuring pedagogies are in step with the necessary strategies required for 21st century learning will likely advance students with the opportunities to practice their own self-management.   It is therefore advisable for schools to offer a supportive infrastructure for teachers that provide sustainable professional development in terms of technical proficiency and strategic pedagogies in order to promote self-management, when learning with digital devices.

iv. A number of avenues could be developed to foster regular communication with parents in anticipation of supporting students' self-management in a BYOD class.   School websites, personalised informative texting, and school Face Book pages are potential avenues for communicating with parents (Harris, Andrew-Power, & Goodall, 2009) but were yet to be fully explored by the school involved in this study.   Enabling student blogs are another possibility that could be adopted for communicating with parents. An added advantage is that this approach involves the students taking a responsible role in showcasing their work through the administering and maintaining of their own blog which also contributes to students' self-management.

6.2 Implications for further research

For future studies that wish to explore students' self-management in BYOD classes; the author offers the following recommendations that could potentially improve outcomes. Participation rates from both students and their parents were relatively low. One way of addressing this issue could be to send out any parent survey at the time of inviting parents to participate. In this way parents could see exactly what was involved in the study/survey and may be more inclined to participate. In this study a parent survey and an invitation to participate were sent out separately. In hindsight, interviewing parents as well as teachers and students, would have provided a more comprehensive understanding of parents' perspectives and permitted an opportunity to explore communications between parents and teachers.

Classroom observations could also provide some clarification on students' applied learning strategies pertaining to their self-management. Similarly, reviewing specific student achievement data may help to triangulate data that categorises students as high, moderate or low self-regulating students.

To date much of the research literature pertinent to digital technologies and students' self-regulation has focused on students' interactions with specific software tools (Clarebout & Elen, 2006; McLoughlin & Lee, 2010) students' effectiveness with hypermedia (Azevedo, Winters & Moos, 2004) students' self-initiative and perseverance (Zimmerman & Tsikalas, 2005) and students' effective use of computers (Winters et al., 2008).

There are gaps in available literature that examines how students manage themselves to enact autonomous learning relative to the key competencies, as defined by the DeSeCo project. As discussed in the literature chapter section 2.3, there are currently no clear guidelines on how schools should assess key competencies. The complexity surrounding assessment centres mainly on projected subjectivity across a variety of contexts (Hamilton, 2013). An extensive discussion on

the assessment of the key competencies has been written by Hipkins (2007) with further suggestions offered by Hipkins, Boldstad, Boyd and McDowall (2014). However, there appears to be minimal literature that specifically focuses on students' use of digital technologies from a self-management perspective in relation to the key competency Managing Self, as described in the NZC (Ministry of Education, 2007).

From the findings of this study, it is likely that within New Zealand schools there exists a number of different interpretations for the key competency of Managing Self and how this relates to students' use of digital technologies. This would be an interesting research focus and may add to the discussion of whether or not the key competency Managing Self (Ministry of Education, 2007), should be assessed and how it might be assessed. Given the importance placed upon schools for students to develop the attributes associated with Managing Self (Ministry of Education, 2007) in conjunction with the emphasis on digital integration, particularly as a conduit for advancing an innovative economy, it seems relevant that this debate receives further attention.

Although the research took place in a school with a predominantly Māori roll the author chose to remain culturally neutral for the research study. The decision not to view this study from a cultural perspective was made after much deliberation of literature pertaining to kaupapa Māori educational research (Barnes, 2013; Bishop & Berryman, 2006; Bishop, Berryman, Tiakiwai & Richardson, 2003; Durie, 1998; Scheurich & Young, 1997). The author did not feel the process of attaining the culturally-immersive diligence required to authenticate an in depth kaupapa Māori study was feasible at the time of this study but it is a field worthy of exploration in future research studies. Managing Self from the perspective of kaupapa Mäori would bring a fresh perspective.

6.3 Concluding comments

This research study has explored potential enablers and barriers to students' self-management when working with their own digital devices. This aspect of education has previously received little focused research particularly within a New Zealand context; nonetheless it is an area of study that requires further investigation given the rapid expansion of digital technologies set to become prevalent within education sectors in the years to come. The importance of providing students with ample opportunities to exercise self-management strategies, when learning with digital technologies, should not be undervalued given the technology consumed environment they inhabit. Students who lack the skills to efficiently use digital technologies run the risk of being excluded from "job opportunities and unable to take part in the full life of the community" (Ministry of Education, 2005).

References

Alberts, P. P., Murray, L. A., & Stephenson, J. E. (2009). Eight educational considerations for hybrid learning. Handbook of Research on Hybrid Learning Models: Advanced Tools, Technologies, and Applications: Advanced Tools, Technologies, and Applications, 185.

Ananiadou, K., & Claro, M. (2009). 21st century skills and competences for new millennium learners in OECD countries.

Arnone, M. P., Reynolds, R., & Marshall, T. (2009). The effect of early adolescents' psychological needs satisfaction upon their perceived competence in information skills and intrinsic motivation for research. *School Libraries Worldwide, 15*(2), 115-134.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72* (2), 261-278.

Azevedo, R. (2005). Computer environments as metacognitive tools for enhancing learning. *Educational Psychologist, 40*(4), 193-197.

Azevedo, R., & Cromley, J. G. (2004). Does training on self-regulated learning facilitate students' learning with hypermedia? *Journal of Educational Psychology, 96*(3), 523.

Azevedo, R., Guthrie, J. T., & Seibert, D. (2004). The role of self-regulated learning in fostering students' conceptual understanding of complex systems with hypermedia. *Journal of Educational Computing Research, 30*(1-2), 87-111.

Azevedo, R., Winters, F. I., & Moos, D. C. (2004). Can students collaboratively use hypermedia to learn science? The dynamics of self-and other-regulatory processes in an ecology classroom. *Journal of Educational Computing Research, 31*(3), 215-245.

Barback, J. (2012). *Nine Schools on Cloud Nine.* Retrieved from http://www.educationreview.co.nz/magazine/november-2012/nine-schools-on-cloud-nine/#.Vsf5RfL5gdU32-33

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest

through proximal self-motivation. *Journal of Personality and Social Psychology, 41*(3), 586.

