



*Stakeholder Perspectives on the use of Bring Your Own Device  
(BYOD) for learning and their impact on the educational outcomes  
of Māori students in Aotearoa New Zealand*

A Case Study presented to the  
**School of Information Management**  
**Victoria University of Wellington**

by

*Nicola Bonica*

in partial fulfilment of the requirements for the MMIM 590 course.

*Due: 16 November 2015*

**Declaration**

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the APA convention for citation and referencing. Each contribution to, and quotation in, this ..... entitled .....from the work(s) of other people has been attributed, and has been cited and referenced.
3. This paper is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work
5. I acknowledge that copying someone else's assignment, essay or paper, or part of it, is wrong, and declare that this is my own work.

Signature(s) Nicola Bonica

Date 16/11/2015

## **1. Executive summary**

The growing need to ensure that Aotearoa New Zealand's young people are equipped with sophisticated digital competencies and 21<sup>st</sup> century skills is compelling educators to explore more creative ways to incorporate digital technologies into their daily teaching and learning programmes. Enter 'Bring Your Own Device' (BYOD) - the use of personally owned devices for learning.

Once considered a taboo in the classroom (Ray, 2013), BYOD is now rated among the more socially accepted technology solutions in schools as government agencies and educators alike are recognising that an increasing number of students, regardless of socioeconomic status, now personally own, or have access to, a mobile device (Song, 2014; Kim, Buckner, Kim, Makany, & Taleja, 2012).

However, to date, very little research has been undertaken to identify whether any clear link exists between the use of digital technologies such as BYOD, and an improvement in the achievement rates and educational outcomes of students, in particular Māori learners, in Aotearoa New Zealand schools. With the release of recent government initiatives intent on achieving a dramatic increase in Māori student qualification achievement rates by 2017 (Ministry of Education, 2012), it is especially important to understand what difference, if any, do technologies such as BYOD mean to Māori student achievement.

This case study was undertaken with the intent to contribute to this knowledge gap by exploring the use of BYOD across different secondary school settings in Aotearoa New Zealand. The aim was to gain an understanding from the perspective of key stakeholders, what impact, if any, these tools have on the learning outcomes of Māori students.

Data for this study was collected using a qualitative analysis approach and supported by the principles of the Kaupapa Māori research method (Smith, 1990). This was achieved through exploratory interviews held with a range of participants from three identified stakeholder groups. Participants included education sector officials, school students and teachers from three distinct secondary provider types, each located within the North Island.

The 'Realising Māori Potential' (RMP) framework (Te Puni Kokiri, 2014) along with several relevant elements of the Kaupapa Māori theory (Smith, 1990) were used to guide the literature review.

The main findings were framed using a combination of the key questions explored by this study, together with the RMP framework as an additional lens. The findings have been used to devise the recommendations outlined at the end of this document and are summarised as follows:

- Although the interest in BYOD in Aotearoa New Zealand schools appears to be increasing, it is still a relatively new technological approach for teaching, learning and assessment and is not yet well understood;
- Not all schools have strategies in place for measuring the effectiveness of BYOD for learning;
- All participants perceived that, when used appropriately, BYOD could help to improve the educational outcomes of Māori students;
- While statistics suggest that more and more students now own a mobile device of some flavour, all participants perceived that affordability and lack of access to a device continues to be a key barrier for Māori students;
- Providing educators with more professional development opportunities and the time to undertake regular training was considered by all teachers as a necessary enabler for ensuring the effective use of BYOD for Māori student learning;
- Teacher knowledge has an impact on the use of BYOD in schools;
- Students require more support at home from parents and whānau.

Based on the findings, particularly in respect to the key barriers and enablers identified in this study, this report makes several recommendations that are intended to inform and assist concerned stakeholders across the wider education sector, in developing strategies to address each of the components that fall within their area of interest and control.

## **2. Acknowledgements**

I'd like to take this opportunity to express my sincere thanks to several parties who have all contributed in one way or another to this case study project.

Firstly to the participants, thank you all for taking time out of your busy schedules to participate in this study and for sharing your valuable thoughts and perspectives with me. Similarly, to the Principals and Senior Managers, thank you for granting me permission to conduct my research on site with the staff and/or students within each of your organisations.

To my dear friends and work colleagues, thank you for being constant sounding boards, for taking the time to share your knowledge and accounts of similar experiences, for always being willing to offer advice and support when I needed it the most (usually at the last minute), for expressing an interest in my progress, and your constant concerns for my wellbeing.

To my senior managers, for allowing me the time off from our consistently hectic work schedule to undertake my studies, and in particular, for supporting my last minute travel arrangements.

To my principal supervisor, Dr Jocelyn Cranefield, thank you for allowing me to change my mind (several times), for reminding me not to lose focus, and for all your support in general throughout the entire case study process. A special thanks also to our associate supervisor, Tony Hooper, for your guidance and the constant reminder that our objective was not to heal the world, and to Usha, for all the amazing administrative work you do for the entire School of Information Management.

And finally to my husband and my children, thank you for pushing me to continue on with my Master's degree and for your ongoing unconditional support and understanding.

Thank you all, for without each of you this project would not have been possible.

## Table of Contents

<b>1. EXECUTIVE SUMMARY.....</b>	<b>2</b>
<b>2. ACKNOWLEDGEMENTS .....</b>	<b>4</b>
<b>3. CASE DESCRIPTION .....</b>	<b>7</b>
3.1 THE SITUATION .....	7
3.2 THE ISSUE.....	7
3.3 SIGNIFICANCE OF THE ISSUE BEING INVESTIGATED.....	8
3.4 EDUCATION SECTOR AGENCY AND GOVERNMENT PERSPECTIVES.....	10
3.5 SCOPE OF THIS STUDY.....	12
3.6 BENEFITS AND IMPLICATIONS OF BYOD FOR LEARNING.....	12
3.7 OBJECTIVE .....	14
<b>4. INTRODUCTION TO ANALYSIS.....</b>	<b>14</b>
4.1 METHODOLOGY .....	15
<b>5. LITERATURE REVIEW.....</b>	<b>16</b>
5.1 MATAURANGA (KNOWLEDGE) .....	17
5.2 RAWA (RESOURCES) .....	18
5.3 WHAKAMANA (INFLUENCE) .....	19
5.4 TINO RANGATIRATANGA ME AKO MĀORI (SELF-DETERMINATION AND PEDAGOGY).....	20
5.5 KIA PIKI AKE I NGA RARURARU O TE KAINGA (SOCIO-ECONOMIC MEDIATION).....	21
<b>6. ANALYSIS.....</b>	<b>22</b>
6.1 RESEARCH METHODOLOGY .....	24
6.2 DATA COLLECTION METHOD .....	24
6.3 THE RESEARCH SETTING.....	24
6.4 PARTICIPANTS .....	26
6.5 THE TECHNOLOGY.....	27
6.6 FINDINGS .....	27
6.6.1. Stakeholder perspectives on the use of BYOD for learning.....	28
6.6.2. Stakeholder perspectives on the use of BYOD as a tool for improving the educational outcomes of Māori students .....	30
6.6.3. Stakeholder perspectives on measuring the effectiveness of BYOD for Māori students' learning.....	32
6.6.4. Stakeholder perspectives on the use of BYOD as a tool for building knowledge and skills.....	34

6.6.5. Stakeholder perspectives on the use of BYOD as a resource.....	37
6.6.6. Stakeholder perspectives on the use of BYOD for the strengthening of leadership and decision-making and influence.....	38
<b>7. RECOMMENDATIONS.....</b>	<b>41</b>
7.1. IMPROVING ACCESS TO, AND SUPPORT WITH DEVICES FOR MĀORI STUDENTS .....	41
7.2. MORE TARGETED SUPPORT FOR TEACHERS AND STUDENTS AND ENHANCING TEACHING AND LEARNING PRACTICES .....	43
7.3. PROFESSIONAL DEVELOPMENT AND TRAINING OPPORTUNITIES FOR TEACHERS .....	44
7.4. DEVISING STRATEGIES TO MEASURE EFFECTIVENESS.....	45
7.5. EDUCATING WHĀNAU AND THE COMMUNITY .....	46
<b>8. CONCLUSION .....</b>	<b>46</b>
<b>9. BIBLIOGRAPHY .....</b>	<b>47</b>
<b>21ST CENTURY LEARNING REFERENCE GROUP. (2014). FUTURE-FOCUSED LEARNING IN CONNECTED COMMUNITIES. ....</b>	<b>47</b>
<b>10. APPENDIX ONE .....</b>	<b>52</b>
INTERVIEW QUESTIONS – ALL PARTICIPANTS .....	52
<i>Teachers</i> .....	52
<i>Students</i> .....	52
<i>Education Sector Officials</i> .....	53

## Tables and figures

**Page 8 - Figure 1.** People aged 18 years with a minimum of NCEA Level 2 or an equivalent qualification (Ministry of Education, 2012).

**Page 10 - Figure 2.** The actual achievement of NCEA Level 2 or equivalent by all 18-year-olds from 2006 to 2001 (Ministry of Education, 2012).

**Page 16 - Figure 3.** Realising Māori Potential Framework (Te Puni Kokiri, 2014)

**Page 40 - Table 1:** The top five key barriers, enablers and changes occurring in schools relating to the use of BYOD for learning, based on the perspective of key stakeholders

### **3. Case description**

#### **3.1 The situation**

Improving the educational outcomes of disadvantaged and vulnerable young people is a high priority for leaders worldwide. They understand that quality educational outcomes are fundamental for breaking the cycle of poverty, improving life outcomes, and building more competitive and productive global economies (Ministry of Education, 2012; Wood, David, 2003).

Equally as important is the need to equip young people with the sophisticated competencies and 21st century skills that employers and tertiary education institutions will demand of them in an increasingly digital world (21st Century Learning Reference Group, 2014; Levin & Schrum, 2013). It is this growing need that is driving a noticeable shift in teaching and learning practices, and consequently, the adoption of new forms of digital technologies in schools (McGuinness, 2012).

