Exploring e-learning in New Zealand’s Regional Health Schools.

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ABSTRACT

This research is situated in the New Zealand (NZ) Regional Health School (RHS) service, comprising the Northern Health School, Central, and Southern Regional Health Schools. Use of e-learning is explored in this specialized area of the NZ education sector.

RHS teachers’ practice of teaching chronically unwell students in a variety of locations is described, and challenges to student and teacher participation in e-learning identified. Challenges relate to four key factors of student illness, student location, managing student learning needs, and the relative isolation of the teacher. It is argued the situation of isolation for both students and teachers defines RHS as a remote community.

In exploring RHS teachers’ perceptions of e-learning use with their students, the potential for improved learning, teaching and communication opportunities in RHS is examined. The vital role of participation, and participation with others, is identified for both student and teacher. With reduced access to a traditional school, e-learning provides an opportunity for RHS students to extend their learning outside of their home or residential health setting.

Engagement in e-learning on their own, and with others, has the potential to reduce the effects of isolation within the remote setting. Teachers also have the opportunity to extend their learning outside of their sometimes isolated work environments. The affordances of e-learning for RHS teachers include the ability to improve contact and share practice with others.

Progressing e-learning within RHS is an aim of this research, mirroring a trend across the education sector. Recounting examples of teachers’ practice and perceptions may assist in motivating others to reflect on the benefits and challenges of their own use of e-learning. Enhanced methods of support and professional development for RHS teachers in e-learning will benefit teachers and students in RHS and other remote settings.
DEDICATION

To my father Allan Buchanan, a great writer who would have appreciated the same opportunity for tertiary education that he encouraged for me.
ACKNOWLEDGMENTS

I wish to thank the teachers of the Northern Health School, Central Regional Health School and Southern Regional Health School for responding to questionnaires or participating in interviews.

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<th>Full Form</th>
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<tbody>
<tr>
<td>BES</td>
<td>Best Evidence Synthesis</td>
</tr>
<tr>
<td>BoT</td>
<td>Board of Trustees</td>
</tr>
<tr>
<td>CEC</td>
<td>Commission of European Communities</td>
</tr>
<tr>
<td>CK</td>
<td>Content Knowledge</td>
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<tr>
<td>CMC</td>
<td>Computer Mediated Communication</td>
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<tr>
<td>CoP</td>
<td>Community of Practice</td>
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<tr>
<td>DE</td>
<td>Distance Education</td>
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<tr>
<td>ERA</td>
<td>Electronic Reading Assessment</td>
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<tr>
<td>ERO</td>
<td>Education Review Office</td>
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<tr>
<td>F2F</td>
<td>Face to face</td>
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<tr>
<td>ICT</td>
<td>Information and communication technology</td>
</tr>
<tr>
<td>IEP</td>
<td>Individual Education Plan</td>
</tr>
<tr>
<td>LIVE</td>
<td>Learning in Virtual Environments</td>
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<tr>
<td>LMS</td>
<td>Learning Management System(s)</td>
</tr>
<tr>
<td>MoE</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>NCEA</td>
<td>National Certificate of Educational Achievement</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic and Communication Development</td>
</tr>
<tr>
<td>PD</td>
<td>Professional Development</td>
</tr>
<tr>
<td>PISA</td>
<td>Programme for International Student Assessment (OECD)</td>
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<tr>
<td>RHS</td>
<td>Regional Health School(s)</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>SE</td>
<td>School of Enrolment</td>
</tr>
<tr>
<td>SEN</td>
<td>Special Education Needs</td>
</tr>
<tr>
<td>SMS</td>
<td>Student Management System(s)</td>
</tr>
<tr>
<td>Te Kura</td>
<td>Te Aho o Te Kura Pounamu (The Correspondence School)</td>
</tr>
<tr>
<td>TK</td>
<td>Technological Knowledge</td>
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<td>TKI</td>
<td>Te Kete Ipurangi</td>
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<tr>
<td>TPACK</td>
<td>Technological Pedagogical Content Knowledge</td>
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<tr>
<td>VC</td>
<td>Videoconference</td>
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<tr>
<td>VHS</td>
<td>Virtual High School</td>
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<td>VLN</td>
<td>Virtual Learning Network</td>
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1. INTRODUCTION

1.1. Regional Health Schools (RHS) – a different learning context

New Zealand’s (NZ’s) three Regional Health Schools (RHS) are based in Auckland, Wellington and Christchurch. The schools enable continuation of education for students unable to attend their school of enrolment (SE) due to illness (Ministry of Education [MoE], 2011).

RHS replaced the NZ hospital teaching service as an initiative of the Special Education 2000 policy framework (MoE, 2008) but may be relatively unknown to the majority of NZ students and their families. Therefore, this study begins with a description of RHS including four key differences in context to the traditional school.

1.1.1. Student illness

A defining difference in context of RHS is that students are chronically unwell due to somatic illness or related to mental health. Students may be participating in a health-funded mental health programme, or require support to return to their SE after a long time away due to illness (MoE, 2011). Admission to the RHS roll is of a variable nature in length and frequency as determined by students’ health needs. For example, students may have only one admission to the RHS roll in the course of their entire schooling, or several admissions over several years. Teaching is for a short (minimum of two weeks) or more extended time for each admission.

1.1.2. Student location

The location of the student is another defining difference of RHS context. “No matter where [the] student lives in NZ, including rural areas, health school teachers work in the hospital and the home” (MoE, 2011, p4).

RHS students may be taught in a hospital or residential setting, in their home, SE or community space such as a library. Students may also be taught online or in a combination of any of these locations. Teaching is likely to be in an individual or small group situation, with the opportunity to attend a RHS classroom dependent on factors of student health or location, and the ability of the RHS unit to provide a classroom or meeting space. Therefore, RHS
student access to teachers and peers is not as frequent or extended as it would be in a traditional classroom setting.

1.1.3. Managing student learning needs

A third difference is RHS teachers’ attendance to the individual learning needs of students within a wide, Year 0 to Year 13, age range. “The focus for health school teachers is on the school curriculum. Every child admitted to a health school has an Individual Education Plan (IEP)” (MoE, 2011, p4).

Following student admission to their roll the RHS teacher formulates the goals of an IEP with attention to student learning needs and/or what the student would be studying in their SE. Student age, or year level and subject specialisation requirements, are key considerations. Specialist subject teaching or National Certificate of Educational Achievement (NCEA) involvement may require sourcing of curricula via the student’s SE, via a dual enrolment with Te Aho o Te Kura Pounamu (Te Kura - the NZ Correspondence school), provided by the RHS teacher, or a combination of all three sources.

Catering for Y0-13 student age range means it is unlikely students of the same year or level would be taught together, except in larger units. It is also unlikely that a group of senior students would study the same subject or assessment standard together, in the same location, at the same time.

1.1.4. Teacher location

A final difference in RHS context is the location of varying numbers of teachers in units around NZ. The Northern Health School situated in the upper area of the North Island, the Central Regional Health School in the lower area of the North Island, and the Southern Regional Health School in the South Island, have units established according to health facilities and/or student population within each of their geographical areas.

As well as presenting further challenges in managing student learning needs there are implications for the RHS teacher, of unit size and teaching location. Although some RHS units include a teaching or classroom space, students’ ability to attend is uncertain, and many teachers travel to meet students in other locations. During a typical day some teachers have the opportunity for personal contact or collaboration with colleagues, but many do not.
These issues of RHS context - student ill-health; the transient nature of the student population; teaching in a variety of locations unlike a traditional classroom; limited teaching time per student; establishing and managing curricula to suit individual student needs, including a wide age range and subject specialisation requirements; and limited personal contact with teaching colleagues - indicate different challenges for RHS teachers to those of the traditional school context. In combination, these issues constitute a situation of remoteness for most RHS teachers and students.

1.2. E-learning for RHS and wider contexts

As Deputy Principal of the Northern Health school my belief is that student illness and student and teacher isolation limit participation in learning. Teacher management of student learning needs is also problematic. My interest in exploring the topic of RHS teacher practice in e-learning was in determining the potential of e-learning to address these challenges.

The NZ Curriculum document (MoE, 2007) suggests Information and Communication Technology (ICT) use might be effective in improving learning, teaching and communication, encouraging its’ use in schools to:

- assist the making of connections by enabling students to enter and explore new learning environments, overcoming barriers of distance and time; facilitate shared learning by enabling students to join or create communities of learners that extend well beyond the classroom; assist in the creation of supportive learning environments by offering resources that take account of individual, cultural, or developmental differences; enhance opportunities to learn by offering students virtual experiences and tools that save them time, allowing them to take their learning further. Schools should explore not only how ICT can supplement traditional ways of teaching but also how it can open up new and different ways of learning. (p.36)

The relevance of this study for RHS teachers is in exploring their own motivation to provide e-learning. How are they enabled or challenged for ICT and e-learning use within their different teaching/learning context? Do they use ICT and e-learning to ‘supplement traditional
ways of teaching’? Have they discovered that ICT and e-learning can ‘open up new and different ways of learning’ in the RHS context?

Located in the primary and secondary education sectors, the study also has significance for distance, itinerant, and special education providers. One intention of the study is to encourage other teachers working in remote situations to identify examples of the benefits or challenges of e-learning for learning, teaching and communication.

Finally, the study is relevant to providers of Professional Development (PD), particularly in remote settings. A further intention is to identify how best to foster e-learning within their schools.

Although the viewpoint of RHS students and RHS management was not surveyed in this study, their views would be useful for further research examining factors such as RHS learner engagement, or RHS management strategy and support for e-learning.

1.3. What questions will this research answer?

RHS teachers were fundamental to this research for their role as practitioners in accessing, planning and/or providing e-learning to their students. The research attempted to answer three questions:-

- What is RHS teachers’ current practice in e-learning?
- What are the benefits of, or challenges to, RHS teachers’ e-learning provision?
- If it has the potential to improve learning, teaching and communication opportunities for RHS teachers and students, then how can e-learning be fostered within RHS?

To answer these questions the research investigated and reported:-

- RHS teacher use of specific ICT tools and e-learning programmes in specific curriculum areas; in a variety of locations such as hospital or residential, student home, RHS unit, or online teaching; enabled by RHS’ learning management systems (LMS), students’ SEs, or Te Kura.
• RHS teacher perception of their own, and their students’, use of ICT and e-learning.
• Methods of support or professional development (PD) in e-learning for RHS teachers.

Statistical data from a survey of RHS teachers profiled factors such as ages of students taught, location of students and teaching location; teacher age, gender and teaching experience; access to curriculum; and availability of other teaching colleagues for advice and support. Interviews added more depth in describing specific experiences of RHS teachers’ use of e-learning with their students, and teachers’ consideration of factors of benefit or challenge in e-learning provision.

RHS teachers’ perception of how e-learning enhanced their student learning and/or their own teaching was explored in the interview situation. Their pedagogy regarding learning, in particular e-learning, was of key interest. RHS teachers’ participation in, and perception of, PD was of high importance in informing future e-learning support or PD needs.

The relevance of the study to learning, teaching and communication within the RHS environment was emphasised through an initial comparison of definitions of e-learning, and reflection on current e-learning research trends.

1.4. E-learning and e-learning research

With continued growth in e-learning for education the topic has generated an increasing amount of research and literature, and definitions of e-learning have evolved. A definition for this study was sought to position the topic of teacher practice in e-learning in NZ’s RHS within the wider field of e-learning research.

1.4.1. Definitions of e-learning

The NZ Curriculum document (MoE, 2007) defined e-learning broadly as “…learning supported by or facilitated by ICT” (p.36), indicating the dependent relationship of e-learning on ICT accepted in this research. An assumption for this study was that proficiency in ICT use was likely to motivate participation in e-learning.
Use of more specific ICTs for e-learning was described by Johnson, Hedditch and Yin’s (2011) definition of “…learning through the use of the Internet, email, audio conferencing, video conferencing, the sharing of a school’s intranet, and web streaming to share classes and information across distance and/or time” (p.59).

Pachler and Daly (2011) preferred a view which emphasised the role of people in interaction with technology, and the importance of learning enabled through communication using ICTs. Their 2010 definition depicted:

A set of practices which enhance the potential of people to learn with others via technology-aided interaction, in contexts which can be ‘free’ of barriers of time and place. It involves the utilisation of a range of digital resources – visual, auditory and text-based – which enable learners to access, create and publish material which serves educational purposes...this material can be shared electronically with fellow learners and teachers both within and beyond the bounds of formal education contexts. (Daly & Pachler 2010, p.217)

Although all three definitions were accepted as valid, Daly and Pachler’s (2010) was most appropriate for exploring e-learning in the RHS setting. Specific emphasis on the process of learning with others via technology, and reference to sharing within and beyond the bounds of formal education contexts aligned with identified issues of RHS educational context.

1.4.2. Trends in e-learning research

Due to the expansion of e-learning research in education, Haythornthwaite and Andrews (2011) maintained research itself should have evolved from a tendency to investigate new or specific forms of ICT use for their various technological affordances. Their preferred focus was on the contribution of technologies towards human and social development. Increasing educational, economic, career and equal opportunities for remote or marginalized sectors of society were recommended as broad context issues for e-learning research. The effect on people and/or their relationship within the e-learning activity or process should be prioritised, rather than the particular ICT or e-learning activity (Haythornthwaite & Andrews, 2011).

The proposal that RHS was a remote community or setting, and the intention to examine student and teacher participation in e-learning for this research topic, affiliated with
Haythornthwaite and Andrews’ (2011) recommendation. Exploration of factors such as student ill health, student/teacher geographical or physical isolation, and complex teacher management of learning needs, might identify how e-learning could be used to increase educational opportunities within the remote sector of society that was RHS.

1.5. Can e-learning address the differences in RHS context?

Addressing a gap in understanding conditions such as limited access or remoteness from a traditional classroom, and from the collegiality, support, and mentoring of peers for RHS students and teachers, prompted a need for this research.

In her literature review ‘E-learning and implications for NZ schools’, Wright (2010) claimed:

Some conditions which lead to positive outcomes [in e-learning] include: the role of the teacher, the types of pedagogy used in technologically able classrooms and the ubiquity of access to technology for everyone concerned. These presuppose effective leadership at a variety of levels within a school – teachers’ professional development and mentoring, technical support, provision of equipment, and a drive to support e-learning as a fundamental aspect of classroom learning. (p38)

Wright’s (2010) statement emphasised the differences for both RHS teachers and students concerning access to technology or technology enabled classrooms. If these were limited, and participation with others was limited, how might that affect positive outcomes in e-learning, for the RHS student? Furthermore how might it affect the role of the teacher, particularly in their motivation to include e-learning in terms of the provision of equipment, student programme provision, technical support, and professional development and mentoring?

It was expected that many challenges would be found for RHS teacher provision of e-learning. Factors of student ill-health and student/teacher isolation or remoteness were likely barriers to student and teacher participation and communication, both with each other, and with other parties.

However, it was also hoped that some factors within the RHS environment would be identified as enablers, or drivers of e-learning. If uses of ICT and e-learning were found which
had potential to improve learning, teaching and communication, or increase educational, economic, career or equal opportunities for remote or marginalized sectors of society, then the research might encourage e-learning practice more widely within RHS and other remote or less traditional learning settings. Findings of positive outcomes for e-learning would validate further, and improved, support and professional development for RHS and other teachers in similar settings.

1.6. Structure of the thesis

A review of literature will briefly examine how use of ICT and e-learning has progressed in NZ schools in general, and describe e-learning programmes and resources favoured by NZ teachers. The first sections of the review will guide research into the questions of RHS teacher practice, enablers and challenges in e-learning, and the potential of e-learning to assist learning, teaching and communication.

Location of the RHS student and teacher were predicted as major influences on e-learning provision. Therefore, issues in literature pertaining to access to technology and e-learning provision in remote settings will be addressed. Literature related to other potential influences or preferences for the student in their use of e-learning or ICT will be reviewed. Potential influences or preferences for the teacher will also be reviewed, for their tendency to benefit or challenge ICT use or e-learning provision.

Literature exploring learning and teaching opportunities, learner and teacher roles, and the potential change of roles within the e-learning environment, will be of interest in comparing learner and teacher roles within the less traditional RHS context.

The final section of the review will explore methods of support and professional development for e-learning addressed in literature, guiding research into fostering teacher provision of e-learning within RHS.

Following the review of literature, the methodology used to research the topic within RHS will be described.
Analysis of research findings for specific e-learning practice of RHS teachers will be reported and discussed according to the same overall themes established for the review of literature. E-learning programmes and resources favoured by RHS teachers will be described. Enablers and challenges of RHS teacher and student location, and other potential influences firstly for the RHS student, and then for the RHS teacher will be examined.

RHS teacher reflection on their pedagogy in terms of e-learning, and consideration of roles of the learner and teacher, will help to identify the value teachers perceive in e-learning within the RHS context. Their views on current methods of support and PD will assist in providing ideas of how best to progress e-learning.

Progressing e-learning within RHS will be the key focus of the concluding section of the study. Conclusions will be made in relation to the four key differences of RHS context identified - student illness, student location, managing student learning needs, and teacher location.
2. LITERATURE REVIEW

2.1. Method of researching literature

The University of Auckland library catalogue and databases were used to search for appropriate literature for this review. In an attempt to limit reading to recent years, dates were restricted to the year 2000 and later. However, some items prior to 2000 were included for their reference to earlier policy or theory development in e-learning.

Initial keywords searched were combinations of school-age, secondary, high school, college, ICT and e-learning.

Guides to e-learning theory and practice over a wide range of issues were identified in three books: ‘E-learning theory and practice’, by Haythornthwaite and Andrews (2011); ‘The Sage handbook of e-learning research’, edited by Andrews and Haythornthwaite (2007); and ‘Key issues in e-learning research and practice’ by Pachler and Daly (2011). References cited in these books were searched, if appropriate.

A multi-database search for journal articles within the education field was effective, though use of Google scholar proved more so. Not all of the information generated was relevant, therefore the search was refined to focus on areas, or for factors, more closely aligned with RHS. For relevance to remoteness, distance, and non-traditional classroom issues of RHS, keywords were extended to include flexible learning, distance learning and correspondence learning.

Much of the distance education (DE) literature focussed on the US, where multiple DE providers existed, no doubt due to a higher population than NZ. There was also a concentration on the tertiary sector in DE literature due to a higher occurrence of online enrolments at the tertiary education level, than for primary and secondary organisations. Literature for primary and secondary levels was preferred.