Bandura, A. (1978). Self- efficacy: Toward a unifying theory of behavioral change. *Advances in*

Behaviour Research and Therapy, 1(4), 139-161.

Bandura, A. (1995). *Self-efficacy in changing societies*. Cambridge, NY: Cambridge University Press.

Barnes, A. (2013). What can Pākehā learn from engaging in kaupapa Māori educational research?

Te Wāhanga, (Ed.), *New Zealand Council for Educational Research*. Wellington, New

Zealand:

Bebell, D., & Kay, R. (2010). One to one computing: A summary of the quantitative results from the

Berkshire Wireless Learning Initiative. *The Journal of Technology, Learning and Assessment,*

9 (2). Retrieved 15 October 2015 from http://www.jtla.org

Bebell, D., & O'Dwyer, L. M. (2010). Educational outcomes and research from 1:1 computing settings.

Journal of Technology, Learning, and Assessment, 9(1). Retrieved 16 July 2015 from

http://www.jtla.org

Bishop, R., Berryman, M., Tiakiwai, S., & Richardson, C. (2003). Te Kötahitanga: The experiences of

Year 9 and 10 Mäori students in mainstream classrooms. *Report to the Ministry of Education.*

Wellington, New Zealand.

Bishop, R., & Berryman, M. (2006). *Culture speaks: Cultural relationships and classroom learning*.

Wellington, N.Z: Huia Publishers.

Boekaerts, M., & Corno, L. (2005). Self-Regulation in the classroom: A perspective on assessment

and intervention. *Applied Psychology: An International Review, 54*(2), 199-231.

doi:10.1111/j.1464-0597.2005.00205.x

Boekaerts, M. (1998). Do culturally rooted self- construals affect students' conceptualization of control

over learning? *Educational Psychologist, 33*(3), 87-108.

Boldstad, R., & Gilbert, J. (2008). School ICT innovations: 21st century learning or digital busywork?

Computers in New Zealand Schools, 3, 42-51.

Bolstad, R., Gilbert, J., McDowall, S., Bull, A., Boyd, S., & Hipkins, R., (2012). *Supporting future-*

oriented learning & teaching: A New Zealand perspective. Ministry of Education Wellington,

New Zealand.

Boyd, S., & Hipkins, R. (2011). The recursive elaboration of key competencies as agents of

curriculum change. *Curriculum Matters, 7,* 70-86.

Brophy, J. (2010). Classroom management as socializing students into clearly articulated roles. *The*

Journal of Classroom Interaction, 41-45.

Brophy, J. (1999). Toward a model of the value aspects of motivation in education: Developing

appreciation for. *Educational Psychologist, 34*(2), 75-85. Doi: 10.1207/s15326985ep3402_1

Bull, A., Brooking, K., & Campbell, R. (2008). *Successful home-school partnerships.* Ministry of

Education, Wellington, New Zealand.

Chandra, V., & Fisher, D. L. (2009). Students' perceptions of a blended web-based learning

environment. *Learning Environments Research, 12*(1), 31-44.

Charteris, J., (2013). Learner agency: A dynamic element of the New Zealand key

competencies. *Teachers and Curriculum Journal*, *13*, 19-25.

Chen, F., H., Looi, C., K., & Chen, W. (2009). Integrating technology in the classroom: a visual

conceptualization of teachers' knowledge, goals and beliefs. *Journal of Computer Assisted*

Learning, 25(5), 470-488.

Chen, W., Looi, C., & Tan, S. (2010). What do students do in a F2F CSCL classroom? The

optimization of multiple communications modes. *Computers & Education, 55*(3), 1159-1170.

doi:http://dx.doi.org.ezproxy.auckland.ac.nz/10.1016/j.compedu.2010.05.013

Cleary, T. J., & Zimmerman, B. J. (2004). Self-regulation empowerment program: A school-based

program to enhance self-regulated and self-motivated cycles of student learning. *Psychology

in the Schools, 41*(5), 537-550.

Clarebout, G., & Elen, J. (2006). Tool use in computer-based learning environments: Towards a

research framework. *Computers in Human Behavior*, *22*(3), 389-411.

Clinton, J., & Hattie, J. (2013). New Zealand students' perceptions of parental involvement in learning

and schooling. *Asia Pacific Journal of Education, 33*(3), 324-337.

Cohen, L., Morrison, K., & Manion, L. (2007). *Research Methods in Education*. New York, NY:

Routledge, Taylor & Francis.

Conrad, D. (2007). The plain hard work of teaching online: Strategies for instructors. In M. Bullen, &

D. P. Janes (Eds.), *Making the Transition to e-Learning: Strategies and Issues,* (pp. 191-202).

Hershey PA: Information Science Publishing.

Corbin, J. M., & Strauss, A. L. (2015). *Basics of qualitative research: techniques and procedures for

developing grounded theory* (Fourth edition) Thousand Oaks, CA: SAGE.

Corno, L. (1989). Self-regulated learning: A volitional analysis. In B. J. Zimmerman & D. H. Schunk

(Eds.), *Self-regulated learning and academic achievement* (pp. 111-141). Springer, New York.

Courtois, C., Montrieux, H., De Grove, F., Raes, A., De Marez, L., & Schellens, T. (2014). Student

acceptance of tablet devices in secondary education: A three-wave longitudinal cross-lagged

case study. *Computers in Human Behavior, 35*, 278-286.

Creswell, J., W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches

(3rd ed)*. Thousand Oaks, CA: SAGE.

Creswell, J., W. (2012). *Educational research: planning, conducting, and evaluating quantitative and

qualitative research* (4th ed). Boston, MA: Pearson.

Dabbagh, N., & Kitsantas, A. (2004). Supporting self-regulation in student-centered web-based

learning environments. *International Journal on E-Learning, 3*(1), 40-47.