#### **3.2 The issue**

In Aotearoa New Zealand, raising the educational achievement of priority and at risk learners, particularly among its indigenous population, Māori, has been a key concern and a matter of national interest for decades (Education Review Office, 2010). Despite the best efforts of numerous stakeholders with targeted strategies and reforms, significant progress in improving Māori educational achievement and in bridging the social divide, remains unrealised for far too many (21st Century Learning Reference Group, 2014).

A recent Ministry of Education report shows that in 2006 only 34% of 18-year-old Māori students attained an NCEA Level 2 or equivalent qualification prior to leaving school. By 2011, following on from targeted strategies, policy setting enhancements, and improvements to teaching and learning practices nationwide, the number of qualifications attained by Māori school leavers lifted to 49.6% (Ministry of Education, 2012).

In spite of this improvement in Māori achievement rates, by the end of 2011 over 50% of 18-year-old Māori students left formal education with no qualification, and therefore no evidence of any knowledge and skills that they

could use to transition to further education, training and or employment. The achievement rate data is even more striking for Māori male students (Ministry of Education, 2012).

With a strong global push towards future focused learning environments and the development of 21st century skills, the challenge today is to ensure that all Māori students have the knowledge, skills and capabilities they need to participate effectively and safely, as Māori, in an increasingly digital world (21st Century Learning Reference Group, 2014).

### **3.3 Significance of the issue being investigated**

Poverty<sup>1</sup> currently affects one in four of this country's young people and is proving to show a clear relationship to student achievement (Johnston, 2015).

Data reveals that young people in schools in Aotearoa New Zealand's lower socioeconomic areas are still trailing well behind their wealthier counterparts, with rising pass rates only making a small dent in the achievement gap (Johnston, 2015). This is attributed to factors such as "students' home background, transience, dysfunction and a lack of resources, which are responsible for up to 80% of a child's school success" (Carpenter & Osborne, 2014 as cited by Johnston, 2015).

Most concerning however, is data from a 2011 OECD report (as cited in Johnston's (2015) education investigation), in which Aotearoa New Zealand schools are described as the least likely to assist students to overcome the disadvantages of being born or raised in low-income families.

This data is hard to digest, particularly when several strategies have been introduced over the years with the intent to improve student outcomes or improve digital competencies. This includes initiatives such as STAR, Gateway, Youth Guarantee and Fees free places, Modern Apprenticeships, The University of Auckland's Starpath Project, Learning and Change Networks (LCN) and Manaiakalani; all of which focus on some aspect of

---

<sup>1</sup> Poverty (as defined by Johnston, 2015) includes household income levels below 60 percent of the median following the deduction of housing costs



raising achievement, tailored learning for individuals, or the use of technology to facilitate accelerated learning for Māori students.

The latest attempt by Government to address the continued social and economic disparity has been the launch of the range of “Better Public Services” (BPS) targets in 2012, with a key priority area committed to boosting skills and employment in Aotearoa New Zealand (Result 5 -6) (Ministry of Education, 2012).

The Government announced that “success in education is essential to the Government’s goal of building a productive and competitive economy” and lifting the educational outcomes of all learners, particularly those of our disadvantaged, priority and at risk students, will ensure that “New Zealanders develop the skills they need to reach their full potential and effectively contribute to the economy and society” (Ministry of Education, 2012).

The BPS NCEA Level 2 is an education sector specific target focussing on increasing the proportion of all students, including Māori and Pasifika, 18-year-olds, with an NCEA Level 2 or equivalent qualification to 85% in 2017 (refer to figure 2.). Approximately 2,400 18-year-old Māori students will need to attain an NCEA Level 2 or equivalent to raise achievement from 49.6% in 2011 to 85% in 2017 (Ministry of Education, 2012).

	2006	2011 (provisional data)
Pakeha (non-Māori/Pasifika)	69%	74.1%
Māori	34%	49.6%
Pasifika	40%	59.6%
Total population	59%	68.4%

**Figure 1. People aged 18 years with a minimum of NCEA Level 2 or an equivalent qualification (Ministry of Education, 2012).**

The overall needed increase of 35.4% within five years, compared to a 15.6% increase from 2006 to 2011, tends to suggest that meeting the BPS NCEA

Level 2 target is both “challenging” (Ministry of Education, 2012) and “ambitious” (Shuttleworth, 2013).

#### ACHIEVEMENT OF NCEA LEVEL 2 OR EQUIVALENT: PERCENTAGES

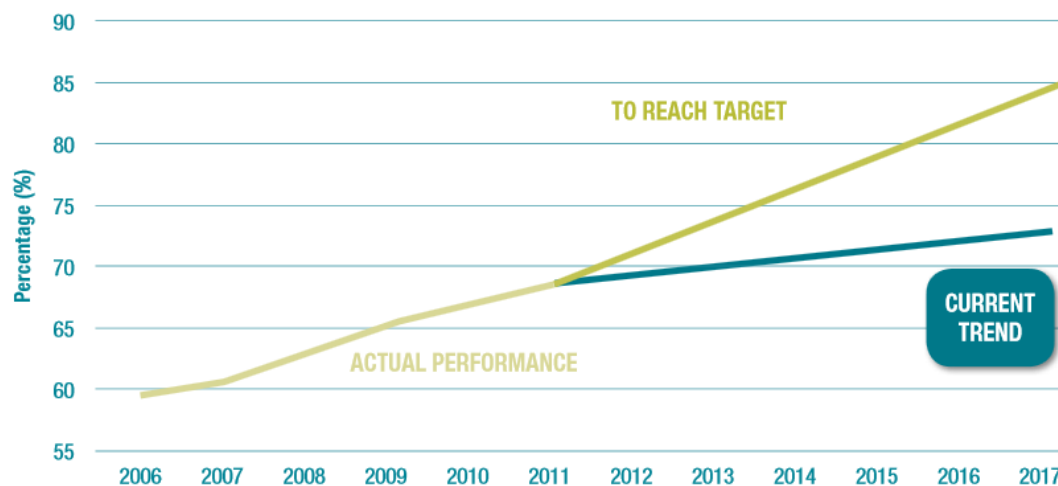


Figure 2. The actual achievement of NCEA Level 2 or equivalent by all 18-year-olds from 2006 to 2011 (Ministry of Education, 2012).

### 3.4 Education sector agency and government perspectives

The combination of the Government target with the growing need for today’s young people to be digitally competent and equipped with 21st century skills is also shifting the focus of educational strategies and policies across the wider education sector.

Government agencies are responding to the need to prepare students for an increasing digital world, and to ensure that they are well equipped with the capabilities that prospective employers and tertiary education institutions are likely to demand in the future.

The New Zealand Qualifications Authority (NZQA) - one of six education agencies involved in the management of Aotearoa New Zealand’s education sector - is exploring how technologies can be leveraged to improve the services it has customarily delivered to its customers, in response to the rapidly changing global environment (New Zealand Qualifications Authority, n.d.).

Part of the focus of the organisations “Future State” programme of work includes a shift from traditional pen and paper based examinations and marking processes, to computer based assessment and online marking (New Zealand Qualifications Authority, n.d.). These proposed changes will impact on the way students undertake assessment and how their results are reported, the way teachers teach both in and out of the classroom, and the way assessment materials are prepared and marked.

The Ministry of Education (the Ministry) - the principal policy advisor to the New Zealand Government on the education system - is the lead agency for the BPS NCEA Level 2 target and is committed to ensuring that “no young person falls between the gaps and is left behind” (Ministry of Education, 2012).

The Ministry has demonstrated this commitment by developing a “Digital Education” strategy, which is intended to “support schools and educators to harness new technologies to prepare students with 21st-century skills” (Ministry of Education, 2013). In addition, their key actions to support the target includes placing a large focus on priority groups that are currently underserved by the education system and ensuring that schools are equipped to provide the necessary support to all young students and their families (Ministry of Education, 2012).

The Government also believes that a key contributing factor in achieving the BPS NCEA Level 2 target is through the use of digital technologies (Ministry of Education, 2013).

In 2013, the Associate Minister of Education publicly announced the Government’s commitment to establish digital literacy opportunities in education and 21<sup>st</sup> century learning environments (Kaye, 2013). As an assurance, the Government allocated \$1500 million worth of funding to deliver wireless, satellite or ultra-fast broadband fibre access to 2200 schools and kura by July 2014 (Ministry of Education, 2013 p.27).

### **3.5 Scope of this study**

A key question that this case study explores is whether or not digital technologies can make a difference in accelerating the educational outcomes and achievement rates of Māori students, to meet the BPS NCEA Level 2 target in 2017.

Increasing numbers of education providers in Aotearoa New Zealand are exploring different digital technologies and the various opportunities for enhanced teaching and learning practices they enable (Tiakiwai & Tiakiwai, 2010), with “Bring Your own Device” (BYOD) - the use of personal devices for learning – now becoming more commonplace in schools (Research New Zealand, 2014).

Personal digital devices, such as mobile phones and tablets, are now a cornerstone of everyday life and are being used in a variety of ways to support teaching and learning activities that aid in the development of 21st century skills (Estable, 2013, Levin & Schrum, 2013), and to expand and accelerate learning outcomes (Hubye & Elsener, 2013). It is the personalised, flexible, economical and portable nature of BYOD, as well as the level of comfort and familiarity that children and young people have with their individual devices, that is progressively attracting more schools towards the adoption BYOD for teaching and learning (Tiakiwai & Tiakiwai, 2010; 21st Century Learning Reference Group, 2014; Estable, 2013; Hubye & Elsener, 2013; Griffin & Minter, 2013).

### **3.6 Benefits and implications of BYOD for learning**

Various authors agree that digital technologies can assist with student learning and achievement. According to Marcoux (2014) “technology has become a part of the culture of society - including schools”, and when managed in a meaningful manner, learning and teaching can be enhanced.