Useful overseas journals were: The Journal of Distance Education; Technology, Pedagogy and Education; British Journal of Educational Technology; and Journal of Research on
Technology in Education. Journals useful in identifying e-learning practice in the Australasian context were: Computers in NZ schools; the NZ Education Gazette; NZ Interface Online; Australian Educational Computing; and the Australasian Journal of Educational Technology.

Organisation for Economic and Communication Development ([OECD], 2002; 2004; 2012) reports, and reporting on Programme for International Student Assessment (PISA) findings (Kirkham, 2011; Thomson & De Bortoli, 2007) provided information on how NZ students compared in various ICT related assessments, with their counterparts in OECD partner, and other countries.

Locating articles in respect to unwell students and ICT and e-learning was difficult. Literature in this area mostly reported use of specialised ICTs for students the NZ education system terms special educational needs (SEN). Although SEN students are sometimes taught by RHS teachers, and teaching may involve the use of specialised ICTs, the special need of ill health determining admission to the RHS roll is not categorised as SEN. Therefore, researching ICT and e-learning for SEN students was considered to be outside the domain of this study.

Although not directly related to ICT and e-learning, work by McNeish (1999), and from the NZ Mental Health foundation (2010), was included for its’ theme of ‘participation’ in enhancing the mental health of children and adolescents. This concept was relevant to later discussion on the value of participation with others in e-learning.

Literature addressing potential influences of student and teacher gender, age and attitude in relation to e-learning and ICT use was considered. Reports of student opinion or ‘voice’ on ICT in education were informed by NetDay (2004; 2006) ‘Speak up’ reports, and the writing of Prensky (2001; 2004).

Factors of teacher experience, proficiency, and e-learning practice in terms of curriculum, programme, course design and targeting learning needs were a focus, with the intention to relate these to the specific RHS setting. Searches made in the areas of PD, staff support or training, revealed an abundance of literature. Within the NZ context Timperley, Wilson, Barrar and Fung (2007) best evidence synthesis iteration (BES) was an excellent guide. When
the search was redefined to PD specifically for ICT and e-learning there was still much literature available, indicating an awareness of the ongoing need for PD in this area.


Selwyn, Wright, Lai, Bolstad and colleagues, Parr and Ward, and Ham and colleagues, were among those whose work was consulted for NZ context. Again, references cited within these texts were accessed if appropriate. NZ Government vision or strategy for ICT in Education, the NZ Curriculum document, and research or reports outlining and tracking the development of various ICT and e-learning initiatives and education statistics, were sourced from the websites of the NZ MoE, NZ Council for Educational Research, Learning Media, Te Kete Ipurangi (TKI), and Research NZ.

In reporting for UNESCO, Blurton (1999) viewed the development of ICT goals and strategy at government level as an important element in fostering ICT use in teachers. Therefore, motivation and support of the NZ government, and NZ schools’ progress in terms of ICT and e-learning was briefly examined.

2.2. Supporting the use of ICT and e-learning in NZ schools

The NZ government ‘Interactive Education’ and ‘Digital Horizons’ strategy documents (MoE, 1998; 2002), the ‘Enabling the 21st Century Learner’ e-learning action plan (MoE, 2006), and the NZ Curriculum (MoE, 2007) strongly promoted ICT use, and e-learning, in NZ schools. Goals and strategies were supported by significant government investment to enable the many benefits to learners and teachers claimed in these documents.

Bolstad and Gilbert (2006) proposed four essential arguments were used to justify government support. The first was the efficiency afforded to teachers through ICT use. Recording and documentation, and accessing and sharing resources with other parties in other places, was simple and effective. The second was the value and ease of interacting online, communicating
or collaborating in a group situation. The third argument Bolstad and Gilbert (2006) called the
digital generation argument, encouraging teachers to enhance or develop their teaching to
align with the ICT motivation or proficiency of their students. The fourth argument proposed,
of the knowledge age or 21st century learning, was perceived as the most important by Bolstad
and Gilbert (2006). This contention was that the existing education system was suited to the
industrial age, and transition to a post-industrial 21st century age involved associated social,
cultural, and economic change. Due significantly to ICT advancement, searching and
acquiring knowledge in this era required a critical change, or even transformation, in
educational thinking.

An alternative view was proposed by Selwyn (2008). He criticised e-learning practice for
what he termed its’ ‘relative ineffectiveness’, citing economic concerns as prime motivation
for government investment. OECD reports suggesting increased gains in Gross Domestic
Product as directly attributable to investment in ICT (OECD, 2002; 2004), gave weight to his
argument that economic and educational needs of a country were enhanced by producing
technologically literate students inclined to use ICT within the workforce.

Regardless of motivation, NZ government support appeared critical in order for ICT advance
in schools. Shortly after establishment of the RHS service in 2000, Education Review Office
(2001) reports claimed NZ schools were only beginning to develop ICT strategy and
equipment, and urged a focus on ICT use for improving student educational outcomes. At a
similar time the ‘Digital Horizons’ document (MoE, 2002) claimed teachers had improved
access to technology and motivation towards learning about ICT, but agreed that use within
classrooms, and by students in learning processes, was limited.

A few years later Johnson, Kazakov, and Svehla (2005) acknowledged the most common
early uses of e-learning in schools were staff access to email services, and to the Internet and
Intranet for learning and teaching resources. However, they reported more positively that,
“Schools are demonstrating a strong interest in e-learning, with the technology infrastructure
largely already in place...around three quarters of all schools are indicating plans for
implementing at least one e-learning activity during the next 12 months” (p.5).

The MoE (2006) considered government strategy and support for ICT and e-learning in NZ
schools was significant, particularly in the previous decade prior to their reporting.
Committing to further investment in their action plan ‘Enabling the 21st Century Learner’, the “increased capability and confidence of teachers to use ICT to support student learning [and schools’ acceptance] that ICT is an integral part of effective professional practice” was noted (MoE, 2006, p6).

An awareness of recent professional practice using ICT in NZ schools was valuable in anticipation of exploring RHS teacher practice in e-learning.

**2.2.1. Current and predicted ICT programmes and resources**

ICT reporting in NZ primary, secondary and Maori medium schools is carried out biennially by Research NZ, with e-learning developments a focus of the most recent report (Johnson et al. 2011). Aspects of ICT use, equipment and resources, planning, and teacher attitudes were reported as perceived by the Principal and one staff member with ICT responsibility or interest, within schools. Johnson et al. (2011) found e-learning activities were provided more frequently at secondary schools, with highest computer use in curriculum areas of English, Mathematics, Computer studies and Social sciences, respectively. Student use of Internet services was highest for email, Wikipedia and social networking. Although use of Youtube, Skype, Google docs and Facebook was popular, an increase in the number of schools not using social software since the previous report was noted. Although the NZ government supported Te Kete Ipurangi (TKI) website was popular for accessing resources, many resources considered useful were infrequently used. Daily e-learning events incorporated use of online LMS to manage student learning and learning resources, and student participation in virtual classrooms with a remote teacher. Weekly or monthly occurrences of student participation in virtual events, and student participation in online collaborative networks and projects a few times per year were observed. However, none of the virtual activities were reported by a majority of the sample, and many activities were reported by 20% or less of the sample. Statistics indicated more sophisticated uses of e-learning were infrequent.

Predictions for technologies which would increase in popularity in NZ educational settings and beyond were made by Johnson, Levine, Smith, and Haywood (2010). Use of collaborative environments for interaction with others, use of cloud computing for storage, and game-based learning and mobile devices was expected to increase within two to three years of their reporting (currently). The potential of games was perceived in fostering student engagement
and collaboration in learning, whereas mobile devices were appreciated for enablement of Internet connection from a variety of places. Johnson et al.’s (2010) belief was that, “Mobiles represent an untapped resource for reaching students and for bridging the gap between learning that happens in school and learning that happens out in the world” (p.40).

RHS teachers’ views for this study would indicate any similarities in their practice to Johnson et al. (2011) findings for NZ schools. They might also indicate tendencies to use technologies according to Johnson et al. (2010) predictions.

For successful provision of any e-learning programmes and resources in traditional classrooms however, access to appropriate ICTs and the Internet, were recognised as key enablers (Wright, 2010). It was therefore important to ascertain the potential for RHS teacher and student access to technology in the variety of locations used for teaching and learning.

2.2.2. The importance of access to technology and the Internet

Haythornthwaite (2007) described the term ‘digital divide’ as identifying population groups who had differences in access to technology and the Internet. Literature addressing digital divide issues (Haythornthwaite, 2007; Haythornthwaite & Andrews, 2011) described student groups who were restricted or denied opportunities.

Haythornthwaite’s (2007) concern was that ‘place-based’ education, including some forms of e-learning, disadvantaged students with inferior, or no technology or Internet access, compared to those with full access, high-speed Internet, and sophisticated technology. Her observations were pertinent in considering access to technology afforded for various ‘place-based’ settings of RHS teachers and students - the RHS class or unit, student home, SE library, learning centre or office space, community space, or online space. In these settings, ICT and Internet access might be enabled by the RHS teacher, student, or SE, in any combination. Implications of limited or no access, in particular to the Internet, would create significant barriers for e-learning.

Haythornthwaite (2007) noted that schools motivate student use of technology, increasing computer and Internet proficiency, and improving information literacy skills in students. NZ Government strategy (MoE, 1998; 2000; 2002) attended to improvements in school ICT capability and infrastructure, including a commitment to delivery of high-speed Internet
access to all schools and most provincial communities (MoE, 2002). In her overview of the PISA 2009 Electronic Reading Assessment (ERA), Kirkham (2011) reported more than 98% of her sample of 4,643 15-year-old New Zealand students had access to computers and the Internet at school. Those students able to attend a RHS unit or classroom should therefore experience excellent access to technology and the Internet.

In reporting NZ student access to a computer and the Internet in the home environment, Johnson et al. (2011) maintained 75% of secondary school principals and 74% of primary principals surveyed, believed half or more of their students had access to a computer. 72% of secondary school principals and 69% of primary school principals believed at least half of their students had Internet access.

Kirkham (2011) reported more positively, that 96% of her student sample had computers at home, and 92% had access to the Internet at home. Internet access at home had increased by 17% in the previous 9 years. Her findings that digital reading achievement was significantly higher for students with home Internet access, than for those without, supported Haythornthwaite’s (2007) concern for the digital divide effects of ‘place-based’ education in disadvantaging students with reduced Internet access.

Reporting appeared to indicate that government strategy (MoE, 2002) had assisted in enabling access to the Internet in NZ schools, and probably in homes. Since home access was increasing, RHS students taught in the home situation might be well enabled for Internet access. For RHS students taught in community libraries, government commitment to provide Internet services and computers should also ensure access.

Statistics could not be located to indicate access to computers or the Internet where the student was taught in a hospital or non-RHS provided unit, such as a space on the site of another health provider. For each of these locations it was likely that Internet access and use of ICT enabled by the provider, the RHS teacher, or the student would need to be co-ordinated by the teacher or student.

Location of the RHS student and teacher was considered a defining issue of context in the introduction to this study. For RHS teachers teaching in each community or home situation,
accounts of their students’ access to computers and the Internet for e-learning, would indicate the extent of this challenge to e-learning provision.

Besides the major issues of technology and Internet access though, other issues associated with alternative locations were identified in literature, and also considered for their tendency to benefit or challenge participation in e-learning.

2.3. Exploring non-traditional learning locations

Lack of a traditional classroom space represented an opportunity for innovation to Johnson et al. (2010). Identifying 21st century learning predictions of increasing use of ICT, they proposed that the learning environment was changing from a physical space, to one supported by ICTs enabling virtual communication and collaboration. As a result, they predicted students’ increasing interest in less formal educational options such as home-based or online learning.

Despite enabling virtual contact, home-based or online learning options might involve less personal contact for the student, just as in the RHS situation. If this reduced contact caused remoteness in location, however, then this was a factor of the digital divide that could isolate or marginalise populations (Haythornthwaite, 2007; Haythornthwaite & Andrews, 2011).

Wagner (2005a) described marginalised populations as disadvantaged due to being, “‘on the margin’ - the socio-economic and cultural-linguistic periphery of a national population” (p99). One marginalising factor observed was living in, or migrating from a historically deprived (usually rural) region. Although the populations Wagner (2005a; 2005b) described had experienced extreme poverty, isolation or illiteracy, he noted situations such as poverty, for example, were a relative term. Poverty in a developed country was still poverty. By the same reasoning, although their geographical location was not remote to the extent of the populations Wagner (2005a) described, the situation of limited personal contact for students isolated in the home might have a marginalising effect. Indications that settings of schools, teachers or students in online, remote, virtual, or distance learning could enable communication or participation for learners would be relevant. Therefore literature pertaining
firstly to communication in e-learning environments, then participation issues in teacher absence and DE courses were examined.

### 2.3.1. Face to face (F2F) and Computer Mediated Communication (CMC)

F2F communication, the traditional method of communication in classrooms, was also the main method of communication between teacher and student in the RHS context. Alternatively, some form of CMC, typical in the DE environment, might operate in teacher absence. Comparisons in DE literature were made between F2F and CMC, with Kanuka and Rourke (2008) claiming potential for higher order learning to be facilitated via text-based, asynchronous communication technologies. However, they also observed a lack of opportunity for participants to develop oral communication skills.

The main concern in literature regarding CMC was that students were required to manage in a mainly text-based environment. Kirkham’s (2011) statistics, that the average digital reading literacy score for NZ 15year olds was significantly higher than for print reading, and significantly higher than the OECD average, suggested NZ adolescents should manage adequately in the text-based environment. Mobile devices such as phones also fit the category of CMC, when used for text communication, or website access. Haythornthwaite and Andrews (2011) claimed, due to frequent use of such technology, F2F and CMC issues should be less of an issue today.

For RHS students and teachers, learning and e-learning in the F2F environment could occur in any RHS teaching location where the teacher and student met. Due to travel requirements to enable teacher/student meetings, the F2F teaching session would occur fewer times in a week, and for a lesser duration, than for students in a traditional classroom. E-learning in the presence of the teacher, would therefore have limited time allocated.

Comparisons of the effectiveness of F2F and CMC modes of communication by RHS teachers and students, use of mobile devices not just for communication, but also for teaching in F2F or CMC modes would be of interest. The prevalence of student ownership of the mobile device might also be a further indicator of digital divide issues.

In the introduction to this study, limited teacher time with the student was identified as an issue of RHS context, and the potential for e-learning to enable increased student participation
in education when the teacher was not F2F was mooted. Examples of situations of learning in teacher absence and DE, including modes of communication used for teaching and learning, were investigated further.

2.3.2. Teacher absence and Distance Education (DE)

Examples of ICT and e-learning support were often described for facilitation or enhancement of student learning in remote locations. For example, in White’s (2010) study a combination of videoconference (VC), interactive whiteboards, Moodle environment, and virtual visits via remote site connections was claimed to improve educational opportunities for students in rural and remote South Australian schools.

In some NZ rural, remote, or small secondary schools, virtual classrooms have been established. For a proportion of the class, VC facilitates learning with teachers and/or classmates based at the same, or other, location(s), and ICT or e-learning support is available between VC sessions. Among other findings, Bolstad and Lin (2009) observed peer collaboration and shared learning occurred less in VC, than in a traditional classroom setting. They also claimed a learner-dependent relationship observed in the traditional classroom setting, was more obvious in some VC environments. An alternative option for learning was proposed:

A different response to the shift to virtual classrooms could be to rethink the roles of both teachers and students, and consider how the new environment could be used to cultivate a different kind of learning culture - one in which the goal of learner “independence” is matched by pedagogies and resources that are genuinely designed to cultivate learners’ independence - as well as their ability to think and learn collaboratively. (Bolstad & Lin, 2009, p63)

A similar need for guidance of students was found by de Villiers (2007) in online teaching and learning within the Wairarapa electronic learning community (Welcom) cluster of schools. Although relative ease of student participation in both de Villiers (2007) and Bolstad and Lin (2009) studies was observed, tendencies for learner dependence and variations in learning experience were apparent. Observations were relevant in relation to Johnson et al.’s (2010) prediction, of students opting for less formal home-based or online education environments. A
question explored in literature, was the ability for these alternative environments to offer a learning experience comparable to that of the traditional school environment.

Several comparative studies between DE and traditional education were attempted in the US. Outcomes identified in DE literature 1985-2002 for independence, achievement, attitude, and retention, were compared with those in the traditional classroom by Bernard et al. (2004). However, the researchers experienced a major challenge in making comparisons. The same ICTs might be used in both environments, but in the classroom they were used in conjunction with F2F instruction, whereas in DE they were used to enable online, collaborative learning in place of F2F collaboration. Due to variations in findings of studies, and a lack of studies effectively predicting learning and attitudinal outcomes only general evidence that classroom instruction and DE were comparable could be concluded.

A study by Kozma et al. (2000) of four courses taught in both F2F and virtual high school (VHS) environments, found student performance was comparable despite less time assigned for student contact and/or spent on coursework in the VHS environment. VHS students were perceived to gain additional benefits from using and communicating with technology. Similar to findings of Bolstad and Lin (2009) however, VHS courses were identified as involving less interaction and group work between students, and less positive student/teacher interaction than F2F. Both Kozma et al. (2000), and Rice (2006) in her review of US DE literature for years 1-12, predicted students in the DE environment would eventually experience the same quality of interaction as in F2F classes. Rice (2006) predicted increasing use of Internet or web-based technologies, and more sophisticated qualities of interactivity in course design and instruction would further assist communication. Kozma et al. (2000) claimed improvements would occur in teacher proficiency in ICT use, and further technological advances would enhance students’ experience.

Rice’s (2006) overall conclusion though, was that “the effectiveness of [DE] appears to have more to do with who is teaching, who is learning, and how that learning is accomplished, and less to do with the medium” (p440). Bolstad and Lin (2009) concluded similarly for students’ differing experiences in virtual and F2F classes. Differences were attributed to teachers’ preferred teaching styles, the specific subject, and subject requirements such as the amount of
content that needed to be covered. For example, constraints of NCEA-level subjects were perceived as a major barrier to personalising learning.