Davis, N. E. (2010). Global interdisciplinary research into the diffusion of information technology innovations in education. In A. McDougall, J. Murnane, J. Jones & N. Reynolds (Eds.), *Researching I.T. in education: Theory, practice and future directions* (pp. 142-149). London, England: Routledge.

Dede, C. (2004). Planning for "neomillennial" learning styles: Implications for investments in technology and faculty. *Harvard Graduate School of Education,* 1 – 32.

Demb, A., Erickson, D., & Hawkins-Wilding, S. (2004). The laptop alternative: Student reactions and strategic implications. *Computers & Education, 43*(4), 383-401. doi:http://dx.doi.org.ezproxy.auckland.ac.nz/10.1016/j.compedu.2003.08.008

Devolder, A., van Braak, J., & Tondeur, J. (2012). Supporting self-regulated learning in computer-based learning environments: systematic review of effects of scaffolding in the domain of science education. *Journal of Computer Assisted Learning, 28*(6), 557-573.

Duncan, T., G, & McKeachie, W. (2005). The making of the motivated strategies for learning questionnaire. *Educational Psychologist, 40*(2), 117-128. doi: 10.1207/s15326985ep4002_6

Durie, M. (1998). *Te mana, te kāwanatanga: the politics of Māori self-determination*. Auckland, NZ: Oxford University Press.

Fadel, C., & Trilling, B. (2009). *21st century skills: learning for life in our times* (1st ed.). San Francisco, CA: Jossey-Bass.

Galloway, C., & Lasley, T. (2010). Effective urban teaching environments for the 21st Century. *Education and Urban Society, 42*(3), 269-282. doi: 10.1177/0013124509357005

Gilbert, J. (2005). Catching the knowledge wave? : The knowledge society and the future of education. Wellington, NZ.: NZCER Press.

Greene, J., & Azevedo, R. (2010). The measurement of learners' self- regulated cognitive and metacognitive processes while using computer-based learning environments. *Educational Psychologist, 45*(4), 203-209. doi:10.1080/00461520.2010.515935

Grolnick, W. S., & Kurowski, C. O. (1999). Family processes and the development of children's self-regulation. *Educational Psychologist, 34*(1), 3-14. doi: 10.1207/s15326985ep3401_1

Gros, B. (2007). Digital games in education: The design of games-based learning environments. *Journal of Research on Technology in Education, 40*(1), 23-38.

Hamilton, R. J., Farruggia, E. R., Peterson, E. R., & Carne, S. (2013). Key competencies in secondary schools: an examination of the factors associated with successful implementation. Teachers and Curriculum, 13, 17- 55.

Hannafin, M., Land, S., & Oliver, K. (1999). Open learning environments: Foundations, methods, and models. *Instructional-Design Theories and Models: A New Paradigm of Instructional Theory, 2*, 115-140.

Harada, V. H., & Yoshina, J. M. (2004). Moving from rote to inquiry: Creating learning that counts. *Library Media Connection, 23*(2), 22.

Harris, A., Andrew-Power, K., & Goodall, J. (2009). *Do parents know they matter? Raising achievement through parental engagement*. London Continuum International Publishing Group.

Harris, L. R., & Brown, G. T. L. (2010). Mixing interview and questionnaire methods: Practical problems in aligning data. *Practical Assessment, Research and Evaluation, 15*(1).

Haste, H. (2001). Ambiguity, autonomy, and agency: Psychological challenges to new competence. In D. S. Rychen, & L. H. Salganik (Eds.), *Defining and Selecting Key Competencies* (pp. 93-121). Seattle, WA: Hogrefe & Huber.

Hatakka, M., Andersson, A., & Gronlund, A. (2013). Students' use of one to one laptops: a capability approach analysis. *Information Technology & People, 26*(1), 94-112. doi: 10.1108/09593841311307169

Hatlevik, O. E., Ottestad, G., & Throndsen, I. (2015). Predictors of digital competence in 7th grade: a

multilevel analysis. *Journal of Computer Assisted Learning, 31*(3), 220-231.

doi:10.1111/jcal.12065

Hatlevik, O. E., Guðmundsdóttir, G. B., & Loi, M. (2014). Digital diversity among upper secondary

students: A multilevel analysis of the relationship between cultural capital, self-efficacy,

strategic use of information and digital competence. *Computers & Education, 81*(0), 345-353.

Hattie, J. (2009). Visible Learning: A Synthesis of over 800 meta-analyses relating to achievement.

London, England: Routledge.

Hipkins, R. (2007). Assessing key competencies: Why would we? How could we? Retrieved from

http://nzcurriculum.tki.org.nz/implementation_packs_for_schools/assessing_key_competencie

s_why_would_we_how_could_we

Hipkins, R. (2009). Reshaping the secondary school curriculum: Building the plane while flying it.

Findings from the NZCER National Survey of Secondary Schools,

Hipkins, R. (2005). Learning to "be" in a new century: reflections on a curriculum in transition.

Curriculum Matters, 1, 71-87.

Hipkins, R. (2006). The nature of the key competencies. A background paper. Wellington: New

Zealand Council for Educational Research.

Hipkins, R. (2012). Reflecting on the key competencies (capabilities) in the New Zealand curriculum.

Curriculum Perspectives, 32(1), 63–66.

Hipkins, R., Bolstad, R., Boyd, S., & McDowall, S. (2014). Key competencies for the future.

Wellington, New Zealand Council for Educational Research (NZCER) Press.

Hoover- Dempsey, K. V., Battiato, A. C., Walker, J. M. T., Reed, R. P., Dejong, J. M., & Jones, K. P.

(2001). Parental involvement in homework. Educational Psychologist, 36(3), 195-209. doi:

10.1207/S15326985EP3603_5

Hyndman, M. J., & Evans, G. T. (1989). Social and life skill competence in potential early school-leavers. British Journal of Guidance and Counselling, 17(3), 286-303.

Inan, F. A., & Lowther, D. L. (2010). Laptops in the K-12 classrooms: Exploring factors impacting instructional use. Computers & Education, 55(3), 937-944. doi:http://dx.doi.org.ezproxy.auckland.ac.nz/10.1016/j.compedu.2010.04.004

Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. Field Methods, 18(1), 3-20.