Hubye & Elsener (2013) discuss how “technology such as BYOD is changing the ways that education is done”. This is supported by Thomas & O'Bannon (2013) who suggests that mobile devices “allow for informal and lifelong learning” as they provide students with anywhere access to information, while

Traxler (2009) describes how the use of personal learning devices can give students a sense of ownership over their own learning.

Other authors discuss the perceived implications relating of the use of BYOD for learning. These include:

- disruptions in the classroom (Avery, 2013; Ally & Prieto-Blazquez, 2014),
- a deterioration of interaction between teachers and students (Handal, MacNish, & Petocz, 2013),
- the opportunities for cheating (Marcoux, 2014; Avery, 2013),
- some students having a great device, some an old device, and some no device at all (Johnson, 2012; Ward, 2013; Kim, Miranda, & Olaciregui, 2008).

These, and other perspectives, are discussed in more detail later in this report.

Ostensibly, Aotearoa New Zealand schools appear to be preparing for the opportunities that digital technologies for learning have to offer. A survey conducted in a 2014 identified that 73% of the schools that responded had already established Information and Communication Technology (ICT) strategic plans, and of these schools, 74% had introduced, or were in the process of introducing, BYOD policies (Research New Zealand, 2014). Interestingly, when asked what impact digital technologies were having on student achievement, two thirds of the total schools were seeing little or no immediate improvement.

However, not so unambiguous is the fact that none of the survey questions focussed on the use or impact of digital technologies, personal learning devices or more specifically BYOD on Māori student achievement. This suggests that while BYOD itself is not a new phenomenon, it appears to be a relatively immature technological approach in Aotearoa New Zealand schools as their effectiveness is not yet obvious.

Possible underlying factors may include a lack of evidence of the value of BYOD as a tool for teaching and learning in an Aotearoa New Zealand setting and little awareness of how to use these technologies as tools for learning experiences that are collaborative, authentic, and student-centered (Hubye & Elsener, 2013). There is also a deficiency in understanding surrounding the effectiveness of BYOD as a mechanism for improving educational outcomes, particularly for Māori learners, who are identified among Aotearoa New Zealand's priority and at risk groups.

### **3.7 Objective**

Driven by a lack of research and data on the link between digital technologies and their effectiveness for improving the educational achievement of Māori students, this case study was undertaken with the intent to examine the use of BYOD across different secondary school settings in Aotearoa New Zealand, and to identify what impact, if any, these tools have on the learning outcomes of Māori students.

## **4. Introduction to analysis**

The key question this case study explores is what impact, if any, does the use of digital technologies in schools have on the educational outcomes and achievement rates of Māori students.

However, as digital technologies can take on various forms and interpretations - that is, the term may be used to describe the tools that are used to aid learning and instruction in schools, such as interactive whiteboards, projectors, computers and laptops (Nelson, 2012; Ray, 2013), or may be used to describe the delivery mechanism or setting in which the tools are utilised, such as m-learning (Estable, 2013) e-learning or virtual learning environments (Tiakiwai & Tiakiwai, 2010) - this study adopted the former interpretation, exploring one particular type of technology as a tool for learning, BYOD, and its impact on the learning outcomes of senior secondary Māori students in different educational settings within Aotearoa New Zealand.

The decision to explore the use of BYOD for learning in schools was supported by several key themes that emerged from the literature review,

particularly the notion that mobile devices usage at home is now normalised, and accessible to many households regardless of income levels (Skillen, 2012).

The literature review was guided by various elements of the Kaupapa Māori theory (Smith, 1990) and the Realising Māori Potential (RMP) framework (Te Puni Kokiri, 2014), as discussed further in the following section.

#### **4.1 Methodology**

Given that this project focuses on Māori, their knowledge, processes and issues, it was appropriate to utilise the 'Kaupapa Māori' theory (Smith, 1990), and the 'Realising Māori Potential' Framework (Te Puni Kokiri, 2014) as the research approach and methodology for this study.

The 'Kaupapa Māori' theory "deals specifically with research that interacts with and/or impacts on Māori people and their knowledge, processes and issues. It is a form of research that seeks to identify and uphold Māori views, solutions and ways of knowing and is about empowering Māori people and their voice, processes and knowledge" (Smith, 1990).

The theory itself is based on six key principles within the context of educational intervention defined by Graham Hingangaroa Smith (1990), which has since been expanded by various other Kaupapa Māori theorists (Kaupapamaori.com, n.d.). The principles of the theory that are applicable to this project have been applied to the literature review and used as the main research approach for this study.

The 'Realising Māori Potential' (RMP) framework (Te Puni Kokiri, 2014) identifies the key enablers that are essential to Māori achieving and realising their potential. The RMP framework provided a particularly relevant perspective for this study as it has been suggested that the BPS NCEA Level 2 target, which insists "success in education will help New Zealanders develop the skills they need to reach their full potential and contribute to an internationally competitive economy and society", may only be accomplished by first realising the potential of the Māori economy (New Zealand Government, 2011).

Of particular relevance is the underpinning of the BPS target that an NCEA Level 2 qualification will give people opportunities in terms of further education, employment, health outcomes and a better quality of life (Ministry of Education, 2012; Te Maro, Higgins, & Averill, 2007).

The RMP framework consists of four key components; Mātauranga (Knowledge); Whakamana (Strength or Influence); Rawa (Resources); and Te Ira Tangata or 'Life Quality' being the overall desired outcome in which Māori potential is realised, as demonstrated in figure 3. (Te Puni Kokiri, 2014).



Figure 3: Realising Māori Potential Framework (Te Puni Kokiri, 2014)

The RMP framework has been applied to the literature review and to frame the key findings of this study.

## 5. Literature review

The principles and elements of the Kaupapa Māori theory and the RMP framework were used to guide the literature review to frame the applicable themes surrounding the use of BYOD for learning in Aotearoa New Zealand schools. The application of these methods combined with the literature review findings are discussed in detail below.



## **5.1 Maturanga (Knowledge)**

As the first factor of the RMP framework, this particular area acknowledges the importance of building knowledge and skills as being a key enabler for realising Māori potential (Te Puni Kokiri, 2014). When framing Maturanga against the available literature on BYOD in secondary schools in Aotearoa New Zealand, there is an apparent lack of knowledge and evidence surrounding their use, including their adoption and the preparedness of schools in delivering teaching and learning practices enabled by BYOD, as well as the effectiveness of BYOD for improving Māori students' educational outcomes.

However, recent research does suggest that as a result of “devices becoming increasingly affordable and mobile” (21st Century Learning Reference Group, 2014), many educational institutions are beginning to implement BYOD strategies, although most are still in the very early stages of adoption of personal learning devices (Research New Zealand, 2014; 21st Century Learning Reference Group, 2014). These reports also indicate that many teachers may not yet be suitably equipped for 1:1 BYOD initiatives, with only 14% of teachers from the schools surveyed having the necessary skills to manage classrooms with personal student devices.

Perhaps also explained by the lack of Maturanga (Knowledge), is that BYOD is often confused with true 1:1 initiatives in which the school supplies the technology for each student (Nelson, 2012). According to Alberta Education (2012), BYOD refers to “technology models where students bring a personally owned device to school for the purpose of learning”. It is this definition that has been adopted by this study.

In Research New Zealand's (2014) digital technologies in schools report, students from 80% of schools surveyed are recorded as using personal digital devices for learning. However, this report does not exclusively consider devices that are personally owned (as per Alberta Education's definition), instead it also deems devices that are supplied by the school as personal 1:1 learning devices.

The challenge with school-owned and supplied devices, as outlined in Research New Zealand's (2014) report, is that they are only available to students during school hours, with only a very small percentage of schools allowing students to take the devices home. This seems an inaccurate reflection of the purpose of BYOD and personal learning devices, defeating the anytime anywhere learning capability that this model facilitates as well as societies changing vision about when, where and how one learns (Estable, 2013; Thomas & O'Bannon, 2013; 21st Century Learning Reference Group, 2014).

## **5.2 Rawa (Resources)**

This area of the RMP framework considers the development and use of resources as a fundamental factor towards the realisation of Māori potential (Te Puni Kokiri, 2014). Using this lens, BYOD can be regarded as an appropriate, sustainable and affordable resource, particularly in today's economic climate of reduced budgets and a persistent culture of 'do better with less', as students are able to use their personally owned devices for learning.

For schools, BYOD equals a sustainable Information Technology solution since the use of students' personal devices for learning means in a reduction in school technology-related costs (Johnson, 2012; Estable, 2013). Though some authors argue that it is merely a shift in costs as schools instead transfer available funding into teacher professional development and network capacity (Harris, 2012). However, for students, it offers an individualised choice in the kind of device that will use for learning (Estable, 2013).

Also contained within the Rawa (Resources) perspective is the international rise of BYOD technologies in schools. According to Griffin & Minter (2013) "touch screens have been around since 1965 but only recently have they found a place in education via smart phones and tablets".

Regardless of how recent this interest may be described to be, the growth of mobile phone and personal digital device use in education has been rapid, with 75% of devices currently used for learning in an international setting

consisting of personal digital assistants and mobile phones (Estable, 2013).

Also considering that 78% of teenagers now own a mobile phone (Thomas & O'Bannon, 2013) and that one and four students have tablets (Griffin & Minter, 2013) it seems an obvious matter of course that the use of BYOD is becoming increasingly accepted and supported within the learning environment.

In Aotearoa New Zealand, statistics show that in 2006, 90.6 percent of individuals within the 15 to 24 years age group had personal use of at least one mobile phone (Statistics New Zealand, 2006). It is therefore expected that this number would now be much higher.

### **5.3 Whakamana (Influence)**

The third of the key elements of the RMP framework, this area focuses on influence and the strengthening of leadership and decision-making (Te Puni Kokiri, 2014). In respect to BYOD, it was important to understand the current perspectives of key stakeholders, to examine whether their opinions, beliefs, attitudes or perceptions have any influence on the decision to adopt BYOD within the school environment, and what the implications on the effective use of BYOD for improving Māori student learning outcomes may be.