Reports of e-learning in teacher presence, teacher absence, and DE, guided the study of e-learning provision in RHS ‘place-based’ locations. Learning experiences and degrees of comfort for students might vary, and indications were for less student interaction or collaboration in learning, and less positive teacher-student relationships in the DE environment. Student dependence on their teachers might also be more obvious. Issues of technology might frustrate learning, in the DE environment, or in e-learning operating in teacher absence. Nevertheless these issues were predicted to improve, and positively influence learning and communication in these settings.

Although comparison of the F2F and DE environments was complicated, indications were that ICT and e-learning could address the issue of remoteness. Success in the DE environment could be comparable to the classroom environment even with less time available for the learning programme. Factors of location or ‘place-based’ education had high relevance to RHS teachers and students. Use of phone, VC, online learning, or similar environment for communication, and RHS teachers’ perception of learner dependence/independence would be noted for various locations. In the RHS context, teachers had the advantage of combining F2F methods with use of a distance education (DE) programme accessed from NZ’s only national DE provider for school age students, Te Kura. RHS teachers’ management of e-learning within the current Te Kura programme would be of interest, as well as other programme options employed.

However, Wagner (2005a) contended ‘minority’ population or marginalised group issues such as location, received less attention in ICT research than issues of the digital divide such as gender, age, and ethnicity. Although they could still have a marginalising effect, the latter were ‘majority’ population issues. Since preferences, attitude and influence of the student and the teacher also contributed to success in these alternative environments (Bolstad & Lin 2009; Rice, 2006; Wright 2010), some of these majority issues were explored for their affect on e-learning, first in relation to RHS students, then for RHS teachers.
2.4. Potential influences on student use of e-learning

Patterns of high use and motivation are not representative of the experiences of all students and/or for all ICT activities. In terms of the digital divide, Haythornthwaite’s (2007) profile for regular online use by gender, race, age, socio-economic status, and region identified young, white, affluent males in developed countries.

For RHS students, living in a developed country such as NZ, with a government that fostered ICT and e-learning has been noted as a benefit to student ICT access and use.

Other factors of majority digital divide, which could be easily assessed, were considered. Because the research relied on perceptions of RHS teachers, issues should be those that could be generalised to allow teacher reflection of a varied and often transient student population. For this reason, race and socio-economic status would be difficult factors to generalise.

Gender and age issues were addressed, both for their potential for generalisation, and for the interest they had received historically as factors of the digital divide.

2.4.1. Student gender and age effects on e-learning

Gender Access to ICT for male and female students has been an issue of discussion for some years. Wagner (2005b) noted an expectation in the early 1980s that the introduction of ICTs in schools of developed countries would favour males, but considered this had not necessarily eventuated.

Thomson and De Bortoli’s (2007) reporting found access in terms of gender was not a significant issue. Differences between female and male students in their access to computers at school or at home were negligible, although the percentage of males who used a computer at home or at school was slightly higher. They acknowledged there were differences in use of ICT for male and female students, for example in comparisons of their extent of use of the Internet, and for entertainment. Marked gender differences existed in the area of gaming, used by 67% of males compared with 33% of females, and in downloading software from the Internet, used by 58% of males compared with 35% of females. NZ students overall were reported as using programmes and software frequently, but for both, use was higher for males.
Some differences in confidence for ICT and e-learning tasks appeared to be associated with gender (Thomson & De Bortoli, 2007). Female students reported high confidence using ICT at a basic level, consistent with findings of females more inclined to use ICT for purposes such as word processing and communication. While confidence in more complex tasks was expressed by a high proportion of females, this was less than that expressed by males. For very advanced tasks, females expressed even less confidence. NZ, Australia, Mexico, Canada and Japan had the lowest margins of gender difference for student confidence for specific ICT tasks.

Netday (2006) reported for the US situation that girls in grades 6-12 were 15% less likely than boys to rate themselves as technologically advanced. Across the higher grades, more boys rated themselves as advanced and more girls rated themselves as average.

In terms of skills, reporting of ERA in 15 year olds (OECD, 2012) found more than 17% of students in Australia, Korea and NZ were top performers in digital reading. Girls consistently outperformed boys, although the gender gap was less than for reading text. An interesting outcome was observed for boys and girls with similar levels of proficiency in print reading. Boys’ stronger navigational skills on the computer appeared to contribute to a higher score for digital reading.

Significantly more positive attitudes of males for ICT use was reported in countries other than Australia, NZ and Switzerland (Thomson & De Bortoli, 2007). The researchers concluded females considered working with computers was important, but might not have the same enthusiasm as males. Although indications were for some existence of a gender divide in student ICT use in many countries, this was seen as improving. For RHS students, therefore, gender should not be perceived as a significant barrier to ICT and e-learning.

**Age** In terms of students’ age in general, their experience and engagement with ICT and e-learning was accepted in much of the literature reviewed. The popular writing of Prensky (2001; 2004) assigned the term ‘Digital Natives’ to students who had grown up in the era of ICT and were native speakers of ‘digital language’. Reporting by Prensky (2001; 2004), and reporting of US teenagers’ opinions on technology (NetDay, 2004), depicted ICT proficient youth. Teenagers were seen to possess high motivation and tendencies towards ICT and e-learning both personally, and in education settings.
For her sample of NZ 15 year-olds, Kirkham (2011) reported regular use of ICT. The most frequent use of school computers was searching the Internet for schoolwork (50% at least once a week). The most popular online activities at home were: 79% browsing the internet for fun at least once a week; 71% using email; 63% chatting online; 60% downloading music, films, games and software. 68% completed homework on the computer more than once a week and 52% used the Internet for schoolwork frequently, when at home.

Lower use of Internet services and general e-learning at school for primary students than for secondary has been previously noted (Johnson et al., 2011). Morgan and Morgan (2011) claimed design and development of ICT had been concentrated on populations between ages 14-40 years, and urged investigation into issues such as ICT proficiency of young children. For Y11 students and above, findings of Johnson et al. (2011) concurred with Bolstad and Lin (2009) that secondary student involvement in ICT/e-learning at school appeared to be affected by NCEA exam involvement.

If similar patterns existed within RHS for student age, then challenges for ICT, Internet and e-learning use for younger students would be observed. Effects of exam involvement on ICT and e-learning activity for older students would also be noted.

Despite potential issues of student gender or age, encouragement for teachers to keep pace with student engagement and motivation towards ICT and e-learning was one justification for government investment in ICT (Bolstad & Gilbert, 2006). Therefore literature confirming student attitude for these activities was important to identify.

**2.4.2. Student attitude effects on e-learning**

Student attitude was very broadly defined for this section as confidence, skills, behaviour, or personality effects of the student for e-learning. Some potential attitude effects, for example, a greater tendency to use ICT, and more confidence in higher level tasks perceived for male students, have already been noted in relation to student gender.

Despite less difference for gender in Thomson and De Bortoli’s (2007) findings for Australian, NZ and Swiss students, overall attitudes in these countries were found to be less positive than the OECD average. The researchers considered some students’ perception of computers as an everyday tool, might be responsible for this more neutral attitude.
Indications in literature were that students in general were highly proficient in ICT use, possibly more so than many of their teachers, and a positive student attitude for e-learning was assumed. Reporting on US middle and high school students’ attitude, NetDay (2004) claimed students’ motivation to learn using ICT, was greater than their schools could facilitate. Students were aware of the importance of technology in their education and beyond, and willing advisers on ICT use and development in schools. NetDay (2004) and Prensky (2004) described changing patterns of educational use of technology, such as students’ replacement of F2F study groups with practices of two or more parties meeting and communicating using various ICTs.

Prensky’s (2004) further contention was that students’ far superior ICT skills than their teachers, enabled them to independently access knowledge if motivated to do so. However Bolstad and Lin’s (2009) indications were of student dependence on teachers in VC environments, and belief that VC required more student independence than participation in a traditional classroom. This would suggest despite superior skills of the student, motivation and independence were key factors for success.

Bernard et al. (2004) also recommended further research or exploration of motivational processes and student motivation for studying in the DE environment. They claimed interest or satisfaction expressed for a DE task or course might indicate its’ selection over a regular course merely for convenience, or the perception of less effort required.

For students in general, engagement and motivation for ICT and e-learning was apparent, but these attitudes might not be as strong for all students, and student enthusiasm might not be as intense as portrayed by Prensky (2001; 2004). It was possible some students had become accustomed to technology, and not as inspired by it as previously. ICT and e-learning environments might even require more independence and motivation on the part of the student than the traditional learning environment.

With their added challenge of ill health, whether ICT and e-learning could motivate the RHS student to participate independently in an educational programme was another important issue.
2.4.3. **Student health effects on e-learning**

For RHS chronically unwell students, research on the influence of student illness in the e-learning situation was not specific. Literature around the wider concept of participation affected by illness was investigated. McNeish (1999) identified young people affected by ill-health as a ‘vulnerable’ or ‘disadvantaged’ group likely to experience more barriers to participation than well students. Low confidence and self-esteem were common traits requiring support for improving communication and participation in this group.

Illness affecting student mental health, and preventing school attendance, is criteria for admission to RHS rolls. The NZ Mental Health Foundation (2010) defined positive mental health as involving predominantly positive social functioning. The Liaison Education Adolescent Project (2012) cited the most common mental illness, depression, as affecting one in 12 teenagers. Peer involvement was a key factor in improving adolescents’ self-esteem (Peterson, Barnes & Duncan, 2008).

Although online and e-learning situations could offer opportunities for participation in learning, with teacher and peers (Haythornthwaite & Andrews, 2011), this was an area where RHS teacher perceptions might be valuable. General indications of e-learning assisting communication and participation for unwell students, particularly students with illness affecting their mental health, would be of interest.

As well as student preferences, preferences and motivation of teachers to provide e-learning were also identified as strong determinants for success in alternative learning environments (Rice, 2006; Bolstad & Lin, 2009; Wright, 2010). Therefore, possible influences on teacher use of e-learning were important to consider.

2.5. **Potential influences on teacher use of e-learning**

An intention of this section of the review was to guide research into the stage of ICT and e-learning implementation, capability and confidence RHS teachers perceived in themselves. Haythornthwaite’s (2007) observation for digital inclusion or ‘e-inclusion’, that access, use, skills, and competence were critical to e-learning, was pertinent for RHS teachers as well as
students. Literature was identified which reported potential influences of teacher proficiency, gender, age, experience, attitude, and pedagogy on e-learning.

2.5.1. Teacher proficiency effects on e-learning

Teachers were generally perceived as less proficient in ICT use than students, and advised to remain aware of, and learn as much as they could from their students’ ICT behaviours (Prensky, 2001; 2004).

Mishra and Koehler (2006) described a model of Technological Pedagogical Content Knowledge (TPACK) which they recommended teacher training programmes include to develop teachers’ technological skills. A focus on Pedagogical Content Knowledge (PCK), wherein the teacher gained understanding and skills of teaching curriculum content, was a component of teacher training programmes they observed. However Technological Knowledge (TK), incorporating technological skills development, was not always a focus. Methods of teacher training to enhance Technological Pedagogical Content Knowledge (TPACK), were preferred for teaching in current educational environments (Mishra & Koehler, 2006; Schmidt et al., 2009).

NZ government ICT focus in schools recognised a need to improve teacher proficiency through improving TK (MoE, 2002). An ongoing scheme supplying laptops to teachers (TELA) was found to significantly improve teacher access, confidence and use of ICT (Cowie et al., 2008a; Cowie et al., 2008b; Cowie, Jones, Harlow, & Forret, 2010; Cowie et al., 2010). Government supported training for NZ teachers in ICT Professional Development (ICTPD) clusters also reported positive results (Ham, 2009; Ham, Toubat, & Williamson-Leadley, 2006; Sahin & Ham, 2010).

There were indications that NZ teacher proficiency continues to improve. Johnson et al. (2011) reported principals’ perceptions of teacher ICT adoption against six levels adapted from Knezek and Christensen’s (1999) research instrument. More than four out of five principals surveyed, perceived teachers were in the higher stages (4-6) of ICT adoption. Although the researchers conceded results were from principals rather than teachers themselves, they claimed principals’ support for teachers’ ICT use was beneficial. This claim was further supported by Stuart, Mills and Remus’ (2009) perception of NZ school leaders’ own ICT use influencing wider ICT use in their schools.
Rather than leaders or principals’ perceptions, RHS teachers’ self assessment of ICT adoption and associated tendency to include e-learning for their students, would be relevant for this research.

As discussed for students, it was also possible teachers’ perception of e-learning and ICT adoption might be affected by personal or attitudinal attributes. Therefore, factors of teacher gender, age, experience, and attitude to e-learning were explored in literature.

2.5.2. Teacher gender, age, experience, and attitude effects on e-learning

Gender Whereas gender divide in ICT for students did not appear too significant, for adults it was perceived as more pronounced and had existed for some time. Blurton’s (1999) reporting was for females less likely to enrol in computer science courses and despite reports of increasing use of the worldwide web by US women, less likely to choose ICT related careers.

Morgan and Morgan (2011) described the past thirty years of research into male and female use of technology from early school through to adult life and from all over the world. They noted consistency in results of males being more positive towards technology and more likely to adopt the use of new technology voluntarily, but some indications of females more likely to use communication-based technologies.

An explanation of differing preferences in online activities of men and women was provided by Haythornthwaite (2007), who conceded the reason could be that women still judged their online skills as lower than men. However, in her citation of the Commission of European Communities ([CEC], 2005) prediction, she was confident that both the gender divide, as well as the divide for older users, should reduce as proficient youth grew older.

Age Teacher age in NZ covers a broad range, with ages of younger teachers including teachers raised as digital natives. The reasoning that divide issues for older users should reduce as these skilled natives age (CEC, 2005, cited in Haythornthwaite, 2007), should also see an increase in teacher proficiency as younger people move into teaching careers. Rather than specific issues of age, there was greater consideration of factors such as more frequent online experience and longer time spent online, leading to an increase in online skills and higher levels of self-efficacy (Haythornthwaite, 2007).
In ICTPD reporting, Ham (2005) observed there were complex associations of factors concerning the teacher, such as gender, teaching experience, competence and length of time in the professional development programme, which affected proficiency. Some indications were that a general attitude of confidence might be a more significant determinant in classroom use of ICT than teachers’ skill or proficiency.

**Attitude** Teacher attitude for this study was generally determined by self-perception, ICT confidence, and pedagogy. As Ham (2005) noted, there were often associations with other factors.

Factors of gender, age and experience combined in research into pre-service teacher ICT confidence over two Queensland Universities (Jamieson-Proctor, Finger & Albion, 2010). Participants were predominantly female, with 48% over thirty years of age. 63% indicated they were confident or very confident in using ICT with students for teaching and learning. Females reported less confidence than males, although an improvement in this statistic was observed from the researchers’ previous studies. Jamieson-Proctor et al. (2010) analysed the TPACK model of Mishra and Koehler (2006) for their sample. High levels of confidence were found for activities such as word processing, presentation software, email, web browsers and web searching. Although this appeared to indicate TK, high competence for more complex activities or for higher level skills perceived as necessary for TPACK in teachers was not expressed. What was lacking in the pre-service teachers may have been experience of successful use of ICT in teaching situations.

Specific successful experience of ICT use could affect teacher self-efficacy, online experience, and confidence:

> The hype about e-learning must be tempered with evidence about what works and how it works…Thus teachers’ pedagogic actions may be prime indicators of successful integration of technological tools into learning opportunities. This points out how important it is for teachers to actively engage with facilitating the use of such tools. (Wright, 2010, p.38)
Therefore, in further addressing teacher ICT use, proficiency, and particularly attitude, it was important to consider Wright’s (2010) discussion on the implications of pedagogy on e-learning.

2.5.3. Pedagogy and e-learning

Wright (2010) noted greater student engagement and sustained concentration as key aspects of achievement recognised in literature she reviewed. Pedagogies she called co-constructive pedagogies, utilising student collaboration, communication, sharing, problem-solving and risk-taking were emphasised as supporting student engagement and concentration. “Communication (of ideas, concepts, methods, practices, knowledge) is a fundamental component of the kinds of pedagogies that link closely to embedded, integrated uses of e-learning and link to positive achievement outcomes for students over time” (Wright, 2010, p.39).

Two NZ studies demonstrated teachers’ attempts to use e-learning for enhancement of engagement and concentration. Investigating student learning styles, Waller (2007) researched engagement of a group of Y12 Physics students in the absence of direct teacher instruction. An online tutorial was least appealing to any students’ learning styles. With the inclusion of video, sound or story mode presentation, Power point presentations proved more interesting to students. A personal response system was judged most successful in enabling student understanding and feedback. Waller (2007) concluded lessons addressing student learning style and incorporating interactivity assisted in fostering engagement.

Kellow (2007) researched two groups of gifted and talented primary students using a guided inquiry-based learning approach in topic studies. As for Waller’s (2007) study, direct teacher instruction was limited. Students were taught in F2F sessions 2-3 times a week, the remainder of the time and searching, using and recording information via the LMS, teacher-selected web links, (mainly) Google search engine, Power point presentations, and email. Interactive whiteboards and wireless laptops also supported topic studies. Kellow (2007) found students maintained high enjoyment, and their understanding of complex concepts, and decision-making in their inquiry was enhanced.

Teacher pedagogy in selection or design of courses for the student could be potential influences on successful e-learning provision. Therefore, RHS teacher decision making or
delivery of e-learning programmes using a variety of sources, content and technology options would be relevant to this study.

Within the MoE’s (2000a) sub-goals and action plans, a specific intention was to progress Te Kura e-learning and online programmes. RHS teacher practice to source curricula from Te Kura predominantly for secondary subjects or for students studying over a lengthy period of time, could comprise courses which were fully online, delivered using a partial online component, or with no online component.

For curricula sourced from a provider such as the student SE, incorporation of e-learning programmes or activities might be advised by the SE teacher. In other cases, RHS teachers would access the same websites and activities available to other NZ teachers. As indicated by Johnson et al. (2011) and Kirkham (2009) typical use would be interactive and web 2.0 programmes, email, Wikipedia and social networking such as Youtube, Skype, Google docs and Facebook. A potential challenge would be for RHS teachers unfamiliar with course content.

White (2010) perceived innovation in e-learning programmes or practice was usually developed by individual schools, but at times by individual teachers. He recommended support for instigation and wider availability of such programmes. ICT courses and options RHS teachers included, for what pedagogical purpose, and whether innovative programmes or activities had been discovered or shared, would be investigated.