Jansen, C., Cammock, P., & Conner, L. (2011). Leadership for emergence: Exploring organisations through a living system lens. Leading & Managing, 17(1), 59-74.

Janssen, K. C., & Phillipson, S. (2015). Are we ready for BYOD? A systematic review of the implementation and communication of BYOD programs in Australian schools. Australian Educational Computing, 30(2)

Johnson, L., Adams Becker, S., Cummins, M., Estrada V., Freeman, A., and Ludgate, H. (2013). *NMC Horizon Report: 2013 K-12 Edition*. Austin, TX: The New Media Consortium.

Johnson, B., & Lundvall, B. (2000). Promoting innovation systems as a response to the globalising learning economy. CASSIOLATO, JE; LASTRES, HMM Arranjos e Sistemas Produtivos Locais e as Novas Políticas De Desenvolvimento Industrial e Tecnológico.Rio De Janeiro: IE/UFRJ.

Kearney, M., & Schuck, S. (2006). Spotlight on authentic learning: Student developed digital video projects. *Australasian Journal of Educational Technology, 22* (2), 189-208.

Kolb, S. M. (2012). Grounded theory and the constant comparative method: valid research strategies for educators. *Journal of Emerging Trends in Educational Research and Policy Studies, 3*(1), 83-86.

Lai, K., & Pratt, K. (2004). Information and communication technology (ICT) in secondary schools: the role of the computer coordinator. *British Journal of Educational Technology, 35*(4), 461-475.

Lai, K. & Pratt, K. (2008). Positive to a degree: The effects of ICT use in New Zealand secondary schools. *Computers in the Schools, 24*, 95-109. doi: 10.1300/J025v24n03_07

Lajoie, S., & Azevedo, R. (2006). Teaching and learning in technology-rich environments. In P. Alexander A., & P. H. Winne (Eds.), *Handbook of Educational Psychology* (pp. 803-821). Abingdon, England: Routledge Handbooks Online.

Lemley, J. B., Schumacher, G., & Vesey, W. (2014). What learning environments best address 21st-Century students' perceived needs at the secondary level of instruction? *NASSP Bulletin, 98*(2), 101-125. doi:10.1177/0192636514528748

Linnenbrink, E. A., & Pintrich, P. R. (2002). Motivation as an enabler for academic success. *School Psychology Review, 31*(3), 313.

Livingstone, S. (2012). Critical reflections on the benefits of ICT in education. *Oxford review of education*, *38*(1), 9-24.

Lombardi, M. M. (2007). Authentic learning for the 21st century: An overview. *Educause Learning Initiative, 1* (2007), 1-12.

Looi, C., Seow, P., Zhang, B., So, H., Chen, W., & Wong, L. (2010). Leveraging mobile technology for sustainable seamless learning: A research agenda. *British Journal of Educational Technology, 41*(2), 154-169. doi:10.1111/j.1467-8535.2008.00912.x

Lundvall, B. Ä., & Johnson, B. (1994). The learning economy. *Journal of Industry Studies*, *1*(2), 23-42.

Lynch, R., & Dembo, M. H. (2004). The relationship between self-regulation and online learning in a blended learning context. *International Review of Research in Open and Distance Learning, 5* (2).

Mace, F. C., Belfiore, P. J., & Shea, M. C. (1989). Operant theory and research on self-regulation. *Self-regulated learning and academic achievement* (pp. 27-50) Springer, New York.

Martinez - Pons, M. (2002a). A social cognitive view of parental influences on student academic self-regulation. *Theory into Practice, 41*(2), 126-31.

Martinez-Pons, M. (1996). Test of a model of parental inducement of academic self-regulation. *The Journal of Experimental Education, 64*(3), 213-227. doi:10.1080/00220973.1996.9943804

Martinez-Pons, M. (2002b). Parental influences on children's academic self-regulatory development. *Theory into Practice, 41*(2), 126.

McLoughlin, C., & Lee, M. J. (2010). Personalised and self-regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology, 26*(1), 28-43.

New Zealand Government (2005). *The Digital Strategy: Creating Our Digital Future.* Wellington: New Zealand Government.

Ministry of Education. (2006). *Enabling the 21st century learner: An eLearning action plan for schools*. Wellington, New Zealand: Leaning Media..

Ministry of Education. (2007). *The New Zealand Curriculum.* Wellington, New Zealand: Leaning Media.

Ministry of Education. (2015) *Four Year Plan 2015 – 2019, Better education for New Zealand.* Wellington, New Zealand: Ministry of Education.

Ministry of Education. (1993) *Te Whāriki.* Wellington, New Zealand: Learning Media.

Montrieux, H., Courtois, C., De Grove, F., Raes, A., Schellens, T., & De Marez, L. (2014). Mobile learning in secondary education: Teachers' and students' perceptions and acceptance of tablet computers. *International Journal of Mobile and Blended Learning (IJMBL), 6*(2), 26-40.

Mutch, C. (2013). *Doing educational research: a practitioner's guide to getting started* (Second edition) Wellington, New Zealand: NZCER Press.

Newman, R. S. (2002). How self-regulated learners cope with academic difficulty: The role of adaptive help seeking. *Theory into Practice, 41*(2), 132.

Nicholas, H., & Ng, W. (2009). Engaging secondary school students in extended and open learning

    supported by online technologies. *Journal of Research on Technology in Education, 41*(3),

    305-328.

OECD. (2005). *The definition and selection of key competencies: Executive summary*. Paris, France:

    OECD. Retrieved from: http://www.oecd.org/pisa/35070367.pdf

Palloff, R. M., & Pratt, K. (2000). Making the transition: Helping teachers to teach online. Paper

    presented at EDUCAUSE: Thinking it through. Nashville, TN. (ERIC Document Reproduction

    Service No. ED 452 806). Retrieved October 4, 2003, from ERIC Database.

Panadero, E., & Alonso-Tapia, A. (2014). How do students self-regulate? Review of Zimmerman's

    cyclical model of self- regulated learning. Anales De Psicologia, 30(2), 450-462.

    doi:10.6018/analesps.30.2.167221

Paris, S. G., & Paris, A. H. (2001). Classroom applications of research on self-regulated learning.