The literature identified several perceived barriers, disadvantages and difficulties (from an international perspective) relating to the effective use of BYOD in the classroom. In regards to student use, these include: disruption, texting, cheating, sexting, cyberbullying and accessing inappropriate content on the web (Thomas & O'Bannon, 2013; Marcoux, 2014; Levin & Schrum, 2013). In addition, noted is the disparity and inequality in student access to wi-fi and devices, which means that students in low-income areas may be missing out (Hopkins, Sylvester & Tate, 2013; Ward, 2013; Johnston, 2015; Griffin & Minter, 2013; Kim, et al., 2008; Tech Learning, 2014).

The perceived barriers relating to teacher influence on the use of BYOD include: teacher beliefs, age, technical knowledge and proficiency, access and time for training (Avery, 2013; Levin & Schrum, 2013; Marcoux, 2014; Thomas & O'Bannon, 2013; Tiakiwai & Tiakiwai, 2010; Ward, 2013).

In addition are the perceptions that the use of BYOD has a negative impact on student writing (Griffin & Minter, 2013; Thomas & O'Bannon, 2013), the suggestion that they are often considered a distraction rather than being seen as a resource (Hubye & Elsener, 2013), that BYOD means a loss of teacher control (Marcoux, 2014; Ward, 2013; Sheehan & Nillas, 2010), and that mobile phones do not support student learning (Thomas & O'Bannon, 2013), all of which can negatively affect integration of these classroom technologies.

Some of the key benefits and opportunities discussed throughout literature include greater collaboration and autonomy (Griffin & Minter, 2013; Raths, 2014; Tiakiwai & Tiakiwai, 2010; Levin & Schrum, 2013; Thomas & O'Bannon, 2013), the increased level of user comfort, satisfaction, motivation, engagement and productivity (Disterer & Kleiner, 2013), as well as the ability to create opportunities for flexible anywhere, anytime learning (Estable, 2013; Tiakiwai & Tiakiwai, 2010).

The enablers include stakeholder buy-in (Raths, 2014), building a consensus and culture of technology acceptance (Ward, 2013), and professional development and support for teachers (Tiakiwai & Tiakiwai, 2010; Raths, 2014).

Involving parents and other members of the wider school community in the decision to adopt, and to support, BYOD initiatives in schools is rated quite highly as “Most parents did not use a lot of computer-based technology when they were going to school” (Levin & Schrum, 2013; Raths, 2014). This is important as their perceptions may have an impact on the effective use of BYOD for learning.

#### **5.4 Tino Rangatiratanga me Ako Māori (Self-determination and Pedagogy)**

The potential for BYOD to help improve Māori student learning outcomes is encompassed by both the Kaupapa Māori principle of self-determination (Tino Rangatiratanga), which acknowledges sovereignty, autonomy, control, self-determination and independence, and the Ako Māori principle (or culturally preferred pedagogy) which relates to teaching and learning practices that may

not be traditionally derived but are preferred by Māori (Kaupapamaori.com, n.d.)

According to Te Maro, Higgins, & Averill (2007), “One way to shift thinking about building Māori potential and opportunities is to tailor personalised learning for individuals”. Consistent with this thinking is the suggestion that the most important benefit of BYOD is autonomy, as students are able to take advantage of the anywhere, anytime, when needed, convenience of personalised learning (Estable, 2013; Tiakiwai & Tiakiwai, 2010).

Sheehan & Nillas (2010) agree suggesting, “When students are primary users of technology, its use can lead to increased engagement and increased understanding. In particular, increased engagement results from technology making a lesson interesting, different, and fun for most students, which increases students’ motivation to participate”.

However, Song (2014) insists that “BYOD alone is not the full explanation for helping students learn, it is only when it is combined with inquiry-based pedagogy that it will have a positive impact on students’ knowledge advancement”. This supports the statement by Tiakiwai & Tiakiwai (2010) that suggests, “Effective teaching practices are critical to successfully incorporating e-learning in indigenous communities”.

### **5.5 Kia piki ake I nga raruraru o te kainga (Socio-economic mediation)**

The Kaupapa Māori principle of Socio-Economic Mediation describes the need to mediate and assist in the alleviation of negative pressures and disadvantages experienced by Māori communities (Kaupapamaori.com, n.d.).

Māori students, particularly those within lower socio economic communities, are faced with the challenge of limited access to computer equipment and unreliable working Internet connections at home. While this may be the case, research suggests that the number of students with mobile phones is increasing, therefore, for minorities and those with lower household income levels, their phone become an alternative, available source of Internet access at home (Griffin & Minter, 2013; Kim et al., 2012).

This is supported by Thomas & O'Bannon (2013), who suggests, “The BYOD model takes advantage of personal mobile devices to increase access while connecting students’ personal and academic learning”.

This makes them particularly useful for off-line learning through the use of social collaboration forums such as Facebook and Twitter, and can be used for maintaining student autonomy and learning place flexibility, allowing students to create, share and collaborate anywhere and at anytime (Estable, 2013; 21st Century Learning Reference Group, 2014).

Although the topic of BYOD in schools in an international setting is widely discussed, the literature highlights a distinct gap in academic literature on a national level, particularly on the link between digital technologies and their effectiveness for improving the educational achievement rates of Māori students in Aotearoa New Zealand.

Driven by these sparse findings, this study was undertaken with the intent to contribute to this knowledge gap by exploring the use of BYOD across different secondary school settings within Aotearoa New Zealand, and to identify what impact, if any, BYOD has on the learning outcomes of Māori students.

## **6. Analysis**

For years, a key concern for successive governments and policy makers has been to raise the achievement rates and educational outcomes of priority learners, particularly those among the indigenous population of Aotearoa New Zealand’s lower socioeconomic regions, which is crucial for providing them with opportunities in terms of further education, employment, health outcomes and a better quality of life (Education Review Office, 2010; Ministry of Education, 2012). Though some gains in improving the achievement rates of Māori students have been realised over recent times, there still remains “significant disparities in educational outcomes related to students’ socioeconomic status and ethnicity” (Madjar, McKinley, Jensen, & Van Der Merwe, 2009).

The Government's BPS NCEA Level 2 target, which focuses on increasing the proportion of Māori 18-year-olds with an NCEA Level 2 or equivalent qualification to 85% in 2017, marks the latest attempt by a government to address the social and economic disparity in Aotearoa New Zealand (Ministry of Education, 2012). Coupled with a strong global push towards future focused learning environments and the development of 21st century skills, the challenge today for all education stakeholders is to ensure that Māori students have the knowledge, skills and capabilities they need to participate effectively and safely as Māori in an increasingly digital world (21st Century Learning Reference Group, 2014) while also addressing the current inequities in educational outcomes.

Driven by an interest in possible solutions to address these concerns, as well as an identified gap in research and academic literature, this study was undertaken with a need to understand more clearly whether any potential link exists between the use of digital technologies in schools and an improvement in the achievement rates and educational outcomes of Māori learners.

However, the main goal of this study was not to explore how digital technologies in general impact on the learning outcomes of Māori students, but to focus specifically on one form of technology becoming more frequently adopted and supported by schools, BYOD, and to explore its use within different educational settings within Aotearoa New Zealand.

The intent was to understand from the perspectives of various key stakeholders (students, teachers and education sector officials), how BYOD is currently being used within these different learning environments, whether BYOD is perceived to be a tool that can assist to improve the learning outcomes of Māori students, and to identify some of the ways that schools are measuring the effectiveness of BYOD for Māori students learning.

For schools that are looking for opportunities to leverage digital technologies with the intent to boost the educational outcomes and skills of Māori learners, comes the need to identify the key perspectives and considerations relevant to them in their own local environment.

## **6.1 Research Methodology**

Derived from the Kaupapa Māori theory is several working principles designed specifically for the purposes of research. These working principles are intended to allow Māori to shape their own research processes and includes key considerations for actively undertaking Māori research.

For this reason, as a Māori researcher exploring an area of interest framed specifically around Māori people, knowledge, processes and issues, it was only appropriate that the research approach used for this particular study included that of the 'Kaupapa Māori' research principles.

## **6.2 Data collection method**

The Kaupapa Māori principle of cultural aspiration, or Taonga Tuku Iho, acknowledges Māori ways of knowing, doing and understanding the world (Kaupapamaori.com, n.d.). However, while digital technologies such as BYOD are seen to be blurring many of these customary ways of knowing and doing (Pihama & Gardiner, 2005), for Māori people, the traditional concept of 'kanohi ki te kanohi' or 'face to face' engagement (a values-based practice that facilitates the building of knowledge connections, relationships and trust) is still of relevance today.

With the intent to remain true to this practice came the decision to undertake a qualitative study, with the majority of data gathered by 'kanohi ki te kanohi' interaction; through exploratory interviews.

This method also appropriately encapsulates the Kaupapa Māori principle of Te Reo, which is integral to the way in which Māori communicate, how relationships are built and maintained, and offers an insight into the way Māori interact with the world (Smith, 1990).

## **6.3 The research setting**

Subsequent to gaining approval from Victoria University's Human Ethics committee, exploratory interviews were held between August and November 2015 with a range of participants from three key identified stakeholder groups.



The participants included two education sector officials, three students and three teachers from three distinct secondary providers<sup>2</sup>, each located within the North Island.

In regards to student participants, the initial intent was to interview a total of two students, however at one setting, two students preferred to participate together and shared or alternated their answers to each question. As a result, this study has instead collected data from the perspective of three student participants in total.

Participation was voluntary and participants were identified through established networks or nominated by senior members of staff within the different schools or organisations that agreed to participate. All but one of the interviews were held on site at each participant's workplace or school environment and ranged from 30 to 60 minutes in length. Due to time and scheduling constraints as well as difficulties in securing one remaining participant, the final interview was conducted by phone.

All participant groups were asked a range of tailored, semi-structured questions and all face-to-face interviews were audio recorded. As a result of an audio equipment failure during one interview, one participant was subsequently approached by email to repeat two of their answers, to ensure all responses were accurately captured.