The role of the teacher, and in particular their ICT confidence and pedagogy, was attributed as a critical influence in their use of ICT and e-learning (Rice, 2006; Bolstad & Lin, 2009; Wright, 2010). Whereas ICT was initially appreciated for its potential to improve efficiency for teachers and students, and for the improvement in skills it afforded, the focus for e-learning appeared to be evolving to an appreciation of its’ role within the processes of learning and teaching.
2.6. Opportunities for learners and teachers in e-learning

Over ten years ago, Blurton (1999) noted that a major change for teaching in DE, besides teacher access to a wide variety of quality resources, was the learner’s more active role enabled through interactivity of ICTs within the DE environment. This active role of the learner was variously described in literature as learner-centredness, learner agency, or learner authority, and promoted in much research to follow.

Bernard et al. (2004) identified student-directed programmes as most appropriate for success in the DE setting, and McCombs and Vakili (2005) claimed a key role of learner-centred principles in the online environment, was in addressing learning needs. Student motivation, social, and learning outcomes, could be enhanced as a result.

Learner-centredness was also encouraged in the traditional classroom environment, but in the e-learning environment learners were perceived as having greater choice. Being able to select learning options according to learning media, communication, availability, or learning preferences improved learners’ attention, and sustained their concentration. These factors were described as determinants for success in learning (Haythornthwaite & Andrews, 2011; Wright, 2010).

Haythornthwaite and Andrews’ (2011) description, of one or more aspects of active learning which should be present for success in e-learning, effectively summarised the views of other researchers. Aspects identified were learner agency, participation with various media, peer production or collaboration, and what they described as a ‘framing and re-framing’ process required for learners interacting within and across e-learning interfaces and processing information presented by others.

The role of the teacher, as traditionally perceived within the school context, also appeared to be changing. A simple example of this change was demonstrated by Thomson and De Bortoli’s (2007) findings of almost half males and one third females self-taught for computer and Internet use, with only 18% of females mainly taught at school, and twice as many males as females taught by friends. Besides another possible indication of gender influence, findings were pertinent to both teachers and students of e-learning, in consideration of their role in the e-learning environment.
2.6.1. A change of roles for the learner and the teacher

Some benefits to the learner enabled by technology were:

- Connectivity to information and to others; 24/7 access to learning resources;
- Greater choice over time, place and pace of study; alternative modes of study: distance, blended work-based, partially or wholly campus-based, more active learning by means of interactive technologies and multimedia resources; participation in communities of knowledge, inquiry and learning; learning by discovery in virtual worlds; development of skills for living and working in a digital age. (Pachler and Daly, 2007, p.16)

A critical observation of the researchers was the significant motivation and participation required on the part of the learner to enable these benefits.

Issues of motivation, learner autonomy, and participation or collaboration also important in more traditional learning environments, appeared crucial for success within environments involving e-learning. Researchers in general perceived a critical role for the teacher in assisting learners’ involvement with these issues.

Ya’Acob, Nor and Azman (2005) recommended teachers needed to train students on how to become effective self-directed learners to enable them to determine their learning direction.

Despite the possible distance and time separation between the teacher and the student, McCombs and Vakili (2005) advised teachers understand learner-centred principles of learning using technology. Implementing a learner-centred framework provided the context and opportunities for improving technological skills such as reflective thinking, and networking and collaboration appreciated as important features of learner-centred cultures, “Learners need quality content and processes, time for learning and change, time to share successful practices, experiment, make mistakes, [and] improve” (McCombs & Vakili, 2005, p1597).

In the VHS environment Kozma et al. (2000) also emphasised teachers’ attention to learner authority and student interaction with each other for collaborative learning. Important pedagogical practice was to include group involvement and discussion in courses and activities.
Wright (2010) believed that collaborative/co-constructive pedagogies fostered interaction and co-operation and led to effective learning and better student/teacher relationships.

Haythornthwaite and Andrews (2011) however, noted participation and peer production aspects of active learning in particular, required motivation or commitment on the part of the learner. The preparation students had for this changed learning role, and the associated responsibility involving engagement with one or more other participants (students or teachers) in the learning process, was questioned.

Ideas of learning and knowledge as the subject of discussion on school reform were addressed by Finley (2000), in researching improvement in teaching and learning. The process of learning involved knowledge being formed by the individual due to interaction with materials, text and other information, ideas, people. As outlined in descriptions of the knowledge age or 21st century learning (Lai, 2008), increasingly, knowledge was no longer viewed as something passed from the teacher to the learner.

In the DE environment, research into levels of learning was a recommendation of Bernard et al. (2004). Understanding levels of learning ranging from simple knowledge or comprehension to higher order thinking, and investigation of the value of collaborative online learning, was encouraged.

Stahl (2006) emphasised historical perspectives of engagement and participation or collaboration with others as conducive to learning and development of knowledge.

An acknowledgedment of Haythornthwaite and Andrews (2011) was that an emphasis on collaboration and participation in e-learning could involve challenges. Their example of student approaches to information and use of information in e-learning noted the teacher role was important to guide and assist students to become confident in searching and evaluating a vast amount of information and opinion, to re-use, and to use appropriately, rather than in providing information to students in the traditional sense.

Bolstad and Lin’s (2009) participants had differing opinions in terms of whether the teacher’s role should involve support for virtual learners, such as adaptation of teaching approaches and strategies to assist and engage students, or whether the VC environment was merely better suited to more independent students. They considered many students’ lessons were still
teacher-directed, with teachers passing on information, and ICT used for traditional information-orientated purposes. They observed few innovative applications of e-learning such as students learning through interaction with others. A re-examination of the roles of both teachers and students in shared learning, providing student opportunities for establishing relationships, and communicating and collaborating during VC lessons, was recommended.

For both personalised and interactive learning to occur successfully, however, Bolstad and Lin (2009) contended some of their participants thought a system-wide shift was needed in the culture of the school. An examination of educational thinking was occurring, informing teacher and learner practice, and in some cases resulting in a change, or transformation, in learning and teaching.

2.6.2. Transformation of learning and teaching in e-learning

While changes in learning and teaching roles may be accepted, transformation is a powerful word, and many might not acknowledge it to describe the effects of ICT and e-learning on education. Lai (2008) also observed essential changes noted in the e-learning environment, such as the teacher no longer being perceived, nor expected to be perceived, as a knowledge provider. He noted these should be accepted due to the ever-changing role of the teacher throughout history. In this respect, transformation was regarded as a continuous, or ongoing, process.

Certainly, a transformation in terms of education provision enabled to a variety of settings was agreed. Haythornthwaite and Andrews (2011) noted teaching and learning once limited to the geographically defined community of the school, could now be extended to meeting or communication in ‘e-communities’. “E-learning fits everywhere and anywhere in this creative mix, one medium or multiple, authority driven Virtual Learning Environment or idiosynchratic user-designed mash-up of applications (Apps) and communications” (Haythornthwaite & Andrews, 2011, p.27). With so many options available, they advised teachers to make considered decisions regarding e-learning environments.

A 21st century transformation in learning in practical and social terms was predicted in Brown and Adler’s (2008) description of ‘Learning 2.0’. Jobs and careers were expected to change rapidly, and require retraining or re-educating. Due to a predicted lack of learning facilities such as a physical campus of a school or university, and limited learner access to existing
facilities, a web 2.0 form of learning would be needed. Shifts in authority and relationships already perceived in the role of teacher to students, and students to each other were predicted in Learning 2.0.

Therefore, opportunities for teachers in e-learning included the fact that they too, would participate as learners within a variety of learning environments. A demonstration viewed by some as a transformation of roles was the Tech Angels project at Wellington Girls’ High School reviewed by Bolstad and Gilbert (2006). Senior students with superior TK to staff, acted as IT trainers within the school, or essentially as teachers. Bolstad and Gilbert’s (2006) four arguments to support ICT use in schools, previously stated in this report, were identified in participants’ perceptions of the Tech Angels project. Some participants perceived the aims of the project were to improve teachers’ efficiency in administration and access to resources, or to assist them to keep up with digital generation tendencies by improving their own practice. As a consequence of the project, these participants expressed an increase or improvement in ICT proficiency. Other participants perceived the project as an opportunity for interaction and exchange of information with others, fostering knowledge age requirements. These participants were more likely to appreciate the ‘inspiration’ and ‘innovation’ afforded by ICT activities. The researchers concluded the extent to which participants perceived a transformation of learning and teaching roles might be influenced by their own perceptions of e-learning and ICT affordances.

It is expected RHS teachers will appreciate the affordances of technology for its’ ability to engage their students, for their own administration and access to resources, and to assist them to keep up with their students’ skills. In gauging their perceptions of learning and teaching with e-learning, it will be of interest to hear whether they perceive such factors as learner agency or independence, opportunities for participation and collaboration with others, a difference in traditional teacher and student roles in e-learning, or a wider appreciation of knowledge age learning opportunities.

Such an appreciation would assist teacher motivation, participation and/or practice in e-learning, in turn affecting pedagogy. However, even without this appreciation, schools’ commitment to NZ Curriculum goals (MoE, 2007), also determined their responsibility to
provide support or training to progress e-learning. Therefore, effective methods of support or training need to be implemented.

2.7. Fostering e-learning

This review of literature has determined ICT engagement and motivation are usually present in the student. Furthermore, ICT access, skills, use, attitude and pedagogy of the teacher are factors influential to teachers’ inclusion of e-learning. Blurton’s (1999) focus on teacher education and training as a key driver in the development of ICT-enabled learning environments supported the assumption that e-learning advances were most effectively fostered at teacher level.

As a result of the MoE’s (2000a) goals and strategy to pilot online programmes, NZ teachers have access to curriculum support online, for example in the form of the TKI website. An ICT/e-Learning advisory service, an online ICTPD community, and a national Virtual Learning Network (VLN) including a virtual PD project, are also available (MoE, 2012a). However, most formalised teacher training, skills development or professional learning opportunities though, are traditionally provided in the form of PD attended by teachers F2F.

To establish the best options for fostering e-learning in RHS, teacher participation, particularly in ICTPD programmes, was examined.

2.7.1. Professional development (PD)

Commenting on professional learning opportunities for teachers, Timperley et al. (2007) perceived PD as necessary to extend or enhance knowledge and practice and noted that in NZ, it was school leaders who primarily enabled PD for their staff.

Just as student motivation was necessary for successful learning, presumably teacher motivation was important in their willingness to participate or engage in PD. 2004 NZ teacher census data (MoE, 2005) indicated teacher numbers who had not participated in PD - primary 7%, composite 11%, secondary 13%, special school 8% - as quite low. However the situation of using whole-school PD which sometimes takes place within school time, and involves an expectation for teachers to attend, may falsely imply teacher motivation.
For PD to be relevant to teachers, Timperley et al. (2007) recommended a focus on engaging teachers in the learning process. They emphasised a ‘Teacher inquiry and knowledge-building cycle to promote valued student outcomes’. The cycle involved the identification of student needs, and of teachers’ own needs, designing appropriate tasks and experiences, carrying out teaching, and assessing the impact on student learning.

These recommendations identified for PD, were paralleled by those identified for ICTPD. Attention to learner centred approaches was also obvious in Bolstad and Lin (2009) recommendations to start at the level of the teacher, consider individual needs and understandings, and link teachers’ ICT development to their understanding of teaching and learning.

Similarly, Lai (2008) claimed PD should address the needs of individual teachers. In considering existing knowledge and theoretical and pedagogical issues, and retaining relevance to place of practice, it could contribute to a wider change.

Practical preferences for short, targeted workshops, individual assistance when needed, and direct participant experimentation with computers (Stuart et al., 2009), and motivating and rewarding teachers to use ICT (Balanskat, Blamire & Kefala, 2006), were further examples of learner centred recommendations.

The successful NZ example of the long-running TELA laptops scheme, motivated and rewarded teachers by funding laptops for individual teachers (Cowie et al., 2008a; 2008b; 2010). Johnson et al. (2011) noted participation in the scheme of nearly all schools they surveyed.

The TELA scheme also incorporated Bolstad and Gilbert’s (2006) perception of a gradual process of change for teachers. In reporting on the development of knowledge age learning goals they described a theoretical ‘spiral’ model of innovation and change, based on observations of successful ICTPD programmes they had researched. Teachers’ gradual advance was described from simple use of ICT; to increased proficiency in using ICT for teaching and learning; followed by the development of innovative use of ICT in teaching; to the stage of developing pedagogy and curriculum consistent with the transformative 21st century knowledge/learner goals.
This gradual process of development in aspects of ICT was also apparent in the NZ government initiative of ICTPD clusters (MoE, 2012a), where teachers worked in groups to develop ICT skills. An initial assessment by Ham et al. (2002) after a three year training period reported an increase in teachers’ skills, confidence and use of ICT both for administration, and by the students in those teachers’ classrooms. However, teachers still expressed concern about their ability to use ICT to improve student learning, and to keep up with continuing ICT developments. Therefore Ham et al. (2002) recommended PD should continue in an ongoing and long term format, emphasising ICT use in existing teaching/learning programmes. Balanskat et al. (2006), and Bolstad and Lin (2009), concurred with this view of the importance in implementing continuous PD.

Stuart et al.’s (2009) recommendation of participation in PD activities in small groups with colleagues and peers was also observed in ICTPD clusters (MoE, 2012a), where the sharing of ideas by groups of teachers was as important as the activity. Ham et al.’s (2002) view was that PD should include opportunities for teachers to observe specific use of ICTs by other teachers in specific teaching situations involving specific curriculum or learning objectives for specific students, therefore affording a move from ‘skill development’ and quantity of classroom ‘usage’ in teachers, to development of significant, ongoing courses adding educational value for students using ICTs. A similar idea of communication of positive attitude/practice examples towards ICT within the workplace was expressed by Balanskat et al. (2006).

Collaboration with others was agreed as important for teacher development. Just as participation and collaboration with others had been observed as important in student learning, as well as a focus on engaging teachers in the learning process, Timperley et al. (2007) identified interaction in a community of professionals as important within the PD context. The MoE (2006) encouraged greater progress in teaching and learning using ICT through sharing and adopting specific, successful examples. Communication of these best practice examples through interaction within individual schools, and with other schools, was viewed as essential in fostering improvement.

Bolstad and Lin (2009) also agreed teachers should share examples of innovative and successful practice, confirming whole-school PD as an avenue to expose staff to ‘new’ approaches to pedagogy and curriculum. Among their examples of goals within the PD
context were to emphasise a view of ICT as an environment for learning, introduce ideas about the roles of digital technologies in a 21st century learning environment, and challenge teachers to reflect on their pedagogy in such an environment.

This concept of developing participation by sharing and collaborating in a group, denoted that group as a ‘learning community’ or ‘community of practice’, recognised as key terms within the literature.

**2.7.2. Participatory learning – Communities of Practice (CoPs)**

Wenger (1998) was unsure whether it was he or his colleague, Jean Lave, who first introduced the term community of practice. It was based on a theory of situated learning, proposing a group of people with shared interest/problems/passion about a topic learn more successfully about that topic through interaction with each other (Wenger, 1998).

In interviews with twelve e-learning practitioners in the NZ tertiary education sector, Nesbit (2008) focussed on the best conditions for emergence of a CoP amongst theoretical e-learning students. Participants indicated a CoP was more likely to emerge amongst e-learning students when students had a passion to deepen knowledge and interact with others about the topic, when they already knew each other or were given a chance to get to know each other, when students were familiar with using technology to socially interact, and when students had shared or similar experiences. Ham et al., (2002) also considered the concept of clustering schools for ICTPD for teachers was particularly effective if schools had an established sense of community.

The idea of co-ordinated PD programmes designed to develop the school as a ‘professional learning community’ was popular with Lin and Bolstad (2010), who reiterated virtual teachers should focus on participatory learning, sharing their VC teaching experiences with colleagues, including those who had not experienced the VC environment.

Lai (2008) proposed TPACK was more likely to be developed in F2F or online CoPs where the focus was on learning in practice and sharing with others, than in the usual PD situation of gaining skills or knowledge through some more isolated form of training, seminar or workshop.
In the national VLN, supported by the MoE (2012a), schools, clusters, tertiary organisations, community and government agencies establish online communities around specific needs such as isolation and limited curriculum opportunities.

The MoE (2012b) also supports Learning Communities Online (LCO), wherein a group of organisations or individuals operate as a collaborative network, similar to the concept of a CoP, using either electronic or F2F mediums. The development of the LCO is informed by a belief that a networked school is more likely to succeed if it acts as part of a collaborative community.

Parr and Ward (2005) researched the FarNet project, an online community of teachers in 10 schools in the remote part of NZ’s North Island who had been part of an ICTPD cluster prior to the project. They considered the project was successful in introducing and/or improving Internet technology and ICT use in the FarNet schools, but made some critical observations. They claimed various issues and challenges surrounding virtual professional interaction and learning were involved in the development of an online community. Teachers needed specialised skills in creation and presentation of appropriate online resources to suit both the classroom and online environment. The purpose for the community was not shared by teachers in the schools prior to implementation and concepts of collective learning and consideration of teacher practice should have been better developed prior to the project. Website development, and collaboration and collegiality of teachers via production and sharing of resources, viewed as assisting a change in teacher pedagogy and enhancement of student learning outcomes was happening within some schools. However these were not as easily enabled in the wider group.

Parr and Ward (2005) concluded building a professional learning community was difficult to achieve within a traditional school, let alone virtually, However recommendations were that efforts to build community within and between FarNet schools could assist the initiative. Their conclusion again brought into consideration the geographical situation for the RHS. Although students learned within the classroom environment, the initiative was interesting due to its potential for development within one or all three RHS, especially considering the similarities of remoteness of the schools, age ranges of students, and desire to source quality curricula.
Would RHS teachers be receptive to the establishment of a CoP? Would the remoteness of individual RHS units from each other, allow a sense of community to develop sufficiently within the schools to establish any form of CoP? Did any already exist within the schools? Was the development of the CoP, and its extension into a virtual community environment, the best means of progressing e-learning?

Before exploring this concept further in the study, a summary of the various and diverse considerations found in literature relevant to e-learning in RHS was necessary.

2.8. Chapter Summary

The introduction to this study described four key differences in the RHS context of student illness, student location, managing student learning needs, and teacher location as potential barriers or challenges to student and teacher participation in learning and teaching with others.