    Educational Psychologist, 36(2), 89-101.

Passey, D., Rogers, C., Machell, J., & McHugh, G. (2004). The motivational effect of ICT on pupils.

    Vol. 523. DfES Publications.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of

    classroom academic performance. Journal of Educational Psychology, 82(1), 33.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie. J. (1993). Reliability and predictive validity of

    the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological*

    Measurement, 53, 801–813.

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in

    college students. *Educational Psychology Review, 16*(4), 385-407. doi: 10.1007/s10648-004-

    0006-x

Plopper, B. L., & Conaway, A. F. (2013). Scholastic journalism teacher use of digital devices and

    social networking tools in a poor, largely rural state. *Journalism & Mass Communication*

    Educator, 68(1) 50-68. Doi: 1077695812472895.

Powell, A. (2011). A case study of e-learning initiatives in New Zealand's secondary schools (Doctoral

    dissertation). Retrieved from ProQuest Dissertations and Theses, UMI 344507.

Proske, A., Narciss, S., & Körndle, H. (2007). Interactivity and learners' achievement in web-based

    learning. *Journal of Interactive Learning Research, 18*(4), 511-531.

Rhode, J. F. (2009). Interaction equivalency in self-paced online learning environments: An

    exploration of learner preferences. *International Review of Research in Open & Distance*

    Learning, 10(1), 1-23.

Robinson, V., & Lai, M. K. (2005). *Practitioner research for educators: A guide to improving*

    classrooms and schools. Corwin Press, California.

Rogers, E. M. (2003). *Diffusion of innovations,* (5th ed.). New York, NY: Free Press

Romero, M., Usart, M., & Ott, M. (2015). Can serious games contribute to developing and sustaining

    21st Century skills? *Games and Culture, 10*(2), 148-177. doi: 10.1177/1555412014548919

Roschelle, J., Pea, R., Hoadley, C., Gordin, D., & Means, B. (2000). Changing how and what children

    learn in school with computer-based technologies. *The Future of Children, 10*(2), 76-101.

    doi:10.2307/1602690

Rosen, Y., & Beck-Hill, D. (2012). Intertwining digital content and a one-to-one laptop environment in

    teaching and learning: Lessons from the time to know program. *Journal of Research on*

    Technology in Education (International Society for Technology in Education), 44(3), 225-241.

Rutherford, J. (2005). Key competencies in the New Zealand curriculum: development through

    consultation. (Report). *Curriculum Matters, 1*, 210.

Ryan, A. M., & Pintrich, P. R. (1997). "Should I ask for help?" The role of motivation and attitudes in

    adolescents' help seeking in math class. *Journal of Educational Psychology, 89*(2), 329.

Rychen, D. S., & Salganik, L. H. (2003). *Key competencies for a successful life and well-functioning society.* Seattle, WA: Hogrefe Publishing.

Rychen, D. S. E., & Salganik, L. H. E. (2001). *Defining and selecting key competencies. Seattle, WA:* Hogrefe & Huber.

Salganik, L., H. (2001). Competencies for life: a conceptual and empirical challenge. In D. S. E. Rychen, & L. H. Salganik (Eds). *Defining and Selecting Key Competencies*, 17-32 Seattle, WA: Berne, Hogrefe & Huber Publishers.

Sana, F., Weston, T., & Cepeda, N. J. (2013). Laptop multitasking hinders classroom learning for both users and nearby peers. *Computers & Education, 62*(0), 24-31. doi: 10.1016/j.compedu.2012.10.003

Schuitema, J., Peetsma, T., & Van Der Veen, I. (2012). Self- regulated learning and students' perceptions of innovative and traditional learning environments: A longitudinal study in secondary education. *Educational Studies, 38*(4), 397-413. doi:10.1080/03055698.2011.643105

Schunk, D. (1985). Self-efficacy and school learning. *Psychology in the Schools,* 22, 208-223.

Schunk, D. H., & Zimmerman, B. J. (1989). *Self-regulated learning and academic achievement theory, Research, and Practice*. New York, NY: Springer.

Schunk, D. H., & Zimmerman, B. J. (1997). Social origins of self-regulatory competence. *Educational Psychologist, 32*(4), 195-208. doi:10.1207/s15326985ep3204_1

Schwarz, N. (1999). Self-reports. *American Psychologist, 54*(2), 93-105. doi:10.1037/0003-066X.54.2.93

Sherry, L., & Gibson, D. (2002). The path to teacher leadership in educational technology. *Contemporary Issues in Technology and Teacher Education, 2*(2), 178-203.

Simon, B. (2001). Family Involvement in high School: Predictors and effects. *NASSP Bulletin, 85*(2), 8-19.

Smith, J. A., & Osborne, M. (2008). Interpretative Phenomenological Analysis. In J. A. Smith (Ed.)

    Qualitative psychology: A practical guide to research methods (pp. 53-79). Sage.2003-06442-

    003

Smith, T. C. (2005). Fifty-one competencies for online instruction. *The Journal of Educators Online,*

    2(2), 1-18.

Snart, J., A. (2010). *Hybrid learning: the perils and promise of blending online and face-to-face*

    instruction in higher education. Santa Barbara, CA: Praeger.

Somekh, B. (2000). New technology and learning: Policy and practice in the UK, 1980–2010.

    Education and Information Technologies, 5 (1), 19-37.

Song, Y. (2014). "Bring Your Own Device (BYOD)" for seamless science inquiry in a primary school.

    Computers & Education, 74, 50-60.

Spooner, E. (2015). Interactive student centered learning: A cooperative approach to learning.

    Lanham, MD: Rowman & Littlefield.

Stavert, B. (2013). BYOD in schools literature review 2013. (Literature review). Sydney, Australia:

    State of NSW, Department of Education and Communities, T4L Program - Information

    Technology Directorate.

Sweeny, J. (2012). BYOD in education: A report for Australia and New Zealand. Intelligent Business

    Research Services.