Prior to the commencement of each interview, participants were offered the opportunity to review their transcripts upon completion, but all parties declined. However, the phone interview was transcribed during the conversation and repeated back to the participant to ensure accuracy.

The interviews were conducted in English, with several Māori words, references, sentences or phrases used throughout the interviews, particularly by those held with native Māori speakers. These particular interviews were

---

<sup>2</sup> Secondary providers included one Kura Kaupapa Māori, one Trades Academy and one English-medium school

transcribed as spoken, and only where considered necessary, have been translated by the researcher within the findings.

Data from face-to-face interviews was transcribed in order of the questions asked and the key emerging themes from all interviews were grouped into categories using both the key questions explored by the study, as well as the 'Realising Māori Potential' framework.

#### **6.4 Participants**

The student participant criteria included those of Māori descent, 16 to 18 years of age and in their senior year(s) of secondary education. The decision to include senior secondary school aged Māori students in this study was linked specifically to the BPS NCEA Level 2 target in which the number of 18-year-old Māori students achieving an NCEA qualification or equivalent is necessary for reaching 85% in 2017. The aim was to understand from the perspective of current students similar in age, whether the use of BYOD is perceived as a tool to help achieve this target.

The education sector stakeholders included government officials involved in any of the current key Māori education strategies or digital technology projects. Their perspectives were integral to understanding whether those involved in leading the education sector initiatives believe BYOD to be an effective tool for improving the educational outcomes of Māori learners and for reaching the BPS NCEA Level 2 target. Both participants were of Māori descent.

The teacher participants included one of each from a Trades Academy, a Kura Kaupapa Māori and an English-Medium school, with each having had BYOD in use for more than one year. Participants included one non-Māori and two of Māori descent.

The inclusion of participants within a full immersion and English mainstream school was to understand whether any key differences in perspectives exist in regards to the impact of BYOD on the learning outcomes of Māori students

within a fully Māori medium setting, to those within an English medium learning environment.

The combination of the BPS NCEA Level 2 target alongside various other education sector-led initiatives (such as Youth Guarantee and Fees free places) is progressively blurring the boundaries of the secondary learning environment. This means that education providers such as Trades Academies and Tertiary High Schools that offer a combination of alternative vocational educational pathways, are also tasked with ensuring that secondary school aged learners, whether semi or fully enrolled with their institutions, are endeavouring to meet the BPS target. For this reason, it was important to gain the perspective of participants within these learning institutions to obtain their opinions on the use of BYOD for increasing the achievement rates of Māori students.

The limited timeframe, the small participant sample size, and as a result, the inability to compare participants by ethnicity, gender and role, schools by location, type or decile ranking, and exclusion of the parent and whānau voice, were recognised as the main limitations of this study.

## **6.5 The technology**

The devices considered were guided by Alberta Education's (2012) description of BYOD for learning, "any devices personally owned by students and used in the classroom for the purposes of learning".

Based on this definition, this study included mobile phones, tablets, iPads and laptops that students personally owned, and specifically excluded any inference of devices that were purchased, owned or supplied by the school.

## **6.6 Findings**

The intent of this project was to understand from the perspectives of various key stakeholders (students, teachers and education sector officials), what impact, if any, does the use of digital technologies in schools have on the educational outcomes and achievement rates of Māori students.

Due to the limited sample size used for this study, and for ethical considerations, the research findings have been organised in a manner that reflects the researchers' responsibility to ensure the privacy of each of the individual participants and their associated institutions. For these reasons, there is no reference made in the following section, to the individuals, organisations or schools in which the research took place.

The findings are reported in two sections, firstly, the grouping of responses by the key questions explored by this study, that is, how BYOD is being used, whether it can help to raise the learning outcomes of Māori students, and how schools are measuring its effectiveness. Secondly, the use of the 'Realising Māori Potential' framework as outlined earlier in the study, has been used as a lens to further frame the findings. This examines stakeholder perspectives on the use of BYOD as a tool for building knowledge and skills, as a resource, and for strengthening leadership, decision-making and influence.

#### **6.6.1. Stakeholder perspectives on the use of BYOD for learning**

In order to gain an understanding of how BYOD is currently being used within different learning environments, participants were asked directly to describe some of the ways BYOD is being, has been, or in respect to the education sector officials, that they are aware of them being, utilised within schools.

##### **From the student perspective**

Although each student mentioned that they are only given limited opportunities during class time in which to use their devices, they described a variety of ways that BYOD is currently being utilised to support the teaching and learning practices within their individual schools. Some of the examples they provided included:

- researching material relevant to the course task,
- online searches for inspiration,
- taking photographs as visual evidence for assessments. The photographs are either sent by email from the device directly to the teacher, to the printer for printing, or posted online in collaborative forum such as 'Facebook' or 'Google Classroom',

- classroom 'selfie' challenges,
- Subject specific quizzes designed by the teacher using 'Kahoot'
- the use of the built-in calculator to solve mathematical problems,
- to communicate with the teacher outside of normal school hours in respect to an assignment.

One student acknowledged the advantages of BYOD enabled environments, commenting on how it is enhancing the way they can learn or revise their own language and engage with their customary knowledge and practices:

*"We use language perfect where students can go on and practice the languages they're learning, there are four different ways to use that, like practicing vocabulary you've already learnt"*

#### **From the teachers' perspective**

All three teachers described how the use of BYOD in their school is limited. For two of the schools it was apparent that as the use of BYOD was still relatively new (being the second year for both since adoption), that BYOD is not yet well understood and as a result, is not adequately utilized within these learning environments. This has had an impact on the effective use of BYOD for learning within these classrooms:

*"I don't really use it a lot and I don't think I use it enough"*

*"the thing with that is initially we had a few parents and even some kaiako (teachers) who were a bit iffy"*

Though for one of the teachers this was due to different reasons:

*"Some workshops no, they're not allowed cell phones in the mechanical, or actually I think it's just the mechanical workshop but that's a safety rule"*

However, all participants acknowledged that when it is used, the main purposes are for Internet searches and researching, for collaborative tasks, information sharing and to increase student engagement:

*“our kids really favour Google, Google classroom and all of those different apps so it just means if we’re doing something or if I’ve written something in Google docs I can then share it to them”*

*“in class really a lot is to do with whakapapa (genealogy), because some of them don’t know, so basically they use their devices to find their awa (river), maunga (mountain), their marae and meanings of words”*

*“they have their phones with their music on when they’re working and they’re really engaged and that’s how they work... They all have different learning styles”*

#### **From the education sector officials’ perspective**

Although it is acknowledged by education sector officials that BYOD is being used for purposes such as playing games, for sending emails, for research and shared learning, also consistent with the teachers’ perspectives is the opinion that the use of BYOD for learning in Aotearoa New Zealand secondary schools is still very much in its infancy:

*“The use of devices is fairly new in the secondary sector for meaningful learning. It’s too new. There’s no strong connection yet between the use of devices in teaching and learning”*

#### **6.6.2. Stakeholder perspectives on the use of BYOD as a tool for improving the educational outcomes of Māori students**

All participants’ responses were generally positive when asked for their perspective on whether BYOD has the potential to assist with boosting the educational achievement rates of Māori students. Though many identified key considerations that first need to be addressed, all agreed that it could in fact be a useful or successful tool for learning.

### **From the student perspective**

The students' agreed that BYOD could help to raise the learning outcomes of Māori students, though each drew on personal experiences where, either they themselves or their fellow students were misusing their devices by using them in the classroom for purposes other than learning. The students offered suggestions or solutions as to how this may be addressed so that BYOD may instead be used more effectively:

*"I know some girls come to school and just use them for snapchat and then others come and actually genuinely work. You can block them and then it means that kids won't be going on to use it for the social things they try to use them for because then they won't have a way to do that"*

*"I think it's good if you use it properly and if it's like monitored otherwise it can become a distraction to your learning and then you'll come off task"*

### **From the teachers' perspective**

The teachers were unanimous in their belief that BYOD can help to lift the educational achievement rates of Māori students. Additionally, they each admitted how much more engaged their students are, and because they are more tech savvy and skilled in using the devices than the teachers, particularly in terms of finding the information they need, and on demand, teachers are often playing catch up with the student:

*"Yes anything that's engaging. So if it's a blog, if it's anything where they're involved, whatever the platform, if it's engaging it's going to lift achievement"*

*"I think that they do help, reason being because of the information they can get on demand...they can link into their runanga, their parents, whakapapa. It opens up a whole lot of stuff for them"*

*"Yes I do, I think it can I've seen my own students in terms of the engagement pick up...I think that anything that gets our kids turned on can only be good"*

*“I had one student who told me yesterday about an app he’s got monitoring his sleep and it shows him how long he sleeps for and what type of sleep he’s had... They know what’s out there and they know how to use it and at the back of my mind with my teacher hat on ...he’s doing it, so it’s me playing catch up with him”*

### **From the education sector officials’ perspective**

Although both participants’ responses leaned towards the affirmative, the education sector officials perceived that success is not attributed to the tool alone:

*“to me a device is a tool, and that I could get achievement raised without a device, so then what’s the defining factor? And to me it is the thing that sits in the middle about what you do on a device, and what you do in a classroom”*

*“Yes, in the same way that BYOD in schools can help to raise the student learning outcomes of all students - through access to a broader range of pedagogically sound teaching and learning tools and practices. Māori people in general do well in shared learning situations and BYOD enables access to these environments”*

### **6.6.3. Stakeholder perspectives on measuring the effectiveness of BYOD for Māori students’ learning**

Participants were directly asked to describe some of the ways in which schools are measuring the effectiveness of BYOD for Māori students’ learning. The findings clearly revealed that none of the participating schools have formal processes in place for measuring these outcomes. This may again be explained by BYOD being so new within these schools, but it seems to highlight the need for schools to be more adequately supported with mechanisms for assessing the effectiveness of BYOD in their own learning environments.