The review of literature concentrated on studies or situations relevant to these differences of context. Particular emphasis was given to the remoteness of the RHS situation, and the affordances of technology for improving communication and educational opportunities for and between RHS teachers and students.

The progress of ICT and e-learning in NZ Schools was briefly outlined, with an appreciation of NZ Government clear statement of goals, and investment and support of numerous initiatives. Whether NZ Government investment was motivated by an economic need for a skilled workforce proposed by Selwyn (2008), or higher ideals such as the need for 21st century learner development proposed by Bolstad and Gilbert (2006) was immaterial. The review went on to outline effective examples and predictions of communication and educational opportunities ICT and e-learning afforded to students and teachers regardless of underlying motivation.

A gradual uptake of ICT and e-learning in schools was noted, possibly too gradual compared with student engagement and aptitude for technology. Teacher and learner practice indicated higher use of ICT and e-learning in secondary schools and for accessing resources, Internet,
email and schools’ LMS. Although lower use of collaboration and virtual activities was noted by Johnson et al. (2011), these were predicted to rise in popularity (Johnson et al., 2010).

Schools were motivators of students’ use of technology due to accessibility of ICT resources, and in particular the Internet, for student learning (Haythornthwaite, 2007). Issues of Internet access in NZ homes were compared with accessibility in other locations. Implications of lack of Internet access in terms of the digital divide and predictions for future use for students and teachers were of concern due to the variety of places RHS students are taught.

Implications for e-learning in alternative locations to the traditional classroom were considered. Options of F2F communication compared to online communication or CMC, DE options for situations of teacher absence, and studies of challenges and successes of VCs and DE were included for their relevance to the limited F2F communication opportunities of RHS teacher/student. Studies involving challenges of teacher planning in VC, DE and e-learning course design, and individualising online programmes were considered. These were relevant considering RHS teacher practice of accessing curriculum from various sources including Te Kura, and RHS teacher use of the IEP to individualise student programmes.

Perceived barriers to participation were further examined in literature pertinent to the RHS situation. Historic digital divide issues, other than location, were briefly addressed, with gender of the student no longer perceived as significant, but age more so. Younger students were seen to have more possibilities for choice or agency in programmes whereas older students might be more compromised by exam involvement. The nature of the subject, and amount of content were observed by Bolstad and Lin (2009) as two factors critical in the VC environment, with NCEA involvement a barrier to personalised learning.

Benefits and challenges of e-learning were considered in terms of whether all RHS students ‘fit’ the Prensky (2001; 2004) description, particularly regarding student attitude. It was noted that NZ students’ attitude was less positive than in other OECD countries. The potential of marginalising factors of distance, and ill health on student participation in learning were of most concern for RHS students. A gap perceived in research was in determining how limited access, or remoteness from a regular classroom and peers, might affect RHS student attitude or motivation. A further gap was in determining how health, particularly mental health, might affect motivation and participation.
Teachers’ ICT adoption, skills and confidence were noted, along with NZ Government input in improving teacher proficiency, and access to resources. The importance of teacher perceptions, attitude and pedagogy was stressed over gender and age attributes, which were considered to be diminishing. Indicators of progress or success in e-learning emerged around teacher proficiency, continued use, confidence, and ‘seamless’ integration of ICT into the curriculum.

Above all, teacher pedagogy or attitude towards their own and student ICT use appeared to motivate inclusion of e-learning for students, despite various challenges. Observations of effectiveness in alternative learning environments identified factors such as who was learner styles, teaching styles, and ‘how’ the learning was accomplished, as more important than the medium (Rice, 2006; Bolstad & Lin, 2009)

There was much agreement in the literature for the effectiveness of pedagogical actions such as personalising learning, variously termed active learning, learner autonomy, learner centredness or learner agency within the e-learning environment. As more freedom for the learner was perceived in the e-learning environment, therefore the need for self-direction or learner independence was a focus.

There was less distinction between the traditional roles of the teacher and the student, since both could be perceived as learners in the e-learning environment. In fact, emphasis in the literature was on a perceived change of roles in learning and teaching, and/or a transformation of learning and teaching necessary for promoting 21st Century learning.

For advantage to the RHS student, in terms of remoteness from peers and their SE for example, could be the pursuit of such 21st C learning goals as learner independence. Whether RHS teachers perceive e-learning’s affordances for opportunities of personalising learning, or as a means for students to collaborate with other parties in learning, was yet to be explored in this research. How RHS teachers perceived the preparedness or response of their students to the e-learning environment, in particular their motivation, or situation of isolation and marginalisation due to illness, was also yet to be explored.

For RHS teachers, the effect of limited collegial contact for support, and encouragement, was raised as an issue to be addressed in this research. Did the situation of lack of access to
classroom and peers affecting their students, also affect the role of the RHS teacher, their professional development and mentoring, technical support, provision of equipment, and drive to support e-learning? Regarding RHS teachers self-perception of ICT and e-learning, were there signs that any teachers were in the later stages of development of Bolstad and Gilbert’s (2006) theoretical loop or spiral of ICT innovation and change, and was this easier to achieve in the RHS situation because it differed to the conventional school setting?

Attention to the goals of progressing or fostering e-learning within RHS involved around motivating and training by way of PD, viewed as the avenue for teacher training in schools. The relevance of PD was to engage teachers in the learning process (Timperley et al., 2007), with emphasis on student needs and teacher needs identifying the same learner-centred approaches as effective for students. Practical, short, targeted, assisted, motivating were features of some successful NZ wide PD such as TELA and ICTPD. A gradual change was presented in models of transition from little or no use of ICT to innovative use.

As for students, collaboration and sharing of ideas was essential for teacher advancement. However PD, or even collaboration, with other staff in the RHS situation, is complicated due to teacher situation in units of various size and location. Examination of models in the literature, such as VCs, online communities and CoPs, as a means of participatory learning for passing on skills would be useful to explore as an avenue for PD within RHS.
3. METHODOLOGY

3.1. Research Design, Approach and Paradigm Identification

Employment of both quantitative and qualitative approaches in the mixed methods design of this research enabled data from each approach to inform the other. The mixed methods design was defined by Tashakkori and Creswell (2007) as “research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study” (p.4).

Teddlie and Tashakkori (2009) claimed pragmatism was the philosophical partner for mixed methods research because it, “embraces perspectives from both sides of the [constructivism-positivism] paradigm debate in interaction with the research question and real-world circumstances” (p.73). They suggested a refinement of classical pragmatism - dialectical pragmatism – in a search for ‘workable solutions’ to the problem being considered. Dialectical pragmatism allowed dialogue between contrasting paradigms that traditionally associated with either quantitative or qualitative approaches, enabling relevant aspects of differing paradigms to be applied. It was therefore adopted as the informing paradigm for this research.

The two-phase sequential explanatory design described by Creswell and Plano Clark (2007) was the specific mixed methods design employed. When using this design the researcher was advised to explain the reasons for the sequence of the phases in the design.

The quantitative phase occurred at the beginning of the research, providing descriptive, statistical information of the RHS service by surveying 72 RHS teachers. Data was gathered for teacher and student gender, age, location, e-learning practice, access to colleagues, and support in e-learning. It assisted in describing features of the service which contrasted to traditional schools, and gave an indication that RHS was a remote teaching situation. Data also provided general information about RHS teachers’ perceptions of themselves, and their students, in e-learning.
An advantage of the participant selection model of the design was for the data collected and analysed in the initial quantitative phase, to inform purposeful selection of a smaller sample of participants for the second phase of the research (Creswell & Plano Clark, 2007). Therefore the qualitative phase which followed, comprised interviews of 11 RHS teachers identified in part using quantitative results.

Qualitative data in narrative form was analysed to provide specific examples and a deeper insight into teacher practice and perceptions identified in the quantitative phase. Interview analysis provided further exploration of the assumptions RHS was a remote service, and that RHS teacher and student participation with others was necessary in enhancing learning, teaching and communication. Each phase is addressed in order of sequence in the following sections.

3.2. Quantitative phase – Rationale and design of the questionnaire

The questionnaire evolved following reading and professional discussion. Questions were designed to gather data relevant to RHS teachers’ current practice in e-learning. Selected questions were adapted from Research NZ biennial reporting of ICT and e-learning in NZ schools (Johnson et al., 2009; Johnson et al., 2011). The Northern Health School’s IT provider account manager also informed the design by displaying and discussing surveys used to assess ICT needs for schools (meeting, December 9, 2011).

Questionnaire items relevant to potential enablers, barriers, challenges and promotion of e-learning considered in the literature review, were included. The NZ teacher census (MoE, 2005) was valuable in providing a comparison between RHS context, and that of other NZ schools.

Comprehensive, practical recommendations for question design were gained through the work of Fink (2009). The mailed, self-administered questionnaire developed (Appendix I), incorporated predominantly closed questions, some five point Likert scale responses from strongly agree to strongly disagree, and some simple rating scales.
Three RHS principals were invited to trial the questionnaire and make observations on design and content. All principals approved the design, and small adjustments were made to the wording of questions as a result of their observations.

**3.2.1. Questionnaire - Respondents and data collection**

Questionnaire respondents were RHS teachers employed permanently, or on long-term teaching contracts (six weeks or more), in a full-time or part-time capacity. Teaching staff employed as day-to-day relievers were not approached to participate as they might not have sufficient knowledge of the schools’ e-learning capability, nor be available as an employee of RHS for the duration of the research.

Following approval of the research within their school, Principals and BoTs of the three RHS supplied workplace postal addresses of RHS sites, and teacher numbers at each site. According to this information, 16 questionnaires were sent to Southern Regional Health School teachers, 30 to Central Regional Health School teachers, and 56 to Northern Health School teachers.

Seventy three responses were received. One respondent maintained they did not use e-learning with students when answering a question gauging provision of e-learning. As the study of teacher practice in e-learning was an essential research goal, it was preferred respondents would be providing or attempting to provide e-learning to give a valid perspective. Therefore this response was excluded from the sample. The responses from 72 respondents, or 71% of the original sample, constituted an excellent response rate.

**3.2.2. Questionnaire - Data analysis**

SPSS software was used to analyse questionnaire data. Descriptive statistics and frequency tables provided mean and percentage data supplying a profile of RHS teachers, their provision of e-learning, and their perception of the value of e-learning for themselves and their students. Data also gauged teacher perceptions of professional development. Some group statistics and cross-tabulations of data were able to be performed. Numerical data was useful in describing the situation and general perspective of the larger RHS sample. Quantitative data was revisited in later discussion and analysis of specific cases during the qualitative phase.
However the sample size of 72 meant a very small size of sub-groups prevented more thorough analyses of quantitative data such as t-tests or ANOVA. In terms of gender, for example, the male to female ratio of 7:65 respondents did not allow inferential statistical procedures to be applied, and this was similar in other sub-groupings.

Creswell and Plano Clark (2007) advised the weighting assigned to each phase of the sequential explanatory design should be stated. Although essential to data gathering and analysis, the inability to report more sophisticated data analyses for the small sample size was a contributing factor for the lower weighting of the quantitative phase within the design.

### 3.3. Qualitative phase – Rationale and design of the interview

The quantitative approach partially assisted the identification of factors of benefit and challenge to teacher provision of e-learning, and options for support in e-learning for RHS teachers. The qualitative approach allowed individual teachers’ perspectives on specific practice, or use of e-learning programmes, to strengthen quantitative data. Where applicable, in the qualitative interview participants were reminded of answers they gave in the questionnaire to enable reflection and explanation of their original responses. In describing their own experiences with their students, teachers could better illustrate responses to the questionnaire. Issues which had not been considered in the design of the questionnaire or in the search of literature might be discovered, or better outlined.

The semi-structured interview (May, 2001) was the preferred interview design. May (2001) advised that participants’ answers to specific planned questions, could be probed by the interviewer for further clarification or information. Thirteen questions based on the initial questionnaire comprised the interview framework (Appendix II). Eight included probe questions, to prompt the participant for further detail if necessary.

Participants were encouraged to answer in narrative form, including personal stories, and examples. Therefore, the rich or ‘thick’ description provided by the narrative data, was another factor in affording a higher weighting to the qualitative phase of the research.
One Northern Health school senior manager participated in a trial of the interview to assist in checking question clarity and interview timing. Minor adjustments were made to the wording as a result of this trial. The interview duration was 55 minutes.

3.3.1. Interview – Participants and data collection

Thirty five questionnaire respondents indicated their willingness to participate in the personal interview by providing contact details at the end of the questionnaire. This number was significantly higher than an estimated number of ten. Data from the initial quantitative phase to guided purposeful selection of participants for the following, qualitative phase as described for the participant selection model of the two-phase sequential explanatory design (Creswell & Plano Clark, 2007).

Four respondents were excluded. Three had worked for less than two terms in the RHS service, and it was assumed their brief length of employment constituted less experience to comment on teaching a wide range of students within specific RHS settings. One respondent stated they would be interviewed only if the target number of participants for the interview was not reached, and was excluded because there were other willing participants.

The range of variables assessed in the questionnaire included location and size of RHS unit, ages or location of students taught, subject levels taught, origin of e-learning programme, teacher design of e-learning programme, and teacher gender and age group. Although a broad representation of these variables was desirable in participant selection for the interview, some were given greater importance than others.

To determine the variety of teacher provision of e-learning, questionnaire respondents selected e-learning activities or practice used, subject areas of e-learning provision, and origin of the e-learning programme provided, during the previous 18 months. Scoring one for each response option, a total score of 17 was possible over the three questions, with a higher score generally indicating greater variety in provision. This data was used as a guide for selection of initial participants, all of whom have been given different names.

Two highest scores of 15 and 14 respectively, indicated Louise and Liz used a wide range of e-learning practice and activities. Both used e-learning in all subject options listed in the questionnaire, as well as in additional subject areas. Both used e-learning sourced from four or
five providers, as well as devising e-learning programmes themselves. In terms of location, Louise worked mainly in student homes, and sometimes in a hospital setting, and Liz worked in a mix of student homes and SEs. Louise had less RHS teaching experience than most other respondents.

Andrew and Sandra were selected from the group of next highest scores because their location for teaching students was in a RHS class, and/or hospital or residential setting only.

Two respondents were selected due to listing specific uses of e-learning the researcher was unfamiliar with. When approached, one declined due to unavailability for interview, but Judi was selected. Katie, who indicated innovative use of e-learning online, was also selected.

Although teacher age and gender were not key considerations, selection of Anna, in a lower age group to those already selected, and Duncan, gave a wider representation of these factors.

Selection of three other high scorers, Jacqueline, Linda and Gretchen, maintained an equitable ratio of staff from all three schools. Linda also had the longest RHS teaching experience of all respondents, and Gretchen’s teaching was predominantly in the Y11+ age group.

After phone and email contact, 11 participants were confirmed for interview. Although generally representative of an older age group within RHS, participants indicated good e-learning practice in a variety of settings, influenced by a variety of factors.

Immediately prior to the interview it was explained to participants they would be asked 13 questions and some sub-questions based on the questionnaire they had completed. They would be able to review their questionnaire answers where relevant for the interview. As their own experiences and opinions regarding e-learning with their students were most important, they should use the questions as a beginning point in relating their own stories, including examples wherever possible.

Participants all appeared comfortable, speaking clearly and relating thoughtful, personal narratives with minimal verbal input or prompting from the researcher. Interviews took 50-90 minutes and were recorded.
3.3.2. Interview - Data analysis

The eleven interviews of one to one and a half hours length were transcribed verbatim by the researcher, and generated between 4000 and 7000 words per interview. Transcripts were neutralised by changing the identity of personal information concerning the participant, their RHS or RHS unit, or people they commented on e.g. students or colleagues. Small reductions in data were made by removing some ‘ums’ ‘ahs’, and repetitions of statements within the same questions. Transcripts were sent to participants for them to change or request a change to any items. It was explained transcripts would be reduced further into themes and returned for another round of participant checking. All agreed transcripts were accurate. One participant altered the language of her transcription as she considered the ‘tone’ in the interview sounded superior. However this did not affect the content of her data.

The transcription process, and further close reading assisted in gaining familiarity with the interview content, but a method of analysis for reducing the data and identifying themes for the next stage was necessary. King and Horrocks (2010) described a version of thematic analysis called template analysis involving:

the conventional move from preliminary coding close to the text to higher order themes... by construction of a coding structure – the template – that is applied to the data and revised as necessary until it captures as full a picture of the analyst’s understanding as possible. (p166)

The template form of thematic analysis suited this research for several reasons. Firstly, King and Horrocks’ (2010) claimed the researcher could define some (but recommended not too many) a priori themes relating to important theoretical concepts or perspectives that had informed the design and aims of the study in advance of the analysis. Therefore, prospective themes were initially guided by the interview questions, which seemed a reliable option for a novice researcher. The hierarchical structure for the coding could then accommodate increasing levels of depth, with the so-called ‘top-level’ themes extending to encompass deeper sub-themes where necessary. Data that did not fit well with initial themes could be used to revise the original template by adding or redefining the template. This process did occur within the qualitative analysis, with the original template undergoing several revisions and additions of new categories.
Secondly, the process of template analysis appeared to be appropriate for use in this Mixed Methods approach with a qualitative emphasis since it:

> does not systematically differentiate between ‘descriptive’ and ‘interpretive’ coding...it assumes the two can never be entirely separated – any theme must be grounded in what is actually present in the data (and so is to some extent descriptive) but at the same time it accepts that there can be no such thing as ‘pure description untouched by human interpretation.....[It is not that the process] rejects any distinction between description and interpretation: rather it treats them as more like poles of a dimension...Some themes will be more strongly interpretive than others and on the whole analysis will tend to become more interpretive overall as the researcher proceeds and grows in understanding of the data” (King & Horrocks, 2010, p168).

This process did occur just as suggested, during analysis, and was reflected in the mix of descriptive and interpretive reporting of results for the research.

Other practical features of template analysis (King & Horrocks, 2010) confirmed it was appropriate for this research. The initial template could be constructed on the basis of a sub-sample of the data set (recommended 6 out of 20 interviews), and applied to code subsequent transcripts. It was recommended as suitable in projects with a sample size of 10-25 hour long interviews, and with two or more distinct groups in the data set to compare.

### 3.4. Ethical considerations

Ethical issues were a major consideration in this research due to my position as Deputy Principal of the Northern Health School, and familiarity with some staff from the other two RHS. The work of Mutch (2005) was an excellent guide in preparing for the research, and for ethics approval from The University of Auckland.