Thoonen, E. E., Sleegers, P. J., Peetsma, T. T., & Oort, F. J. (2011). Can teachers motivate students

    to learn? Educational Studies, 37(3), 345-360.

Vesisenaho, M., Valtonen, T., Kukkonen, J., Havu-Nuutinen, S., Hartikainen, A., & Karkkainen, S.

    (2010). Blended learning with everyday technologies to activate students' collaborative

    learning. *Science Education International*, *21*(4), 272-283.

Wang, F., & Hannafin, M. J. (2005). Design-based research and technology-enhanced learning

    environments. *Educational Technology Research and Development, 53*(4), 5-23.

Wang, Q. (2008). A generic model for guiding the integration of ICT into teaching and learning. *Innovations in Education and Teaching International, 45*(4), 411-419.

Watson, J. (2008). Blended learning: The convergence of online and face-to-face education. Promising practices in online learning. *North American Council for Online Learning.*

Weinert, F. E. (2001). Concept of competence: A conceptual clarification. In D. S. Rychen, & L. H. Salganik (Eds.), *Defining and Selecting Key Competencies* (pp. 45-65). Seattle, WA: Hogrefe & Huber.

Wentzel, K. (1997). Journal of educational psychology. *Journal of Educational Psychology, 89*(3), 411-419.

Wentzel, K. R. (2009). Teacher-student relationships. In H. T. Reis, & S. Sprecher (Eds.), *Encyclopedia of Human Relationships* (pp. 1626-1629). Thousand Oaks, CA: SAGE. doi:10.4135/9781412958479.n536

Wentzel, K. R. (2004). Understanding classroom competence: The role of social-motivational and self-processes. *Advances in Child Development and Behaviour, 32*, 214-242.

Weston, M. E., & Bain, A. (2010). The end of techno-critique: The naked truth about 1:1 laptop initiatives and educational change. *The Journal of Technology, Learning and Assessment, 9* (6). Retrieved 2 November 2015, from http://www.jtla.org

Wheeler, S., Yeomans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student-generated content for collaborative learning. *British Journal of Educational Technology, 39*(6), 987-995.

Winne, P. H., & Perry, N. E. (2000). Measuring self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner, (Eds.), *Handbook of Self-Regulation* (pp. 531–566). San Diego, CA: Academic Press.

Winters, F. I., Greene, J. A., & Costich, C. M. (2008). Self-regulation of learning within computer-based learning environments: A critical analysis. *Educational Psychology Review, 20*(4), 429-444.

Wolters, C. (1999). The relation between high school students' motivational regulation and their use of learning strategies, effort, and classroom performance. *Learning and Individual Differences; Learn.11*(3), 281-299.

Wolters, C. A. (2003). Regulation of motivation: Evaluating an underemphasized aspect of self-regulated learning. *Educational Psychologist, 38*(4), 189-205. doi:10.1207/S15326985EP3804_1

Wright, N. (2010). E-Learning and implications for New Zealand schools: A literature review. Wellington, NZ: Ministry of Education.

Zimmerman, B. J. (1989). Models of self-regulated learning and academic achievement. In B. J. Zimmerman, & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theory, research, and practice* (pp. 1-25). New York, NY: Springer-Verlag.

Zimmerman, B. J. (2002). Becoming a self- regulated learner: An overview. *Theory into Practice; Theory Practice, 41*(2), 64-70.

Zimmerman, B. J., Bandura, A., & Martinezpons, M. (1992). Self- motivation for academic attainment - the role of self-efficacy beliefs and personal goal-setting. *American Educational Research Journal, 29*(3), 663-676.

Zimmerman, B. J., & Tsikalas, K. E. (2005). Can computer-based learning environments (CBLEs) be used as self-regulatory tools to enhance learning? *Educational Psychologist, 40*(4), 267-271. doi:10.1207/s15326985ep4004_8

Zimmerman, B. J., & Pons, M. M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal, 23*(4), 614-628.

Zimmerman, B. J., Bonner, S., & Kovach, R. (1996). *Developing self- regulated learners: Beyond achievement to self- efficacy* American Psychological Association. doi:10.1037/10213-000

Zimmerman, B. J., & Schunk, D. H. (1989). *Self-regulated learning and academic achievement* Springer Science & Business Media.

Zimmerman, B. J. (2013). From Cognitive Modeling to Self- Regulation: A Social Cognitive Career Path. *Educational Psychologist, 48*(3), 135-147. doi:10.1080/00461520.2013.794676

Zimmerman, B. J. (1986). Becoming a self-regulated learner: Which are the key sub processes? *Contemporary Educational Psychology, 11*(4), 307-313. doi:http://dx.doi.org.ezproxy.auckland.ac.nz/10.1016/0361-476X(86)90027-5

Zimmerman, B. J. (1990). Self-Regulated Learning and Academic Achievement: An Overview. *Educational Psychologist, 25*(1), 3.

Zimmerman, B. J. (2000). Self-Efficacy: An Essential Motive to Learn. *Contemporary Educational Psychology, 25*(1), 82-91. doi:http://dx.doi.org.ezproxy.auckland.ac.nz/10.1006/ceps.1999.1016

Zimmerman, B. J. (2008). Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects. *American Educational Research Journal, 45*(1), 166-183.

Zimmermann, B. J. (2000). Attaining Self-Regulation: a social cognitive perspective. In M. Boekaerts, P. R. Pintrich & M. (.). and Zeidner (Eds.), *Handbook of Self-Regulation* (pp. 13-39)

Appendices

Appendix A: Participant Information Sheet

Appendix B: Student Assent Form

Appendix C: Parent/Caregiver Consent Form

Appendix D: Student Survey

Appendix E: Parent Survey

Appendix A: Participant Information Sheet

THE UNIVERSITY OF AUCKLAND
FACULTY OF EDUCATION
Te Kura Akoranga o Tāmaki Makaurau
Incorporating the Auckland College of Education

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STUDENT PARTICIPANT INFORMATION SHEET

Title of Project: Self-regulation in the e-Learning environment

My name is Mrs Boyde-Preece and I am a teacher at ██████████████ but this year 2015, I have a year's study leave to complete my Masters of Education with the University of Auckland. As part of my studies I will be doing some research into how students manage themselves in the e-learning class. Because you are a participant in this class I would like to invite you to take part in my research.