### **From the student perspective**



The students were not aware of any specific measurements that teachers were using to assess the effectiveness of BYOD for their learning, but instead perceived the evidence of task completion to be a possible form of assessment:

*“Um, when we take the photos for like our portfolios? Yep, they can see what we’ve been doing, so I dunno, they can use that”*

*“We email our work to our teachers. Also some websites that we go on, our revision scores get emailed to our teachers”*

### **From the teacher perspective**

One teacher confirmed that they were aware of the need to devise a strategy for measuring the effectiveness of BYOD in the classroom and hoped to address this in the near future, with the others implying they had not considered it. As a result, and similar to the students’ perspectives, each of the teachers instead referred to anecdotal examples as evidence:

*“that’s one thing that we’re still trying... to be honest we haven’t actually sat down to date and just had a hui just about that so we know the issues to deal with...it’s still really looking at ‘okay, so how are our kids?’”*

*“If you look at their attendance and punctuality so if they’re here on time and ready to go that’s a good indicator that they want to be here. Course completion, talking to the students. You get really honest answers from students this age”*

*“That’s a good question. I think it’s just the information that they’re using and getting from the device is essential for their learning...to measure it, I’m just measuring how they use it, that’s all I can say”*

### **From the education sector officials’ perspective**

The education sector officials again expressed an aligned but completely different perspective to those of the teachers and students, providing a possible explanation as to why schools may not have any formal

measurements in place, or any support currently provided by agencies with the education sector:

*“Success is achievement stats showing how kids are performing such as national standards - not the mode of learning”*

*“No different. Comes down to teaching and learning, not the tool”*

#### **6.6.4. Stakeholder perspectives on the use of BYOD as a tool for building knowledge and skills**

To understand how BYOD is viewed as a tool for building knowledge and skills, participants were asked questions that focussed on the benefits, disadvantages and difficulties they perceive as being key to BYOD either helping or impeding in the improvement of Māori learning outcomes. Participants were asked to compare these perspectives with traditional forms of instruction such as paper-based and textbook learning.

##### **From the student perspective**

The benefits identified by the students relate to the ability to share information, as well as the convenience of, and accessibility to, information using BYOD:

*“There is a lot more material to go off rather than having one piece of information”*

*“If you’re using it correctly and not going on Facebook and stuff then yeah there are heaps of benefits. But you can take photos and take it home and show your parents”*

The students identified a key barrier as being the school restrictions on their devices that prevent them from completing a task, though they clearly demonstrated that they have the required skills to work around this barrier.

*“Sometimes work gets lost and we lose websites or sometimes things are restricted and we need to find other ways to do work. But with paperwork usually it gets recovered”*

*“If we didn’t have it we wouldn’t be able to take the photos we need for evidence, but it’s not that big of a problem, we’d find a different way so it’s not that much of a problem”*

Another noteworthy comment is the perception that students are unable to approach adults for support with their devices due to a lack of understanding on their (the adults) part:

*“Adults ask you for help. You can’t go to them for help with devices”*

### **From the teacher perspective**

The teachers each touch on some of the key benefits of BYOD relating to on demand access to information, the transparency, capability and ease of sharing information, and the potential for students to think outside the square:

*“I can just hook my computer into the touch screen and then they can see the mahi I’m doing if they’ve got their own tablets”*

*“You can’t tailor and you can’t adapt paper learning...you can put YouTube clips up and other options where they can look at and develop their thinking”*

*“I think the devices are good because students have them in the classroom and can access them straight away...I would say we’re going to start researching a person and they may use it to look up their research and find out the info about them”*

*“I find that because the kids are on their own devices...well they’ve started to go into actually reading and looking at other areas not just for the purpose of what they’re doing”*

In regards to the difficulties and disadvantages, one teacher could not think of a good reason in which BYOD impeded the development of their students’ knowledge and skills. The others touched on the misuse of devices by students that veer off task and use them for purposes other than learning. For both of these teachers they felt that as a result, they needed to control and monitor student usage more closely:

*“I think BYODs good but I have to constantly watch what they’re doing to make sure they’re on task”*

*“the Social media use and for me I was surprised, I looked at one student on and Facebook and he had 56 friends that were all online at the same time and they were all messaging each other”*

*“I haven’t seen too many difficulties with it, if anything it’s helped my kids”*

### **From the education sector official perspective**

Both participants described the benefits of BYOD for developing knowledge and skills, such as the autonomy and portability it provides, and the way in which BYOD facilitates the development of individualized learning platforms and transferable skills:

*“Mobility is helpful... It means that kids are not hampered by industrial learning. It provides more individualised learning pathways”*

*“Having those critical thinking skills that will enable them to pick up anything and say to themselves, “you know ok I need to be able to do this” and then they can go ahead and do it”*

*“Probably access to more information, easy access to more information”*

In respect to the disadvantage and difficulties, the responses were varied but touched on some of the key issues that may hinder students’ access to knowledge and skill development, such as unreliable networks and Internet connections and the need for teachers to rethink their teaching and learning programmes.

In addition, aligned with the teachers’ perspectives is the opinion that BYOD enables quick and easy access to information. However, both education sector officials commented on the risk that information might be obtained from unreliable sources, highlighting the need to ensure students are appropriately equipped with skills necessary to overcome this:

*“A difficulty has got to be access for Māori particularly because a lot of our kura are rural ... this doesn’t necessarily mean that they will have the*

*capability to be able to access some of the resources that will be available through that ultra-fast broadband and really robust networks”*

*“I would say that teachers are challenged because it really is a matter of having to think about innovating”*

*“Firewalling, censoring, safety, and this other one that’s around students learning - how to critically analyse a source that’s on the Internet to know that it has credibility and assurance for them”*

#### **6.6.5. Stakeholder perspectives on the use of BYOD as a resource**

With the intent to understand the key drivers behind a schools decision to adopt BYOD for learning, participants were asked what they knew about, or why they thought schools are making the decision to choose BYOD over other possible IT solutions such as school supplied devices. The participants supplied multiple reasons such as cost, the need to move with the times, unavailability of school technology, unreliable school networks and one indicating that the actual decision was in response to the students’ suggestion.

##### **From the student perspective**

In the students’ schools, BYOD is not used exclusively so the perspectives expressed by the students focused on the challenges surrounding access to school technology, as well as the level of comfort that using BYOD provides.

*“I think, because a lot of classes try to book the school supplied laptops at the same time they decided it would be easier to have their devices at hand”*

*“I prefer using my own device because like it’s kinda nice having your own phone...If I had a school device I’d be too scared I’d break it”*

##### **From the teacher perspective**

The teachers’ perspectives are completely diverse, demonstrating the various individual drivers behind each of their schools decisions to adopt BYOD within their own learning environments:

*“Keeping up with technology and moving students into that way of using digital technology to keep up with the rest of the world”*

*“You use what you’ve got to the best of what you’ve got”*

*“We started having [connection] issues and that’s when our kids were “oh koka can I just bring my tablet in and use it” ‘hmmm okay we’ll think about that’. So that’s where the whakaaro (thought) came from”*

### **From the education sector official perspective**

Similar to the teacher perspectives, the reasoning behind the schools decision to adopt BYOD over other IT solutions is varied for sector officials:

*“Probably cost I would say. The cost of the devices”*

*“I think it’s because devices allow an amount of individuality, as to where they [students] can bring an iPad or tablet or whatever”*

### **6.6.6. Stakeholder perspectives on the use of BYOD for the strengthening of leadership and decision-making and influence**

To understand whether behaviors, opinions, beliefs, attitudes or perceptions have any influence on the effective use of BYOD for improving Māori student learning outcomes, participants were asked what they perceive the key barriers and enablers to be, and to explain the changes they have noticed in schools as a result of BYOD being introduced.

Due to the large volume of information collected in relation to these questions, the data has been grouped into the top five perspectives of all participants, as demonstrated in table 1.

Participants were also asked to describe some of the ways they believe external influences, such as parents, whānau, hāpu, iwi, education agencies or the government, could assist with BYOD in respect to Māori students learning.

### **From the student perspective**

The students perceived schools and parents to be the key influences behind the effective use of BYOD for improving Māori student learning outcomes:

*“Schools need to find ways to make the learning interesting for the students with more hands on activities and visual things and incorporating the language, the Māori language, into their teachings”*

*“I reckon parents, like our Māori parents need to be a lot harder on us...encouraging me more and discipline me more like confiscate my phone if I'm not doing my work”*

### **From the teacher perspective**

The teachers perceived that the key influences are all external to the school, believing that support with BYOD for Māori students learning is required from parents, whānau, hāpu, iwi, education sector agencies and the government:

*“Parents understanding...Parents just support them because it's the thing to have, but they should be buying them for the education purposes...Kids have been brought up with it. Parents just don't know”*

*“Need a community approach to it because there's little knowledge and monitoring. As affordability is an issue, better access to devices and resources through hapu and iwi”*

*“Reliable networks, better access to devices and resources through the government - There are a number of students that cannot afford devices, I suppose that's one way that the Ministry of Education could support low-income families who struggle to get them, the Ministry could help fund them”*

### **From the education sector official perspective**

The education sector officials perceive the key influences to be a shared responsibility with schools, parents, whānau, hāpu, iwi, education agencies and government, each having a part to play in ensuring the effective use of BYOD as a tool for Māori students' learning:

*“Teachers have to become facilitators and sit back”*

*“Parents, whānau & iwi need to be moving with it, not intervening”*

*“[Government and education agencies] need to ensure equitable access to technology, devices and networks and support so smaller, rural and poorer communities are not disadvantaged”*

*“There is also something in here about capability - making sure Māori students have the skills to be able to use the technologies”*

**Table 1: The top five key barriers, enablers and changes occurring in schools relating to the use of BYOD for learning, based on the perspective of key stakeholders**

<b>Barriers</b>	<b>Student</b>	<b>Teacher</b>	<b>Education sector officials</b>
Affordability and access to a device	x x	x x x	x x
Teachers (knowledge, age and control)	x	x	x x
Teaching and learning practices		x x	
Support at home	x	x	
Device support	x		
<b>Enablers</b>	<b>Student</b>	<b>Teacher</b>	<b>Education sector officials</b>
Teacher training and professional development		x x x	
Teaching and learning practices	x	x	x
Communities and leaders		x	x
Teacher support		x x	
Student support	x		
<b>Changes occurring in schools</b>	<b>Student</b>	<b>Teacher</b>	<b>Education sector officials</b>
Increased student engagement and attitudes	x	x x	x
Innovative teaching and learning practices		x	x x
Higher levels of collaboration		x x x	
Increased student dependency on devices	x	x x	
Flexibility and independence for students with learning and communication difficulties		x x	



Note: Participants corresponding answers are each represented by an 'x' and some participants offered opinions on more than one category. Table 1 demonstrates both individual and shared perspectives.