Initial permission for the research to be undertaken was gained via letter and information sheet to three RHS Principals and BoTs. The information sheet outlined the research goals and design. Permission was requested to send questionnaires to permanent or long-term contract
RHS teachers, and to further interview a smaller number of selected staff individually at their RHS unit or a location of the teachers’ choosing.

3.4.1. **Confidentiality, anonymity and privacy**

All three RHS Principals and BoTs provided Unit addresses and staff numbers for each site. Questionnaires and pre-addressed envelopes were sent to units, with letters including information about the researcher’s position, and research goals and design. In this way, informed consent was provided to prospective participants. Response to the questionnaire was voluntary.

If staff returned responses in the pre-addressed envelope their replies remained anonymous to the researcher, unless they supplied contact details indicating interest in participating further in the interview. If they chose to return the questionnaire via email, responses were not anonymous. Thirty five out of seventy three questionnaires returned included staff name and contact details.

Following selective sampling, 11 participants were phoned to assess their availability for interview. They were reminded their participation was voluntary. An email request was sent, with further information about the research and an explanation of what would be required for the interview providing informed consent for the qualitative phase. One participant declined at this stage, and was replaced.

Participants were informed of how and when information they supplied would be recorded, reported, stored and ultimately destroyed. They were advised their own names would not be used in any reporting. Although confidentiality would be respected by the researcher, they were advised it might be possible for other staff to identify them in the final report due to specific practices or examples they described.

3.4.2. **Participant safety**

A participant information sheet stressed issues of participant safety in terms of their employment relationship remaining unaffected, considering the position of the researcher. They were made aware of personnel to approach should they have concerns about the research.
Participants were interviewed at a venue of their choice. Two participants chose to be interviewed at their homes, three chose to be interviewed at a community location, and six chose to be interviewed at their RHS office or unit.

Prior to the interview, the researcher reviewed the participant information sheet and conditions of the interview with participants. They were reminded of their right to decline to be recorded, or have the recording device turned off, to withdraw at any stage, and to withdraw any information up to the time results had been analysed.

3.4.3. Validity, reliability and trustworthiness

Triangulation of data occurred through the process of using mixed methods. Data gained via questionnaire in the quantitative phase was analysed using SPSS software and further supported by narrative data gained via interview in the qualitative phase. Although there was only face validity for questionnaire data, interview transcripts provided narrative data recognised for its’ validity due to the fullness of the information provided. This is commonly termed thick, rich description.

The questionnaire was checked for content and relevance by three RHS Principals. The interview outline was trialled by a senior staff member from the Northern Health School. Comments resulted in minor alterations to wording and design of the questionnaire and interview outline.

For interview participants, member checking occurred at two stages of the data analysis. Participants were able to check initial transcripts and ask for these to be altered or parts to be deleted. Once data had been coded, a further check by interview participants was completed. Reducing and coding of interview data for analysis used a recognised method of template analysis.

Storage and disposal of data was according to The University of Auckland guidelines.
3.5. **Chapter Summary**

In summary, a two-phase sequential explanatory Mixed Methods design was employed to accommodate both quantitative and qualitative approaches in this research.

The value of the quantitative approach, occurring in the first phase, was its’ ability to define the RHS setting and teachers in terms of descriptive statistics for factors such as location and components of teacher caseload. Perceptions of 71% of RHS teachers’ e-learning practice and provision were gathered and analysed. Quantitative data also guided selective sampling of 11 participants for interview.

Narrative interview data provided rich descriptions of RHS teacher opinion and specific e-learning provision, emphasising information gained in the quantitative phase. In this way, data from each phase supported data in the other and verified the decision to use a Mixed Methods design.

Despite the researcher’s position of employment at the Northern Health school, the one to one interview situation proved successful in allowing participants to speak candidly about their own, and their students proficiency and tendency towards e-learning. Participants readily volunteered their perceptions of methods of support or professional development which prevented or progressed e-learning within RHS.

Considering the position of RHS as a specialised area within the NZ education sector, one limitation of the research was a lack of transferability of results to other settings.

Nevertheless, an accurate description of a variety of teacher e-learning practice, barriers and challenges to e-learning provision, themes of RHS student and teacher remoteness, and the importance of participation with others in e-learning emerged in analysis of results.
4. RESULTS AND DISCUSSION

In this chapter the reporting of quantitative and qualitative results and discussion is combined. Where both types of data are reported in the same section, or in discussion of the same issue, quantitative results are presented first, followed by qualitative. Throughout the chapter participants in the questionnaire, or quantitative phase, are referred to as respondents. Interview participants in the qualitative phase, are referred to as participants.

The first section of the chapter reports RHS teachers’ current practice in e-learning in terms of their use of ICT and e-learning. Preferred ICTs and e-learning according to subject areas, programmes and resources, and origin of the programme, are identified. Issues of benefit for e-learning experienced by the teacher, or student, are generally addressed prior to issues of challenge.

4.1. RHS teacher use of ICT and e-learning

In the 18 months prior to completion of the questionnaire, 97% of respondents had supported their students to access online resources; 70% had supported their students to use an online LMS belonging to RHS, Te Kura, or the students’ SE; 60% had used web 2.0 tools with students; and 8% had used other methods of e-learning. Although these results did not indicate all 97% of respondents supported ICT use for all of their students, nor the frequency of support for students, they appeared to indicate use of e-learning by a majority of respondents.

Respondents showed highest ICT use for accessing online resources, and for LMS use. However, more than half of all respondents also used web 2.0 tools, perceived as involving greater interaction on the part of the learner (Johnson et al., 2011).

For this study it was assumed teachers’ perception of the value of ICT for student learning would motivate higher use of ICT targeted towards learning as opposed to entertainment, engagement or access to resources. This purposeful use of ICT for improvement in learning was recommended by researchers such as Wright (2010).
Levels of agreement selected by respondents, for statements regarding their perception of the value of student ICT use, were represented in Table 1.

Table 1

*Teacher perception of value of ICT use for student*

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Important for resources/info for student</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>strongly disagree</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>disagree</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>neither agree nor disagree</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>agree</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td>strongly agree</td>
<td>36</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100</td>
</tr>
</tbody>
</table>

| **Important to student learning objectives** |           |         |
| strongly disagree              | 0         | 0       |
| disagree                       | 3         | 4       |
| neither agree nor disagree     | 10        | 14      |
| agree                          | 41        | 57      |
| strongly agree                 | 18        | 25      |
| Total                          | 72        | 100     |

| **Opportunities for student learning** |           |         |
| strongly disagree              | 0         | 0       |
| disagree                       | 1         | 1       |
| neither agree nor disagree     | 6         | 8       |
| agree                          | 37        | 52      |
| strongly agree                 | 28        | 39      |
| Total                          | 72        | 100     |

Table 1 showed a majority, but not all respondents, believed ICT was important in providing resources and information for students, providing opportunities for student learning, and important to student learning objectives. Although disagreement was low, most disagreement or indecision was for the importance of ICT to student learning objectives.

Jacqueline expressed the most commonly held view of interview participants regarding initial decisions to include e-learning in the student programme. Priority was given to establishing
students’ immediate learning needs, and a secondary consideration was whether e-learning could address those needs somehow.

Therefore, teacher practice in use of e-learning to address students’ learning needs in specific subject areas was examined.

4.1.1. **E-learning practice - subjects**

Quantitative data reported respondents’ provision of e-learning in order of greatest to least in Mathematics, English, Careers, Science, and other subjects. The results differed slightly to those of Johnson et al. (2011), who reported provision of e-learning in NZ schools in order of greatest to least in English, Mathematics, Computing, and Social Sciences.

An importance placed on Numeracy and Literacy as core curriculum areas, would explain RHS teachers’ highest use of e-learning for Mathematics and English. Inclusion of only five subject categories in the questionnaire - Mathematics, English, Careers, Science, and other - explained further differences in results. However, investigating RHS teacher e-learning provision according to subject needs explained possible influences on teacher practice.

**Mathematics e-learning** 86% of respondents had provided e-learning in Mathematics in the previous 18 months.

All interview participants reported high use of e-learning in Mathematics, with the commercial Mathletics (www.mathletics.co.nz) web 2.0 programme most frequently used. Although appreciated for its’ engagement of students, the greatest advantage stated by Sandra and Gretchen, was the opportunity to individualise the programme, with adjustment according to students’ ability. Students of a higher year level could participate in a lower level Mathletics programme where necessary, without this being obvious to themselves or other students.

Websites were a source of expert knowledge for participants, particularly for those teaching senior, or more academically capable students. Liz, Katie and Gretchen used Khan Academy (www.khanacademy.org) to introduce or reinforce prior learning of more complex Mathematical concepts. Liz, Judi, Duncan and Anna used instructional video clips on Youtube (www.youtube.com), or Google (www.google.com) to assist students’ understanding, and sometimes their own. Anna claimed the one to one RHS setting lacked the stimulation of peer
involvement, and her use of the NZ Maths (www.nzmaths.co.nz) website was a source of innovative lessons.

Proficient in their use of these familiar websites, participants appreciated affordances for their students of engagement, individual programmes, expert knowledge, and stimulation in the absence of peers. Purposeful use of quality resources important to their students’ and their own learning, explained high use in e-learning for Mathematics.

**English e-learning** 75% of respondents had provided e-learning in English in the previous 18 months.

For interview participants teaching younger or less capable students, online resources supported motivation or interest in reading. Sunshine online (www.sunshineonline.com.au), and Oxford readers’ online (http://ukcatalogue.oup.com/category/education/primary/digitalresource) websites were effective for this. A specific Youtube video, ‘Battle at Kruger’ was identified by Sandra, as an example of enriching student reading in conjunction with a junior reading book ‘The lucky little buffalo calf’.

Motivating students to write and communicate with others was another purpose for e-learning in English. Liz set up Wiki most often for students below Y9, and Sandra described use of Power point. Both programmes were highly effective in enabling creation, saving, and sharing of personal communication with family and RHS or SE teachers and peers.

Fostering discussion or facilitating communication within a small class of students, all with mental health needs, was Andrew’s intent for a ‘quiz’ activity regularly used. Although the e-learning activity was to research information for answers, it was essentially used to increase participation within the group.

Achievement of NCEA or other assessment was a focus for older or more capable students. For students studying specified Literature texts and lacking the opportunity for class discussion Sandra introduced the study guide website, Sparknotes (www.sparknotes.com). This provided expert critiques of texts and ensured NCEA criteria that Literature was critically acclaimed. Judi assisted senior students to access English revision items, or to create revision items, especially for texts not commonly used. She might use a specific website, but more
often used Google to search for appropriate resources. As an alternative to reading text for the NCEA English ‘Response to reading’ standard, Louise introduced students to viewing speeches from TED (www.ted.com), where they listened and responded to a topic of their own interest.

As for Mathematics, teachers used websites for student engagement, motivation and quality resources in English. Although specific websites were identified for certain activities, a more diverse range of websites was required for researching topics, expert knowledge, or revision for English, than for Mathematics.

The same quality of practice and purpose appeared to exist for English e-learning as for Mathematics. However in English, there was more opportunity for activities involving reading, communication and connection with others.

**Careers e-learning** 58% of respondents had provided e-learning for students in the Careers/transition area in the previous 18 months.

Five interview participants favoured the Careers New Zealand (www.careers.govt.nz) website for its’ value in assisting students to make choices in subjects and courses of study. Participants’ familiarity with the website allowed them to assist students in decision-making for current study and future training and career pathways, often leading to subsequent searches for information. Careers NZ e-learning activities were engaging for students, explaining this subjects’ third highest use in RHS. Activities were particularly learner-centred through fostering students’ course or career goals.

**Science e-learning** 44% of respondents had provided e-learning in Science in the previous 18 months.

Interview participants had accumulated knowledge of specific websites for individual programmes or topics, used predominantly for their own or student access to resources. Favoured websites were the Science hub (www.sciencelearn.org.nz), video science (www.sciencehouse.com), LearNZ (www.learnz.org.nz), BBC bitesize (www.bbc.co.uk/bitesize/), and Kids biology (www.kidsbiology.com). Favourite Youtube video clips for commonly taught science topics also enhanced student learning through interactivity.
Expert knowledge and virtual learning experiences were accessed through audio/video conferences and virtual fieldtrips. An extensive variety of topics requiring research related to SE topic focus, explained fourth highest e-learning use in science. Science e-learning required teacher knowledge or proficiency in searching a wider range of websites than previously mentioned subjects.

**Other subjects** In the previous 18 months 36% of respondents had provided e-learning in subjects other than Maths, English, Careers and Science.

Interview participants claimed that access to expert knowledge was essential for supporting senior students studying a subject the teacher did not have content knowledge (CK) of, or did not teach regularly. Katie found the previously mentioned Khan academy useful for various subjects, but most recently for CK in senior Accounting, which she rarely taught. Louise found podcasts (learnfrenchbypodcast.com) and the BBC website (http://www.bbc.co.uk/languages/french/) effective in supporting students’ occasional foreign language studies. Although relatively proficient in Te Reo Maori, Gretchen used the Google translation facility for difficult translations.

For many specialised subject areas or levels of attainment, participants acknowledged to students their own inability to be CK experts. Use of technology to assist this, demonstrated the TPACK skills promoted by Mishra and Koehler (2006). Teachers’ modelling or support to students in online searching of CK, was a positive example of the ongoing searching and learning required in 21st century learning.

Maintaining awareness of websites, and the ability to quickly access online resources for various subject needs, was the greatest challenge perceived by participants. Therefore RHS teachers accessibility to resources for programme provision, was important to gauge for its’ effect on e-learning.

**4.1.2. E-learning practice – resources**

Teachers’ options for accessing curriculum resources or programme (not e-learning) were via their own RHS, Te Kura, or the student’s SE. 26% of respondents used a relatively even mixture of these sources, 74% used one source more than the other two. Teachers reported
their practice, including benefits and challenges in terms of e-learning provision, for each option.

**Te Kura** 61% of respondents mainly sourced the student programme from Te Kura, 13% used Te Kura resources sometimes, and 26% rarely or never used Te Kura resources. 83% of respondents had accessed e-learning via Te Kura in the previous 18 months.

Participants’ practice in general was to use the Te Kura programme for long-term secondary students, particularly those at Y11 and above with specialised subject or assessment needs. Although the majority of Te Kura courses were supplied in booklet form, or in a mix of booklet and online resource, they were increasingly being provided online. E-learning was incorporated via online links to the Te Kura Online Teaching and Learning Environment (OTLE).

For a student of Anna’s, the opportunity for e-learning via Te Kura had overcome the situation of remoteness limiting educational experiences. Without the opportunity for local exposure to the topic, he had used a Music toolbox on the OTLE facility to listen to examples of dance tracks before creating his own.

Four participants praised the quality of online links within the Te Kura NCEA Level 1 Science, Chemistry and Horticulture, and NCEA Level 2 Art programmes. These were perceived as extending students’ information and understanding of the topic through richer explanations than the text content of the programme. Katie noted the value of links within the Art course to personal interviews, and examples of the artists’ work, in providing background information motivating independent research. Several participants maintained their own enjoyment and understanding of a subject had improved.

Participants agreed e-learning options were improving continually in content and user-friendliness, as predicted by Kozma et al. (2000) and Rice (2006) for online programmes. Sourcing student programme via Te Kura appeared to be an increasingly successful option for e-learning.

However, a challenge perceived by participants was their need to support student participation. It was rare that students could independently use the Te Kura website and OTLE facility. The process of going online to the Te Kura website and accessing OTLE when
students began the course, needed to be demonstrated. Continued encouragement to use the site was necessary, possibly due to the effort required on the part of the student.

SE 15% of respondents mainly sourced the student programme from students’ SEs, 46% used SE resources sometimes, 39% rarely or never used SE resources. 36% of respondents had used e-learning enabled via their student’s SE in the previous 18 months.

Linda and Andrew noted an increase in the number of students accessing their SE LMS to complete work set by SE teachers, and perceived a benefit for students in maintaining a connection with their SE teachers and class when participating this way. Students accessing the commercial Mathletics or Maths buddy (www.mathsbuddy.co.nz) sites enabled through their SE login rather than RHS login, worked reasonably independently on e-learning set up by their SE teacher. Andrew stated an advantage to students in working as a part of their SE Mathletics ‘classroom’ was the SE teacher following the student’s progress alongside the rest of the class, despite the student’s absence. In contrast, Louise preferred students use the RHS log-in and work as a member of her own Mathletics ‘classroom’. For students who used their SE log-in, she observed RHS teacher access was not enabled. Therefore planning, assessment and reporting facilities to view work, or communicate with students, were unavailable. She perceived a difficulty in some students not wishing to have both log-in options.

Although the SE was the least used source of e-learning for their students, participants mostly encouraged students to maintain connections with SE teachers and/or peers as recommended by researchers (Bolstad & Lin, 2009; Haythornthwaite & Andrews, 2011; MoE, 2006; Wright, 2010). Challenges in doing this are addressed in later results sections.

RHS 36% of respondents mainly sourced the student programme using RHS resources, 35% used RHS resources sometimes, and 29% rarely or never used RHS resources. 22% of respondents had used e-learning enabled via their RHS in the previous 18 months.

Three participants had direct involvement in developing their RHS’ LMS online environment enabled by Moodle (www.moodle.org.nz). Anna’s preference was in developing the Maths area of her RHS’ site by collecting and formatting a series of web links to other online sites. Links incorporated activities based on games and interactivity rather than instructional teaching. She believed there was potential for more frequent use of such links in Mathematics.
For subjects/topics less regularly taught, sites may be rarely used within a short space of time, therefore Anna recommended teachers should search online as required.

Louise’s RHS had also stored course and website links in Maths and English areas on their Moodle LMS. One area developed by a staff member - Fiction engine (www.thefictionengine.com), incorporated games or interactive activities targeted towards adolescent age groups, in several subject areas.

Liz’ interest and responsibility in developing her RHS’ Moodle site included the intent to incorporate facilities for student education and communication. She and Louise appreciated the potential to use a blog or Wiki type system within Moodle, for communication within and outside of RHS.