What's involved?

If you and your parent/caregiver agree, the first thing I would like you to do is to complete a short online anonymous questionnaire in class which will take you about 15 minutes. When all the responses have been received, the online form will be taken down and the data will be stored on the Auckland University servers.

You may also be asked to take part in a short interview which will be between 30 and 45 minutes long. In the interview I will ask you questions about your experiences in the e-learning class. The interview will be audio recorded and transcribed (which means it will be typed up). A third party (who has signed a confidentiality agreement) will check the transcriptions. You can ask to see the transcribed version if you wish to. Any information you give will be stored for six years on a secure server with the University of Auckland. Audio data will be destroyed by erasing recorded material once it has been transcribed.

Voluntary Participation

Taking part in this research project is voluntary for everyone, which means that you don't have to take part. Whether you choose to take part or not will not affect anything else at school. You can also withdraw from the research project at any time and you will not have to give a reason why. You can also withdraw any information that you have given at any time up until it has been analysed, 3 July 2015 is the cut off day.

You will be given a code to use instead of your name in the online questionnaire so that your identity can be kept confidential. A third party (who has signed a confidentiality agreement) will maintain the

coded list in a secure place at the school. I will only be told your name, if you are chosen for an interview AND you have agreed to participate in an interview with me. If you are chosen for an interview you can ask to have another adult with you if you want to. Your personal identity will not be shared with anyone outside the research team. Your personal identity will not be shared with anyone outside the research team. Your name, your teacher's name and your school's name will not be used in any way. However, because I am identified with the Woolf Fisher Lead Teacher scholarship, my research may be identifiable but I will do my best to retain confidentiality of all participants.

A summary of findings from the research project will be made available to all participants. Results may also be published in journal publications or presented at education conferences.
Should you wish to participate, you will need to fill in the attached assent form and your parent or caregiver will need to sign the consent forms. Please return your assent form and your parent/caregiver consent forms to the main office as soon as possible.

Thank you for considering to this opportunity this research will help teachers to support students' in future e-learning classes.

If you have any questions or want to know more, please phone or email any of us at the addresses below:

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For any queries regarding ethical concerns please contact:

The Chair, The University of Auckland Human Participants Ethics Committee, UAHPEC Chair contact details ro-ethics@auckland.ac.nz

The University of Auckland, Research Office – Office of the Vice Chancellor, Private Bag 92019, Auckland 1142. Ph.: (09) 373 7599 ext. 83711

Approved by the UNIVERSITY of AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 4th June 2015 for three years.

Reference Number: 014493

Appendix B: Student Assent Form

School of Curriculum and Pedagogy
Te Kura o te Marautanga me te Ako

STUDENT ASSENT FORM

This form will be held for a period of six years

Title of Project: Self-regulation in the e-Learning environment

Researcher: Kerry Boyde-Preece Lead Teacher Scholar,
Woolf Fisher Research Centre.

I have read the Participant Information Sheet, and I understand the research and why I have been selected. I have had a chance to ask questions and have had them answered.

I understand that I may withdraw myself (pull out) from this project at any time without having to give any reasons. I understand that I may withdraw any information I have given at any time up to the 3 July 2015 without having to give any reasons.

I understand that my participation is voluntary and that my school has agreed that whether I do or don't take part will not affect anything else at school.

Please circle or cross out what applies below:

      I agree to take part in this research.

      I agree to complete a short online questionnaire.

      I agree for my name to be given to Mrs Boyde-Preece so that I can take part in short face-to-face interviews, if I am selected.

I understand that my personal identity will remain confidential during the questionnaire and interview stages.

I understand that my personal identity will not be shared with anyone outside the research team. . My name, teacher's name and school's name will not be used in any way.

I understand that the data will be stored securely, separately from the consent forms, on the Auckland University server and will be destroyed (shredded) and/or deleted after a period of six years.

Name: _____

Signature: _____ Date: _____

Approved by the UNIVERSITY of AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 4 June 2015 for three years.   Reference Number: 014493

Appendix C: Parent/Caregiver Consent Form

School of Curriculum and Pedagogy
Te Kura o te Marautanga me te Ako

PARENT/CAREGIVER CONSENT FORM
FOR MY CHILD TO PARTICIPATE
This form will be held for a period of six years

Title of Project: Self-regulation in the e-Learning environment
Researcher: Kerry Boyde-Preece,
               Lead Teacher Scholar, Woolf Fisher Research Centre

I have read the Participant Information Sheet and I understand the research and why my child has been selected. I have had the opportunity to ask questions and to have them answered to my satisfaction.

I understand that I may withdraw my child from this project at any time without having to give any reasons.

I understand that I may withdraw any information that my child has provided at any time up to 3 July 2015 without having to give any reasons.

I understand that my child's participation is voluntary and that my school has agreed that his/her participation or non-participation will not influence our relationship with the school or access to school services.

I agree that ………………………………………………….(child's name) of the year 10 E-learning class may participate in this research.
I agree that my child may participate in a short online questionnaire during the research period.

I agree that, if selected, my child will be identified to the researcher and will participate in a short face-to-face interview with the researcher.

I understand that the interview will be digitally audio recorded and that the interview will be transcribed. I am aware that I may ask to see the transcribed recording. I understand that this process will occur just once during the research period.

I understand that information about my child's learning experiences will be confidentially collated and entered into a database by the researcher.

I understand that my child's, and my own identity will remain confidential and will be protected at all times, and that neither his/her name, nor the name of the teachers, the school or myself will be identified in any publication or presentation that arises from the research.

I understand that the data will be stored safely and securely at the Woolf Fisher Research Centre at the Auckland University after which all copies will be destroyed after a period of six years.