## **7. Recommendations**

This study has identified that stakeholders perceive BYOD to be an effective tool for helping to raise the learning outcomes of Māori students in New Zealand secondary schools.

Also apparent from these findings is the consistency between the perspectives of stakeholders involved in this present study, with many of the international perspectives on the effectiveness for BYOD for learning as discussed in the literature review. These include the benefit of autonomy, as students are able to take advantage of the anywhere, anytime, when needed, convenience of personalised learning, an increase in engagement and understanding which increases students' motivation to participate, and the challenge of limited access to devices and unreliable working Internet connections at home.

However, the data from this current study does highlight that as BYOD is a relatively new technological approach within secondary schools, there are some aspects of BYOD not yet considered by key stakeholders, which may ultimately impact on these technologies being used effectively as a mechanism for improving the learning outcomes of Māori students.

Based on the current findings, particularly in respect to the key barriers and enablers identified in this study, this report makes several recommendations that are intended to inform and assist concerned stakeholders across the wider education sector, in developing strategies to address each of the components that fall within their area of interest and control.

### **7.1. Improving access to, and support with devices for Māori students**

Despite what recent statistics suggest, stakeholders were unanimous in their perspective that a key barrier preventing effective use of BYOD for improving

the educational outcomes of Māori learners, is due to not having access to, or being able to afford a device.

Māori students, particularly those from low-income households, are still at an obvious disadvantage due the lack of resources, which leaves many students uncomfortable and embarrassed by it:

*“You have some that come in with no devices and they feel whakama (embarrassed) so they have to ask if they can use a school computer”*

This validates the obligation to ensure equitable access to devices for Māori students, and supports the recommendation made in the 21<sup>st</sup> Century Learning Reference Group report, of the responsibility to ensure “all learners, regardless of location, background, abilities or socioeconomic status, must have access to suitable digital technologies”

Prolonging or establishing initiatives, such as 2020 Communication Trust’s ‘Computers in Homes’ project, in which computers, internet connections, training and support is offered for families with school age children in low decile schools, will partially address this issue. However, as this study has shown, this concern is not simply isolated to schools with low decile rankings, but spans across various schools and provider types, demonstrating the necessity to ensure the needs of all Māori students are met, regardless of decile, provider type or location.

Quite relevant, however, are the comments made by student participants indicating that they would rather not use a device owned and supplied by the school, but instead prefer the comfort and familiarity that goes with being able to use a personally owned device for learning.

For parents and whānau that cannot afford to purchase a device outright, schools could assist by securing devices on behalf of families, then offer affordable repayment plans to help them work towards owning their child’s device. This is a similar initiative to that of the ‘Manaiakalani programme’.

Not only would this allow schools to specify a range of preferred device types to be used for learning, thus making it easier for the school to provide support, it would also alleviate the concern raised by one of the student participants, about borrowing a school owned device and causing damage.

## **7.2. More targeted support for teachers and students and enhancing teaching and learning practices**

There was a high level of confidence demonstrated, particularly by adult participants, that students that do own personal devices, know how to use them. However, it was mentioned on several occasions that students do not always use them appropriately, or have the necessary skills to identify the difference between valid and disreputable sources of information.

This demonstrates a need to foster more digital citizenship and digital awareness strategies into school teaching and learning programmes, to develop students' skills and judgement on the appropriate use of their devices and online materials. This will be particularly important for students looking to move into further studies within tertiary education learning environments, in which a strict component of academic essay and report writing is the appropriate citation and referencing of reputable literature.

Students and teachers also raised concerns about a lack of support in regards to the use of devices for learning, resulting in teachers thinking usage needs to be closely controlled and monitored, students feeling unsupported by adults and the need for teachers to deliver more innovative teaching and learning practices within the classroom. While teachers and educators agreed, they also discussed the need for teachers to become facilitators rather than instructors, and acknowledged that a shift away from traditional methods of instruction will require a complete mind-shift for most.

Each of these points highlight the need to establish more support networks, or develop awareness about existing networks, that both teachers and students are able to tap into.

The 'Investing in Educational Success' initiative will address part of this issue, by enabling schools and kura to come together as 'Communities of Learning' to support each other and share teaching and learning best practices with the intent to raise achievement for children and young people. However, as it is an 'opt-in' initiative, this means some schools may choose not to take part, or some schools may be constrained, such as not having the time to participate, therefore not all schools will benefit.

Also, it is a forum intended for teachers to discuss and share information and excludes a direct student voice, when they too require the opportunity to be heard and to feel supported.

Expanding on the 'Communities of Learning' forum to incorporate a student audience, or creating more awareness within schools of other existing collaborative platforms, such as Pond (which enables teachers, school administrators and students to collaborate and share knowledge and experiences) may help to address these issues, and provide teachers and students with the support they require.

### **7.3. Professional development and training opportunities for teachers**

Several participants identified teacher knowledge to be a key barrier to the effective use of BYOD for learning. Interestingly, all teachers believed a key enabler to be through their own training and professional development.

However, this led into other issues including time for teachers to undertake training (due to workload), and the location of training (with many being hosted in other regions). One participant commented on training sessions only being useful when the learning is applied in practice soon after, otherwise the information is soon forgotten.

Also apparent from the findings was an obvious difference in skill and knowledge levels of each teacher participant. Some described the active use of collaborative platforms in the classroom, such as Google docs to share information, others felt BYOD affected the delivery of their teaching and learning programmes as they are unable to plug USBs into student devices.

The difference in skill levels had an obvious impact on the use of BYOD within these classrooms.

This supports the need to provide more regular training opportunities for teachers, however, due to the variation in knowledge and skill levels, these sessions need to ensure to avoid a 'one-size-fits-all' approach.

In addition, making use of collaborative forums, such as those described earlier, will enable teachers to access information on demand, as and when they require it, and will ensure the information is current, relevant and able to be applied in context.

#### **7.4. Devising strategies to measure effectiveness**

The findings clearly revealed that none of the participating schools have formal processes in place for measuring the effectiveness of BYOD for Māori students learning.

As suggested earlier, this may be explained by BYOD being so new within these schools that they have not yet had the opportunity to formulate appropriate strategies, however, it may also mean that schools need to be more adequately supported with mechanisms for assessing the effectiveness of BYOD in their own learning environments.

Using the online collaborative forums may help schools to gain an understanding of best practices being used across the sector and help schools to devise their own strategies for measuring effectiveness.

For schools that may be looking for more innovative ways to measure learner outcomes, utilizing online forums and designing assessments that require students to initiate discussions, or comment on blog posts, or tasks that require a video or YouTube clip as outputs, may be alternative options. This would address the concern raised by one student, about teachers needing to offer more innovative learning programmes, and would also align with the future focused worldview.

## **7.5. Educating whānau and the community**

Coupled with the need to improve Māori student access to devices is the responsibility to ensure students are equipped to use them appropriately.

Many felt that this support needs to come from parents, whānau and the wider school community, however, participants noted that, as parents and whānau are not as technologically savvy as students, that they do not have the capability to offer the required support. This highlights the need to ensure members of the wider school community are also educated on the use of BYOD for learning.

This may be achieved through initiatives such as targeted workshops and training sessions for parents, whānau and communities that could either be student, teacher or sector-led; through the maintenance and upgrade of school websites, with more interactive online tools for parents to experience what their children are learning in schools; or by creating an awareness of collaborative forums such as Pond; any of which may be used by parents, whānau or the community to support children and young people with the use of their devices for learning at home.

## **8. Conclusion**

This study explored the use of BYOD across different secondary school settings in Aotearoa New Zealand. The aim was to gain an understanding from the perspective of various key stakeholders, what impact, if any, they perceive these tools to have on Māori student learning, and whether any potential link exists between the use of digital technologies in schools and an improvement in Māori student educational outcomes.

The findings from this study have revealed that as BYOD is a relatively new technological approach within Aotearoa New Zealand secondary schools, there are some aspects of BYOD not yet considered by key stakeholders, which impacts on these technologies being used effectively as a mechanism for improving the learning outcomes of Māori students.

Based on these findings, this report makes several recommendations intended to inform and assist concerned stakeholders across the wider education sector, in developing strategies to address each of the components that fall within their area of interest and control.

For secondary schools that may be exploring ways to leverage digital technologies with the intent to boost the educational outcomes of Māori learners, it is important to understand, in a local context, what difference digital technologies such as BYOD, may ultimately mean to Māori student achievement.

## **9. Bibliography**

21st Century Learning Reference Group. (2014). Future-focused learning in connected communities.

Alberta Education. (2012). Bring your own device; A guide for schools. Alberta, Canada.

Ally, M., & Prieto-Blazquez, J. (2014). What is the future of mobile learning in education. *RUSC: Universities and Knowledge Society Journal* , 11 (1), 142-151.

Avery, B. (2013). Free the digital natives. *Communications of the ACM* , 56 (12), 8.

Disterer, G., & Kleiner, C. (2013). BYOD bring your own device. *Procedia Technology* , 9, 43-53.

Education Review Office. (2010 5-May). *Promoting success for Maori students: Schools' progress 2010*. Retrieved 2015 21-April from Education Review Office: <http://www.ero.govt.nz/National-Reports/Promoting-Success-for-Maori-Students-Schools-Progress-June-2010/Overview>

Estable, M. (2013). A review of considerations for BYOD m-learning design. *Distance Learning* , 10 (3), 21-26.