A challenge of the Moodle environment, stated by Louise, was the cumbersome nature of accessing a course or activity. Accessing the website on a computer, logging in, selecting the student area, the subject area, then the specific course or activity she considered a possible deterrent to teachers and students. She proposed simpler access to structured, well-planned courses would enable more effective use.

Louise, Anna and Duncan shared the view that a major challenge in creating a course for RHS students was their unpredictable and inconsistent lengths of admission to the RHS roll. It was difficult to generalise courses to suit students requiring access at various times, and for varying lengths of time, throughout the year.

Despite a focus in e-learning course design on predicted innovations such as game based learning (Johnson et al., 2010), early stages of RHS’ LMS development in all three schools was a probable reason for lower use of their RHS as a source of e-learning. Nevertheless, RHS teachers also had access to e-learning for student programmes from sources common to all teachers.

**Government supported websites** In the previous 18 months, 85% of respondents had sourced e-learning via NZ Government supported websites such as NZCareers, NZQA, TKI and StudyIT.
Besides the frequency and effectiveness of use of the NZ Careers website mentioned by participants in the subject section, Linda and Andrew noted the potential of the site particularly for motivating disengaged students.

The NZQA (www.nzqa.govt.nz) website was well used by participants teaching NCEA level students. Gretchen described typical teacher use in guiding students with the log on process to check entries and achievement, and plan their assessment schedule throughout the year. Anna praised website exemplars for fostering academic improvement through sharing other students’ work.

Participants’ less frequent use of the TKI (www.tki.org.nz) and StudyIT (www.studyit.org.nz) sites, mirrored Johnson et al.’s (2011) findings of some useful resources appearing to have low levels of use. The TKI website Digistore area (http://digistore.tki.org.nz/) was used by Louise for accessing learning objects which she described as interactive and engaging for students. However, Anna stated she had not appreciated the value of the NZ Maths facility on the same site, until she began to work on her RHS’ Moodle project. Although aware of the site, she claimed it could be overlooked with the urgency of setting up individual programmes for new students. Jacqueline too, maintained a lack of time in being able to explore it as a reason for infrequent use. Liz found it cumbersome to navigate and perceived it was more time-efficient when planning individual programmes, to search on Google, for example.

Duncan was critical of the StudyIT website, noting approximately 20-25 links on the front page interface which he considered overwhelming for many students. He claimed it was suitable only for the high functioning academic student, with students seldom motivated to use it until they reached an independent learning stage.

Participants’ familiarity with particular government supported websites, and use of e-learning for specific student needs or purpose, again indicated effective practice. Challenges were perceived in the frequency of setting up learning programmes for new students, and for complicated features of some websites frustrating students’ independent use.

**Commercial/other websites** In the previous 18 months 89% of respondents had sourced e-learning via commercial/other websites.
Participants searched and accessed sites to individualise programmes for student motivation, enrichment, and information and skills development. The previously mentioned Mathletics programme was Liz’ her first consideration for primary level students who came onto her roll and needed to improve Mathematical skills.

For a student awaiting a heart transplant, Louise had accessed a website (http://www.pbs.org/wgbh/nova/eheart/transplant.html) where the student interacted as part of an operating team in an animated transplant simulation. Linda had targeted e-learning activities prior to visits to a large Museum, a maritime Museum, and an Observatory. Venue websites were accessed for online bookings, and sometimes virtual visits.

As reflected in findings of Johnson et al. (2011), Google and associated programmes were favoured by participants. Sandra described reliance on information searches from Google, “which you can barely get through an hour without needing to use”. Gretchen’s use of the site for information and language translations, Katie’s use of Google Maps to ‘virtually’ visit ancient Rome with classical studies students, and Duncan and Gretchen’s use of Google images to enrich understanding were other examples of note.

Youtube was heavily favoured for instructional videos on a wide variety of subjects and topics, also reflected in Johnson et al.’s (2011) findings. Teachertube (www.teachertube.com) and encyclopaedia websites were used to a lesser extent due to teachers’ better familiarity for Youtube.

Familiarity, as well as ease of access to favoured sites, contributed to some participants’ belief they had developed proficiency to the extent of ‘seamlessness’ in their provision of e-learning.

Lack of time to explore individual websites and to explore a wider variety of websites, was the most common challenge expressed by participants in identifying useful sources of e-learning. An appreciation that attention to learner centred programmes might not require frequent use of the same websites and that sites might change before there was a need to use them again for another student, meant some teachers were reluctant to save ‘lists’ of preferred sites. While Google or other searches were used to find appropriate sites, it was usually necessary for teachers to develop scanning techniques to quickly assess the value of resources.
Deterrents for Duncan in his use of programmes such as Mathsbuddy (www.mathsbuddy.co.nz), were a lack of sophistication of interfaces and animations, and the retention of an Australian narration perceived as unattractive to his students.

From these initial findings RHS participants appeared to be developing skills and proficiency in their use of various subjects, websites and sources of e-learning. While some claimed a sense of seamlessness was developing in their practice of online searching, challenges in continuing to identify new resources, and lack of opportunities for repeated use were noted.

A further important resource-related issue was RHS teachers’ practice in use of specific ICTs.

**Affordances of technology** Each RHS was trialling the use of various ICTs for e-learning. Teacher personal ownership of ICTs was increasing, and personal use increased teacher proficiency. The issue of seamlessness in their practice of searching websites was also found to be a feature in teachers’ preference for technology.

Louise attributed personal ownership of an iPad directly to her proficiency in ICT and e-learning. She appreciated almost instant and uncomplicated access to an extremely wide range of applications. A common teaching practice was to pre-select webpage bookmarks or applications, storing them in a named student file, and changing application settings to suit each student. A web link to the application or web address could be emailed to the student to use on their computer. Students could also download many of the most-used applications from the Internet onto their own computers.

For a visually impaired student Linda downloaded audible books from the student’s SEN school and Amazon (www.amazon.com), onto an iPad. Having some limited vision allowed the same student to use the Mathletics programme with the iPad held very near to her face. For a student with Arthritis Liz was trialling use of an iPad as an alternative to the sometimes painful exercise of manual recording.

For Linda’s senior students, use of a Kindle (https://kindle.amazon.com/) was effective in providing NCEA reading assessment and recreational reading resources. Kindle use, with adjustments for light and size of type on the computer screen, was successful for visually impaired students, but she perceived the Kindle also appealed to students who were reluctant readers.
Well-established computer programmes afforded opportunities for e-learning. Examples were Sandra’s previous mention of the Microsoft Power point programme, Jacqueline and Liz’ use of the Microsoft Publisher programme to support students’ presentation of work, and Andrew’s use of the Microsoft Paint programme for students to design and plan outside structures. Simple email contact between the SE, home, and Linda, was effective for a recent student who did not engage with a Te Kura programme. Accessing the student programme from SE and emailing specific work to the student’s parents, maintained connection with all parties and motivated the student to work on their regular programme.

As predicted by Johnson et al. (2010), RHS teachers viewed mobile devices as a benefit for teaching in various situations. Judi used a laptop and iPhone for ease of access to e-learning when she made community visits. Duncan and a student ‘discovered’ access to the SE Wifi and LMS when working with the student’s iPhone in the SE library. Both Judi and Duncan claimed student ownership of iPhones or smart phones was increasing, consequently increasing the convenience of connection and access to SE work. A challenge perceived by Duncan and Louise for the iPhone, was the disadvantage of the size of the screen, although Duncan claimed students didn’t consider this an issue.

Louise’s definite preference was for the interface, size and capabilities of the iPad. It enabled the teacher to set up learning programmes for the student and constant access to programmes when the teacher was absent. Although it was not apparent to her that student ownership was greatly increasing, she considered it would be ideal.

A variety of ICTs were used by participants to enable e-learning, and opportunities to explore new ICTs and affordances appeared to be available, and increasing. Access to the Internet however, was the key resource identified in enabling e-learning (Haythornthwaite, 2007; Wright, 2010). RHS teacher practice in e-learning determined by location, noted the importance of access to various resources, but particularly to the Internet.
4.2. Where RHS teachers use ICT and e-learning

An assumption for this section was that consistency of teaching location would influence e-learning provision. Regular teaching in a well resourced classroom space for example, should be conducive to providing opportunities for e-learning.

Location of teaching was a two-fold issue, with the first consideration being RHS teachers’ main teaching location as displayed in Table 2.

Table 2

Main teaching location for teachers

<table>
<thead>
<tr>
<th>Location</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital or residential ward/room</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Hospital or residential classroom</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>RHS classroom</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Student home</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>SE</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Public place such as library</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Online</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Even mix of locations</td>
<td>30</td>
<td>42</td>
</tr>
<tr>
<td>Other location</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100</td>
</tr>
</tbody>
</table>

Data reported in Table 2 showed 42% of respondents listed their main teaching setting as a mix of two or more locations. All of these teachers experienced variation in teaching environments.

33% of respondents taught mainly in students’ homes. For those teachers, the teaching location for each student differed, because each student home was different.

Regardless of their main teaching location(s), Table 3 showed respondents providing e-learning in each location.
Table 3

Places of e-learning provision to students

<table>
<thead>
<tr>
<th>Place of Provision</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital/residential ward provision</td>
<td>no</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>72</td>
</tr>
<tr>
<td>RHS class provision</td>
<td>no</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>72</td>
</tr>
<tr>
<td>Home provision</td>
<td>no</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>72</td>
</tr>
<tr>
<td>SE provision</td>
<td>no</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>72</td>
</tr>
<tr>
<td>Public place provision</td>
<td>no</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>72</td>
</tr>
<tr>
<td>Online provision</td>
<td>no</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>72</td>
</tr>
</tbody>
</table>

Table 3 showed 72% of respondents had provided e-learning in an RHS classroom, despite the RHS classroom showing as the main teaching location of only 12% of respondents in Table 2. 68% of respondents had provided e-learning in student homes, whereas but student homes were the main teaching location of 33% of respondents in Table 2. One quarter to one third of respondents had provided e-learning at SEs and/or in a hospital or residential ward or room. Provision of e-learning was equal lowest for respondents in public places such as a library, and online, but still comprised almost one-fifth of the sample.

Access to the Internet and other resources, time available to meet with the student, and the ability of the student to continue to work in teacher absence, emerged as key influences on RHS teacher practice in e-learning for each location described.
4.2.1. Student home

68% of respondents, and nine interview participants had experience teaching in students’ homes. Teaching sessions were generally of 60-90 minutes duration, up to twice a week. Liz stated a goal common to other participants of using the F2F time available during her visit to motivate students to participate in learning in her absence. She perceived e-learning had more potential to do this than other learning programmes due to its’ greater capacity for student engagement. Participants used F2F e-learning opportunities in general, to research and explore sites with students and develop student independence.

In initial home visits there was a need to establish the ICTs and Internet resources/access available for student use. Both Louise and Liz stressed the importance of asking parental permission specifically for student use of the computer and Internet for completion of work. Parents were generally supportive, and their encouragement usually enabled successful participation in e-learning.

Some participants were experimenting with adaption of existing programmes to other modes of delivery for home-based students. For example Katie was about to trial the Availll (www.availll.com) reading programme, normally used with a DVD on a screen in the classroom situation. Teachers in her unit planned to take the programme to students in remote areas using a laptop to enable delivery.

Participants agreed the resources most effective in enabling e-learning in students’ homes were students’ personal laptops or similar, and Internet that was easily accessible. All of Jacqueline’s and Katie’s, and most of Duncan’s current students had access to computers and Internet in their homes. This was a pattern the teachers believed had been improving over several years. For example, past difficulties in Broadband service within Katie’s teaching region had decreased. Judi estimated one-third of her students were well set up with computer and Internet easily accessible. Anna was the only participant who observed a lot of her students’ homes were without a computer and/or access to the Internet.

Liz and Judi explained availability and access to the home computer could depend on where in the home students were taught. Judi estimated half of her students would have a computer which was not easily accessible during her visit because of computer placement in the home, or another family member using it. Computer placement in a different part of the room to
where the student and teacher were working, or with another family member using it, often required a specific request for student access. A computer in a different room, especially one in their bedroom, complicated use because of RHS requirement for supervision. Other challenges mentioned by Anna were lack of familiarity with the student equipment, and the inability to guarantee equipment would work efficiently. In a few cases, as for one of Liz’ students, a complete ban from using the computer was in place and specific requests to use it for e-learning activities had to be written on the student’s programme outline.

For students without a computer, a laptop might be taken to use at the student home for a specific task. However, Liz explained general reluctance to do this due to preference for the visit to be used for teaching contact rather than for computer access. A computer might be loaned to a student in some cases, but Internet access was too costly to be facilitated by RHS for daily student use. A specific concern for students challenged for Internet access was expressed by Jacqueline, who perceived their participation in Te Kura courses would be restricted due to the continued increase in e-learning content in those courses.

The convenience and ease of using participants’ own laptops, tablets or smartphones for teaching or demonstrating in the student home required Internet access enabled by the home Wifi connection. Louise and Jacqueline agreed parents were usually happy to enter their connection password. However, some were reluctant due to Internet connection limits, and concerns or lack of understanding about connection requirements. Use of a 3G card or stick could overcome this problem, but could also present other challenges. 3G was inclined to be a slower connection option, and heavy use applications could use up the allowance within a brief time space. While the cost of the 3G option was paid by their RHS, participants felt uncomfortable spending too heavily. Louise noted several popular websites used Flash animation. This required her to use a laptop, as Flash could not be used on her iPad. She therefore needed 3G use on both her laptop and iPad, or parents’ permission to use their Wifi on both. For parents concerned about access to their Wifi for one device, the situation was compounded in asking for access for two.

Participants were limited by lack of F2F time for individual lessons in the home. In teaching senior students, Anna contended time was compromised by the necessity to focus on specific subjects or assessments separately, let alone to include e-learning. Louise and Gretchen agreed
that even the slightest factor such as the home computer being turned on could be an issue for promptness of delivery within the lesson time-frame. The time factor of setting up a laptop, start-up, and activation of the modem was a concern for Louise as this could intrude on the student lesson. If a further link to the Wifi was required, that also took time.

Relying on students’ independence in learning was also a challenging issue. While Duncan agreed it was time consuming for him to demonstrate e-learning activities, his main concern for home-based students was that e-learning was predominantly only successful for high-achieving students, due to their greater independence in learning.

Despite benefits of engaging students in learning which might continue in teacher absence, and advantages for working individually with students on a learner-centred programme, there appeared to be many challenges for e-learning provision in the home environment. Equipment and resources such as Internet access, while improving, were sometimes restricted in use or access for the teacher and student. Time available for e-learning during the visit was limited, and design of the e-learning programme was often dependent on student independence or parental support in teacher absence.

Although teaching of some students was restricted to the home environment due to health or distance requirements, the challenges presented in teaching in the home environment often motivated teachers to encourage alternative locations to teach students.

4.2.2. RHS class or unit

72% of respondents, and all interview participants, had experience teaching students able to attend an RHS class or unit space. Teaching was generally for a longer time than in the home, and might occur once or more during the week. Participants reported their units were well resourced for e-learning. Not only were there sufficient ICTs, they were usually in close proximity to teacher and student, enabling ready access to online resources.

Judi, Sandra and Duncan agreed that e-learning was probably more readily available, and more easily supervised at RHS units than in a large computer class or lab at a regular school, due to smaller numbers of students in the RHS unit. A benefit for RHS teachers was their knowledge of what the students were studying individually, enabling them to ensure students remained on task.
Gretchen perceived a benefit in the longer F2F teaching time available at the RHS unit, for using or introducing e-learning programmes. However, Anna’s observation of time constraints in covering specific subjects or standards separately, with senior students at home, was still valid for teaching in the unit situation. She and other participants mentioned time pressures in managing individualised programmes when several students working on different subjects and standards might be present in the RHS unit.

Participants also observed the wide range of student ages or levels represented in the RHS class. Sandra noted ICTs could be an asset in this situation, and that peer tutoring could occur, which both older and younger students appeared to enjoy. However Anna considered the individual levels and programmes of students provided difficulty in co-operative learning or in co-operative use of ICTs and e-learning. For example, interactive whiteboard use might only have relevance for one student programme at a time, within the unit.

RHS units were well resourced, and conducive to e-learning, making them the preferred location for teachers to facilitate e-learning. Challenges were still present in managing student learning needs in terms of time constraints, and opportunities to facilitate co-operative learning for students with a wide variety of learning needs.

4.2.3. Schools of Enrolment
Although the SE was not the main teaching location for any respondents, 36% provided e-learning in this location if their students were attending the SE part-time.

Nine participants had recently provided e-learning in SEs, and reported mixed experiences. Liz found teaching in secondary school learning support centres or libraries a good option for e-learning. There was usually immediate access to computers, for teacher and student use whenever required during the lesson. Jacqueline spent significant time teaching students at a local secondary school and was easily able to access the school wireless/broadband. As previously noted by Duncan in his earlier example of a student accessing the SE LMS by smartphone from the SE library, schools were increasingly developing systems for all students to access the Internet and e-learning, on site.

Challenges for the SE situation, such as not knowing in advance where they would be working with the student, were explained by Louise and Linda. Access to a computer in a workspace
where the student could log on to the school Internet service, was not guaranteed. Heavy use applications must be either downloaded prior to the lesson, or avoided due to the need to use 3G for Internet access while with the student.

Judi found students’ own computers or smartphones were often brought to school. In using these, or SE computers, sometimes Wifi connections were difficult to access. Students might be reluctant to use their own 3G allowance for intensive data requirement, due to small data limits. If Judi’s laptop didn’t connect to the Wifi either, she needed to use her own phone for e-learning.

Benefits of the SE location for e-learning were continued development of SE e-learning programmes, student participation in the same learning programme as their SE peers, and potential collaboration with SE teachers and peers. Nevertheless, variability in ICTs, Internet access, and meeting venue were challenges to e-learning provision in this setting.

4.2.4. Hospital or residential setting

Sandra and Andrew were among the 7% of respondents for whom a hospital/residential setting was their main teaching location. If a RHS unit or class space was incorporated in this setting, they agreed e-learning provision was similar to other RHS units. Teaching time was generally greater than for community visits, they were well resourced for computers and for Internet access, and both noted e-learning might be better enabled than for regular students in their SEs.

Linda’s access to computer and Internet were also good at her office on the site of a health campus. She could provide a teaching space, but its’ size limited the number of students she could accommodate. If she chose to relocate to a larger space for the teaching session, all equipment needed to move.