Name: _____

Signature: _____

Child's Name: _____   Date: _____

Approved by the University of Auckland Human Participants Ethics Committee on 4th June 2015 for three years. Reference Number: 014493

Appendix D: Student Survey

This questionnaire is designed to help you identify the things you currently do that help you manage yourself in digital classes. There are no right or wrong answers so just try to make your answers as truthful to you as possible. Thank you for taking the time to complete this survey, your answers will help us get an idea of student's learning styles and self-management in digital classes.

1. Please enter your unique code

2. Are you male or female?

- o   male
- o   female

3. What is your ethnicity?

- o   Maori
- o   Pacifica
- o   European
- o   Asian
- o   Middle East/Latin American/African
- o   Other (please specify)

All of the items in the student survey used a 5 point Likert scale with the following responses:

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

4.	I regularly learn things at school that I find relative to me and my interests
5.	I think it's important to have a device in class to learn with
6.	I want to do well in class because it is important to show my ability to my family
7.	I find the work in class challenging
8.	I feel like I don't have any choice in my class
9.	The course material covered in the class is not useful for me to learn.

10.	I like to have work that challenges me because I want to learn new things
11.	I want to get better marks than most of the other students
12.	I think our classes are more interesting because of the technology involved
13.	I love to play online computer or Xbox games because they are challenging
14.	I feel it is my own fault if I don't understand the * material in class.
15.	If I try hard enough, then I can understand what we cover in class
16.	I feel like a capable learner in this class
17.	I am not very good with computers
18.	I am much better at self-management because I am in the BYOD classes
19.	I can work at my own pace in this class
20.	I often feel bored in this class and don't finish what I planned to do
21.	I make judgements about my own learning so that I know how to improve
22.	I expect to do well in this class
23.	I feel more motivated to learn because of the technology I can use
24.	I easily give up when I find things * difficult in class
25.	I try to make connections with my school work to something I like doing or find interesting
26.	I make an effort to connect what I'm learning to my own experiences
27.	I remind myself how important it is to get good marks at school
28.	I push myself to see if I can do better than I've done before
29.	I try to find connections between what I learn in one subject to another subject, for example between science and maths.
30.	I promise myself some kind of reward if I can get my assignment or homework done on time
31.	I work hard in this class even if I don't like what we are doing
32.	I often see how I can combine or link digital solutions (laptop, apps or the internet) to traditional methods (pen, paper, books) to make them better or different in some way
33.	I challenge myself to complete the work and learn as much as possible

34.	Using my digital device to learn with helps me * be more organised
35.	I am not good at completing long term projects that take 4-6 weeks
36.	During class time I often miss important points because I am thinking of other things
37.	I know how to keep my device updated and in good working order
38.	I set myself learning goals and make a plan to achieve them
39.	I often find ways to help me solve problems via the internet or online forums
40.	I can stick to my learning goals even when I find things difficult
41.	I have strategies for eliminating distractions for example from peers who interrupt me, Facebook, watching YouTube or playing games which have nothing to do with our learning etc…
42.	I can motivate myself to do my school work even when there are other things I would rather be doing
43.	I ask my friends or other students to help me when I am stuck or confused about something
44.	In the box below write down all the things you can think of that help you to learn in the BYOD class
45.	In the box below write down all the things that you think could be better in the BYOD class, to help you learn

Thank you for taking the time to complete this survey, you have been awesome!!

Appendix E: Parent Survey

This questionnaire is designed to give the researcher an idea of your child's ability to manage themselves. I am interested to learn what factors influence their ability to self-manage within the 'Bring your own device' BYOD classes and what their learning preferences are.

The survey is made up of statements with answers ranging from strongly disagree to strongly agree. There are no right or wrong answers so please try to make your answers as accurate as possible.

Your answers will help us to get an idea of your child's learning preferences and their self-management in the BYOD classes so that we can better meet their learning needs.

Thank you for participating and making this project possible.

1. Please enter your unique code

All of the items in the parent survey used a 5 point Likert scale with the following responses:

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

2.	My child regularly learns things at school that he/she finds relative * and interesting
3.	The work in the BYOD classes is challenging for my child
4.	I often tell my child it is important for them to do well at school
5.	The content covered in the BYOD classes is not useful for my child to learn.
6.	My child is offered some choice in the BYOD classes regarding what they learn
7.	My child does not feel motivated in the BYOD classes
8.	The work in the BYOD classes is interesting for my child
9.	I think the BYOD classes are more interesting for my child than regular classes because of

	the technology used
10.	I think it's important for my child to learn at school with a computer
11.	I always encourage my child to do the best they can
12.	My child tells me he/she often feels bored * in the BYOD classes
13.	I praise or reward my child when he/she shows an interest in learning * something new
14.	My child is good at managing things that distract her/him from their learning
15.	I give my child lots of encouragement when he/she is struggling with his/her schoolwork
16.	I encourage my child to persevere when he/she is faced with difficulties at school
17.	I show my child how to motivate his/her self to complete his/her learning when he/she would rather be doing things that he/she considers to be more interesting
18.	I know my child works hard in this class even if he/she does not like what they are doing
19.	My child will easily give up when he/she finds things difficult in the BYOD classes
20.	I praise or reward my child when he/she achieves his/her learning goals
21.	My child is very good with computers
22.	My child is very resourceful and is good at finding solutions to problems
23.	My child is not very good at managing his/her own time when it comes to getting his/her school work done
Please answer these questions from your perspective rather than your child's.	
24.	I enjoy learning and I am always learning new things (e.g. reading books, magazines, newspapers, listening to the news new hobbies, retraining etc.…)
25.	I set goals (personal or professional)
26.	I like to share my goals with my whanau or family members
27.	I am not fazed by difficulties in my life because I know I can learn from these experiences
28.	I can stick with my goals and achieve them
29.	I like to be involved in my child's learning and help wherever I can
30.	I do not feel confident with helping my child to learn how to manage herself/himself

31.	In the box below please comment on what is helping your child to learn well * in the BYOD classes
32.	In the box below please comment on what isn't helping your child to learn in the BYOD classes
33.	Were there any questions you did not like or did not understand in the survey?