- Griffin, J., & Minter, D. (2013). The rise of the online writing classroom: reflecting on the material conditions of college composition teaching. *National Council of Teachers of English* , 65 (1), 140-161.
- Handal, B., MacNish, J., & Petocz, P. (2013). Adopting mobile learning in tertiary environments: instructional, curricular and organizational matters. *Education Sciences* , 3, 359-374.
- Harris, C. (2012). Going mobile. *School Library Journal* , January (2012), 14.
- Hopkins, N., Sylvester, A., & Tate, M. (2013). *Motivations for BYOD: An investigation of the contents of a 21st century school bag*. Retrieved November 2, 2015, from <http://www.staff.science.uu.nl/~vlaan107/ecis/files/ECIS2013-0890-paper.pdf>
- Hubye, N. E., & Elsener, A. A. (2013). To move forward, we must be mobile: practical uses of mobile technology in literacy education courses. *Journal of Digital Learning in Teacher Education* , 30 (2), 46-51.
- Johnson, D. (2012 October). On board with BYOD. *Educational Leadership* , 84-85.
- Johnston, K. (2015 4-November). *Education investigation: The great divide*. Retrieved 2015 5-November from The New Zealand Herald: <http://www.nzherald.co.nz/news/print.cfm?objectid=11539592>
- Kaupapamaori.com. (n.d.). *Principles of Kaupapa Maori*. Retrieved August 15, 2015, from Rangahau: <http://rangahau.co.nz/research-idea/27/>
- Kaye, N. (2013 10-April). *Government responds on digital literacy*. Retrieved 2015 20-April from Beehive.govt.nz: <http://www.beehive.govt.nz/release/government-responds-digital-literacy>
- Kim, P., Buckner, E., Kim, H., Makany, T., & Taleja, N. (2012). A comparative analysis of a game-based mobile learning model in low-socioeconomic



communities of India. *International Journal of Educational Development* , 32 (2012), 329-340.

Kim, P., Miranda, T., & Olaciregui, C. (2008). Pocket school: Exploring mobile technology as a sustainable literacy education option for underserved indigenous children in Latin America. *International Journal of Educational Development* , 28 (2008), 435-445.

Levin, B. B., & Schrum, L. (2013). Using systems thinking to leverage technology for school improvement: Lessons learned from award-winning secondary schools/districts. *Journal of Research on Technology in Education* , 46 (1), 29-51.

Madjar, I., McKinley, E., Jensen, S., & Van Der Merwe, A. (2009). *Towards University: Navigating NCEA course choices in low-mid decile schools*. University of Auckland, Starpath Project.

Marcoux, E. (2014). Reading & cheating & technology. *Teacher Librarian* , 41 (5), 69.

McGuinness, D. (2012). The digital education revolution: 4 years on: has it changed the fundamentals of schooling? *Summer* (2012-2013), 4-7.

Ministry of Education. (2012). *Delivering better public services - Boosting skills and employment by increasing education achievement for young people*. Wellington.

Ministry of Education. (2012 August). *Increasing education achievement for young people*. Retrieved 2015 20-April from Ministry of Education: <http://www.education.govt.nz/assets/Documents/Ministry/BPS/BPSYoungPeopleWEB.pdf>

Ministry of Education. (2013). *Statement of Intent 2013-2018*. New Zealand Government, Ministry of Education.

Nelson, D. (2012). BYOD an opportunity schools cannot afford to miss. *Internet@Schools* , November/December (2012), 12-15.

- New Zealand Government. (2011, September 13). *Maori economic strategy to be developed*. Retrieved June 22, 2015, from <http://www.beehive.govt.nz/release/maori-economic-strategy-be-developed>
- New Zealand Qualifications Authority. (n.d.). *Where are we going?* Retrieved 2015 15-August from NZQA: <http://www.nzqa.govt.nz/about-us/innovation-at-nzqa/>
- Pihama, L., & Gardiner, D. (2005). *Building baseline data on Maori, whanau development and Maori realising their potential*. Te Puni Kokiri, International Research Institute. Auckland UniServices Limited.
- Raths, D. (2014 October). Ways CTOs can impact the classroom. *The Education Digest* , 22-27.
- Ray, M. (2013). BYOD. *School Library Journal* , 59 (4).
- Research New Zealand. (2014). *Digital technologies in New Zealand schools - 2014 report*.
- Sheehan, M., & Nillas, L. (2010). Technology integration in secondary mathematics classrooms: Effect on students' understanding. *Journal of Technology Integration in the Classroom* , 2 (3), 67-83.
- Shuttleworth, K. (2013 18-July). *Schools fail to meet ambitious government targets*. Retrieved 2015 21-April from The New Zealand Herald: [http://www.nzherald.co.nz/nz/news/article.cfm?c\\_id=1&objectid=10899904](http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10899904)
- Skillen, S. (2012). What's normal in schools today? *Quick No. 123* , Summer (2012-2013), 9-11.
- Smith, G. H. (1990). Research issues related to Maori education. *NZARE Special Interest Conference*. Massey University.
- Song, Y. (2014). "Bring Your Own Device" (BYOD) for seamless science inquiry in a primary school. *Computers & Education* , 74, 50-60.

- Statistics New Zealand. (2006). *Household use of information and communication technology*. Retrieved August 20, 2015, from <http://www.stats.govt.nz/~media/Statistics/Browse%20for%20stats/HouseholdUseofICT/HOTP06/householduseofict2006hotp.pdf>
- Te Maro, P., Higgins, J., & Averill, R. (2007). *Creating strong achievement gains for Maori students in english-medium mathematics classrooms*. Te Poutama Tau Evaluation Report. Wellington: Ministry of Education.
- Te Puni Kokiri. (2014). *Effectiveness for Maori measurement and reporting framework: A resource for state sector agencies*. New Zealand Government, Te Puni Kokiri.
- Tech Learning. (2014 September). *The realities of BYOD*. Retrieved 2015 14-April from BIG IDEAS: [www.techlearning.com/September14](http://www.techlearning.com/September14)
- Thomas, K., & O'Bannon, B. (2013). Cell phones in the classroom: Preservice teachers' perceptions. *Journal of Digital Learning in Teacher Education*, 30 (1), 11-20.
- Tiakiwai, S.-J., & Tiakiwai, H. (2010). *A literature review focused on virtual learning environments (VLEs) and e-learning in the context of te reo maori and kaupapa maori education*. Kiore Enterprises Ltd.
- Traxler, J. (2009). Current state of mobile learning. In M. Ally, *Mobile learning: Transforming the delivery of education and training* (pp. 247-264). Edmonton, Alberta, Canada: Athabasca University Press.
- Ward, L. (2013). *National Education Network (NEN) trial extension*. Evaluation, Ministry of Education.
- Wood, David. (2003). *THINK AGAIN: Hindsight, insight and foresight on ICT in schools*. European Schoolnet.

## **10. Appendix One**

### **Interview Questions – All participants**

#### **Teachers**

1. Can you please describe some of the ways that your school utilizes BYOD for learning?
2. What do you think are some of the benefits of using BYOD for Maori students learning as opposed to more traditional techniques such as paper-based methods?
3. Similarly, what are some of the disadvantages or difficulties you have encountered - particularly if you were to compare BYOD vs. textbook/paper-based learning?
4. In your experience, what are some of the key barriers and enablers relating to the effective use of BYOD for Maori students' learning?
5. Why do you think your school chose to implement BYOD over other digital technology solutions such as a school supplied/supported device?
6. In what ways does your school measure the effectiveness of BYOD for Maori students learning?
7. What are some of main changes you have noticed in your school as a result of BYOD being introduced? (attitudes/behavior's/cultures)
8. Is there anything else you can think of that your school/whanau/hapu/iwi/education agencies/the government should do, or need to change, that will assist Maori students in regards to BYOD for learning?
9. Finally, do you personally think that the use of BYOD in schools can help to raise Maori student learning outcomes? If so, how?

#### **Students**

1. Can you please describe some of the ways that you use BYOD for learning at your school?
2. What do you think are some of the benefits of using BYOD for your learning as opposed to more traditional techniques such as paper-based methods?
3. Similarly, what are some of the disadvantages or difficulties you have encountered - particularly if you were to compare BYOD vs. textbook/paper-based learning?
4. What do you believe are some of the key barriers and enablers relating to the effective use of BYOD for your learning?
5. Why do you think your school chose to implement BYOD over other digital technology solutions such as a school supplied/supported device?

6. In what ways does your school measure the effectiveness of BYOD for your learning?

7. What are some of main changes you have noticed in your school as a result of BYOD being introduced? (attitudes/behavior's/cultures)

8. Is there anything else you can think of that your school/whanau/hapu/iwi/education agencies/the government should do, or need to change, that will assist Maori students in regards to BYOD for learning?

9. Finally, do you personally think that the use of BYOD in schools can help to raise Maori student learning outcomes? If so, how?

### **Education Sector Officials**

1. Can you please describe some of the ways that you are aware of, as to how schools are using BYOD for learning?

2. What do you think are some of the benefits of using BYOD for Maori students learning as opposed to more traditional techniques such as paper-based methods?

3. Similarly, what are some of the disadvantages or difficulties you have encountered or heard of - particularly if you were to compare BYOD vs. textbook/paper-based learning?

4. In your experience, what are some of the key barriers and enablers relating to the effective use of BYOD for Maori students' learning?

5. Why do you think schools choose to implement BYOD over other digital technology solutions such as a school supplied/supported device?

6. How are schools measuring the effectiveness of BYOD for Maori students learning?

7. What do you think are some of main changes occurring within schools as a result of BYOD being introduced? (attitudes/behavior's/cultures)

8. Is there anything else you can think of that schools/whanau/hapu/iwi/education agencies/the government should do, or need to change, that will assist Maori students in regards to BYOD for learning?

9. Finally, do you personally think that the use of BYOD in schools can help to raise Maori student learning outcomes? If so, how?