In the majority of hospital sites where teaching occurred in a hospital ward or room, Internet connection was non-existent or significantly challenged. Sandra taught in wards in either of two hospitals. Laptops could be used on wards in only one of those hospitals to teach students unable to attend the hospital classroom. Even on those wards Internet connection was often difficult, and this was a deterrent to using e-learning. Wards at the adjacent hospital site,
where most students 15 years and older were taught, had no Internet access. For Internet access those students needed to visit the RHS hospital classroom in the adjacent building.

Louise’s experience of teaching students at her local hospital was typical for teachers where the hospital or residential unit did not incorporate a RHS unit. It was unusual for students to have their own ICTs or ability to connect to the Internet, and Louise used her own laptop and 3G to enable e-learning. These conditions were not conducive to e-learning.

**4.2.5. Library or community space**

19% of respondents had provided e-learning through the use of wireless enabled computers at a community space such as a public library. This was an innovative move and several participants noted its’ effectiveness as an option. Linda described the requirement of most libraries for reconnection after half an hour of Internet use, but noted reconnection was usually quick and uncomplicated.

For several students in the outer vicinity of her RHS unit’s teaching region, Judi booked a library meeting room twice weekly where students had access to Wifi facility and to computers in the main library area using a booking system. Another alternative was for students to bring their own device (laptop or iPhone) and use the library Wifi. Because students own laptops might be unreliable, having her laptop available was also an option. She appreciated the use of computer and Internet access for two of her students in particular. One student used an online Te Kura programme and had Wifi access at home, but during the day completed schoolwork at the family workplace where there was no connection. The other student had a rarely used dial-up connection at home. E-learning was better enabled for both students in the library situation.

Teaching in public libraries was a practice enabled due to NZ Government strategy of providing Internet access to schools and communities (MoE 2002). It was a successful option to enable e-learning for students who lacking facilities in their home, and unable to attend their SE or RHS unit. It was also an opportunity for students to observe an alternative means to access ICT and e-learning within their communities. Although students participated among others, due to individualisation of programmes there were limited opportunities to collaborate with others in learning.
4.2.6. Online

A fault of the questionnaire was that it had not adequately defined an online environment. 19% of respondents who had provided e-learning in an online environment may have interpreted this as an online F2F situation only, whereas using CMC between one or more parties asynchronously could also constitute an online environment.

Apart from those located solely in hospital or residential settings where regular F2F teaching was possible, all other participants regularly used CMC via email or text message. This was mainly used for organisational purposes such as arranging meetings, setting programmes, or enquiries around progress of work.

Liz enabled CMC with students she set up with Wiki, finding this a successful means of collaboration for many students Y10 and below. Louise noted CMC extended her contact time, particularly with students who owned a tablet or smart phone. Students had access to written, photo, game-based or video communication with her or their SE via e-message, posting websites, or video call at a time that suited both parties. Combining text, email and document sharing allowed regular practice on their programme. She cited use of Google docs and sites, Facetime, Skype, blogs, Wiki and discussion forums, and frequent participation with students using interactive and competitive games such as Words HD or Draw free.

Judi had developed a method of online teaching she called ‘co-construction and editing via email’ as a means of extending teaching time for senior students. Linda, Katie and Gretchen described similar practice, without giving it a name. The Microsoft Word programme, sometimes with the tracked changes facility, and email contact between the teacher and student, was used to discuss and progress student work.

Katie and a colleague regularly used the Learning in Virtual Environments (LIVE) system managed by their RHS. A computer, fast internet connection, webcam and Bridgit conferencing software (www.smarttech.com/bridgit) enabled speaking, viewing and desktop sharing between two or several parties. LIVE use for Katie was motivated by teaching in a geographically widespread unit with some challenging road conditions, and offered alternative or extended F2F online communication with students located at a distance.
Although Katie and Gretchen and reported problems with connection and time delays in the early years of LIVE set up, Katie noted this was no longer the case. Improved capability of equipment and reduction in time delays meant students could now view or show Power point presentations, for example, online. The co-construction and editing process via email was a typical activity that could also occur between teacher and student on LIVE. Although many F2F activities could also be used, Katie considered there were some disadvantages for these in the LIVE environment. Viewing on a screen combined with a brief time delay, meant voice, facial expression, and body language cues which helped her decide students’ understanding of a concept, were diminished. These disadvantages were similar to those identified by Kanuka and Rourke (2008) as challenges identified in early e-learning programmes, which should improve over time.

Some students Katie and her colleague brought ‘virtually’ into the RHS classroom via participation in LIVE discussion or teaching sessions. CMC had enhanced learning opportunities with the teacher and other students. However Duncan contended at RHS there was less opportunity for RHS student participation in an online group. His observation of a website set up in a SE where a blog was used to engage a group of students in a Literature study, was that similar use would be difficult for his students, studying different levels, subjects and standards at various times of the year.

As predicted, location of the student proved a significant factor affecting e-learning provision for the RHS teacher. Although Katie claimed factors of location were becoming more even over each RHS environment, e-learning was still best enabled in terms of resources and Internet access in the RHS unit or classroom. However in some cases challenges of student location had contributed to teacher innovation in e-learning practice. Notable examples were the use of the public library and LIVE locations, and the practice of editing and co-construing via email.

In hospitals or residential units, homes, SEs, public place and online, e-learning affordances remained variable. Over several environments the RHS teacher might work in, there were challenges in enabling and sustaining e-learning. Teacher and student location, along with e-learning resources, appeared to be a definite influence on e-learning provision. However, besides practical issues of location and resources which determined teacher practice, issues
pertaining to teachers’ perceptions of their students preferences for e-learning, were also a consideration.

4.3. RHS teacher perception of their students and e-learning

Factors of student gender, and culture or socio economic status were stated in literature as possible indicators of the digital divide. With frequent changes likely throughout the year to many respondents’ rolls, it would be difficult to specifically assess the effects of these factors on e-learning in RHS. Information regarding potential gender, age and attitude effects of students for e-learning relied on interview participants’ general perceptions.

4.3.1. Student gender and e-learning

The literature review for this study noted gender had been discussed historically for its effects on ICT use and e-learning. Some differences might still exist for male and female students’ perception of ability, attitudes, and preference in ICT and e-learning use (Thomson & De Bortoli, 2007).

The majority of interview participants were confident students’ gender did not affect students’ inclination to participate in e-learning. Nor did they believe student gender affected their own decisions in providing e-learning. Jacqueline re-iterated RHS programmes were individualised according to student needs rather than factors such as gender. Duncan considered it was a stereotype that boys might be more interested in e-learning than girls. Despite observing a tendency of boys towards mechanical drawing and graphics packages, he did not see major differences in what males and females used e-learning for educationally. He noted his practice of referring students to Youtube instructional videos, for example, was not gender specific in relation to students or video content.

Linda observed a gender difference in relation to presentation skills. In English, she perceived girls’ presentation skills were generally superior, and they had more tendencies towards computer use in word processing and email. This was also noted by Thomson and De Bortoli (2007). Contrary to Louise’s perception of lack of gender difference in participation in Te Kura courses, Linda noticed girls’ greater willingness to complete Te Kura work online. She perceived boys as more likely to participate in interactive programmes affording a more
immediate result or feedback. One example was a male students’ recent study for NCEA. When the student was unmotivated by the Te Kura programme, Linda successfully used the online Mathletics programme, which provided instant assessment for activities. She also found boys, in particular those who were reluctant readers, would read on a Kindle in preference to a book. This observation aligned with Kirkham’s (2011) findings of boys’ higher proficiency for online reading than paper-based.

Duncan and Liz both perceived a gender difference in students’ recreational use. Liz admitted being influenced by her observation of boys’ preoccupation with recreational gaming. Awareness of a disproportionate amount of time spent by a recent male student in an Internet game situation discouraged her inclusion of e-learning in that students’ programme.

The majority of participants expressed student gender was not an influence in e-learning. Nevertheless valid observations of different tendencies in student e-learning and ICT use were made, particularly for students’ recreational use. Considering RHS teachers’ ability to design the e-learning programme for the individual, it was accepted that student needs rather than gender, would be their first concern.

**4.3.2. Student age and e-learning**

A more significant factor of influence in e-learning was student age, profiled for RHS using questionnaire data. Three options of mainly, sometimes, or rarely/not at all, could be selected for respondents’ teaching of primary (Year 0-6), intermediate (Year 7-8), junior secondary school (Year 9-10) and senior secondary school (Year 11+) students. Respondents could select ‘mainly taught’ for more than one category if student ages were spread across groups.

Respondents mainly taught secondary students. 70% mainly taught, 22% sometimes taught, and only 8% rarely or never taught Y11+. At junior secondary level, 48% mainly taught, 42% sometimes taught, and 10% rarely or never taught Y9-10.

Participants considered e-learning for Y11+ students was more prescriptive than for younger students. It was targeted towards tasks, or research and support in specific subject areas or for specific NCEA assessments. Despite this limitation, Liz’ example of a high quality poster on animal science produced by an NCEA student was evidence that e-learning could still be enjoyable and rewarding at senior level.
From his own research of a small sample of high school students Duncan believed a shift in students’ independence in taking ownership of learning and e-learning occurred as they progressed to higher year levels. Students at advanced senior secondary levels were more inclined to access website support for specific e-learning, without teacher direction.

NCEA requirements could initially be a barrier to e-learning provision for the Y11+ age group. Planning a programme to suit academic needs was participants’ immediate concern. Sandra described typical practice in ascertaining the level of the student, and what could be achieved towards NCEA or other assessment standards, before introducing any e-learning.

For Y10 and below, use of programmes such as Mathletics, Wiki and various websites, indicated participants’ emphasis on skills development in core subject areas for students. Participants generally considered there was more opportunity for enjoyment in e-learning for these younger students, due to the opportunity for a student-centred focus on a topic of interest.

15% of respondents mainly taught, 63% of respondents sometimes taught, and 22% of respondents rarely or never taught Y7-8 students. 15% of respondents mainly taught, 54% of respondents sometimes taught students, but 31% rarely or never taught at primary level, Y0-6.

Katie, Linda and Sandra all assumed proficiency was common in even their youngest students. Although Louise’s practice of creating a student file on her iPad for use during the lesson suited all ages, the process of accessing the folder, and proceeding with activities was quickly learned by younger students. For very young students, Louise and Liz maintained parental permission and support was essential. In Louise’s experience it was more accepted for older students to use the computer, but restrictions on use or access for younger students, was common.

Student age appeared to influence teacher provision of e-learning mostly due to NCEA assessment, and factors of student independence and support, as also noted by Bolstad and Lin (2009).

4.3.3. Student attitude and e-learning

As well as gender and age, student attitude or behaviour towards ICT and e-learning was a feature in literature. Attitude was mostly portrayed as overwhelmingly positive (Prensky,
Respondents’ perceptions of student attitude determined by student enjoyment, confidence and perception of usefulness or importance of ICT were surveyed by questionnaire.

Table 4

*Teacher perception of student attitude to ICT*

<table>
<thead>
<tr>
<th>Teacher perceives student enjoys</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>disagree</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>neither agree nor disagree</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>agree</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>strongly agree</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teacher perceives student is confident</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
</tr>
<tr>
<td>disagree</td>
<td>5</td>
<td>7</td>
</tr>
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<td>21</td>
</tr>
<tr>
<td>agree</td>
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<td>56</td>
</tr>
<tr>
<td>strongly agree</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teacher perceives student considers useful</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>disagree</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>neither agree nor disagree</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>agree</td>
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</tr>
<tr>
<td>strongly agree</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4 results showed a majority of agreement or strong agreement by respondents that their students enjoyed, were confident, and considered ICT useful or important.

However, 21% of respondents disagreed or were uncertain their students considered that ICT use was enjoyable and/or useful, and 29% of teachers disagreed or were uncertain about student confidence with ICT. Therefore, they appeared to be more conservative in their perception of the strength of positive student attitude to that portrayed by Prensky (2001; 2004) and Net Day (2004).
**Student enjoyment** Although participants stated e-learning was not their immediate concern when first meeting a student, it was often a consideration due to perceived student enjoyment. Linda described a typical scenario of meeting a student, gauging their personality, initiative, learning style or preferences. In attempting to cater to the student learning style she increasingly included e-learning for instant engagement in the learning programme. However in one case her decision to include e-learning was influenced due to student lack of enjoyment. After introducing Maths online she had provided a book-based programme, explaining it could be used if the student had Internet problems or wanted variety. This student later stated a preference for using the book. Anna had a similar experience with a student for whom she provided a mix of programme for motivation. The student preferred to complete workbooks. Both found other students often preferred the option of a combination of online and bookwork.

In some cases, participants claimed student enjoyment was for just one aspect of the e-learning programme. Linda’s perception was of student enjoyment due to the instant reward or response afforded by interactive programmes. Gretchen observed particularly in Y10 and below, some students did not enjoy the programme if there was no game component included, or if the game or activity component in a frequently-used programme ceased to be engaging. Extreme enjoyment for personal gaming was described as a barrier to participation in RHS e-learning activities for a nine year old student taught by Liz. Although she included educational games, his preference remained for his own.

Katie, Duncan and Andrew claimed students’ motivation for e-learning might be reducing. They still perceived student motivation, particularly for visual presentation and moving images in some programmes. However they also considered the element of novelty had decreased due to increased exposure. Whereas Duncan recently assumed the Mathsbuddy programme would appeal to his students, they commented on a lack of sophistication of the interface and animations. Andrew’s perception was that students in general accepted computer use as a part of their lives, not bored by it, but not especially enjoying it either. These participants’ opinions paralleled those of Thomson and De Bortoli (2007) in explaining Australian, NZ and Swiss student attitudes less positive that the OECD average.
Overall, participants still strongly agreed that technology appealed to the majority of young people. Students’ positive tendencies to use e-learning, increased teachers’ tendency to include it in their programme. Examples given for students’ interest in interactive and game-based programmes raised the question of whether teachers perceived students found ICT and e-learning useful, as well as enjoying the activity.

**Usefulness** There was definite agreement by participants that students saw importance or usefulness in specific use of ICT or e-learning. Gretchen commented on students’ appreciation of usefulness of cell phones as spellchecker, calculator, navigational aid, and for various other research. The usefulness of programmes such as Google for everyday research in students’ lives was described by Sandra on one occasion when the Internet was inaccessible. A student resorted to researching the word ‘badger’ using a book. In addition to the more cumbersome process of finding an image of the animal, the quality of that image was disappointing compared to what would have been available online.

It was sometimes necessary for teachers to explain or demonstrate the usefulness of ICT. Anna described an example of a student needing to access a specific book, and Anna’s suggestion she check the local library online to obtain it. Although the student had not initiated the search, as a result of this experience in future she probably would.

Some participants believed students’ perceptions of the usefulness of e-learning were related to perceptions of enjoyment. Sandra believed younger students were more inclined to think of e-learning as entertainment rather than as useful. Louise maintained students of all ages appreciated the usefulness of game-based learning situation, but their enjoyment and inclination to use educational games, was less than for recreational ones.

In contrast, some curriculum delivery modes of e-learning not necessarily enjoyed, were nevertheless appreciated by students as useful. Jacqueline noted students could find the Te Kura programme and OTLE environment frustrating due a need to constantly search through pages on the site, but they were aware that it was useful for their coursework. Duncan’s research into students’ motivation to use the government supported StudyIT website, concluded younger secondary students did not perceive the site’s importance and were less inclined to use it.
Usefulness of ICT programmes such as Word, Publisher, Power point and Paint, for publishing, sending or storing documents, was appreciated by students. Katie commented that it was now rare for any of her students to complete items by hand. In contrast, Gretchen maintained it was difficult for her to convince students to complete their written work using the computer. In her experience of senior students’ long-term use of a Te Kura book-based programme, she considered the process of completing work in a booklet, and using that for revision and NCEA assessments, meant any e-learning task was viewed as less important or useful. For the example Linda had given of her student offered an online Maths programme, but opting for bookwork, she too perceived a sense of importance of written work as opposed to online work might be a reason for the choice.

Participants considered knowing or understanding the purpose of the e-learning task was key to students’ appreciation of its’ usefulness. While they appreciated use of ICTs or e-learning for specific purposes, as indicated by Wright (2010), they also opted for other methods of learning. Another possibility for this might be attributed to the next aspect of student attitude explored - that of confidence.

Confidence Although 73% of respondents agreed or strongly agreed their students were confident in e-learning, this was a less convincing percentage compared with 79% perception of students’ enjoyment and sense of usefulness of e-learning. Almost a third of respondents were uncertain, disagreed, or strongly disagreed that students were confident in e-learning.

Some interview participants perceived students’ ability to use technology was evidence of confidence. One of Andrew’s students displayed confidence in navigation of computer web links and programmes despite extremely poor typing skills. Katie and Andrew both observed students of a low academic achievement level could be confident in terms of their ability to type at speed, and to quickly pick up new concepts and techniques in ICT use. Gretchen, Anna and Sandra still found a small number of students unable to type, or use a mouse or a backspace key for example, and e-learning was compromised as a result of lack of confidence in this area.

Familiarity or ease of use of a website or programme was cited by Duncan and Jacqueline as important for student confidence. More confidence in terms of students’ high familiarity for specific websites such as Facebook, was noted by Jacqueline, for example. Duncan specified
for older students a ‘tricky balance’ of ease of use to instil confidence, combined with sophistication in appearance was required, but was lacking in several educational websites.

A previously mentioned preference of some students for a paper or book-based programme was perceived by Linda and Gretchen as a sense of greater confidence in that programme, than for e-learning. Linda stated advantages in a paper-based method for allowing students time to ponder, review or refer back to model answers or examples. Gretchen claimed a task involving completion of paperwork, gave students evidence, and a better sense of completion when this occurred. In the online environment Linda noted it might be necessary to scroll back through multiple pages, or select online ‘help’ which students were reluctant to do. Similarly, on some occasions Gretchen had set an e-learning task which hadn’t been completed due to more ‘involvement’ perceived on the part of the student to complete.

A lack of confidence in students indicated by Haythornthwaite and Andrew (2011), for specific processes such as researching on the Internet, was particularly noted by participants. Gretchen cited an example of a recent Y10 student a capable in using a Kindle reader, but unable to research for key ideas for a topic online. Liz explained some students would research in exactly the same places or sites, for example only in Wikipedia, rather than extending their search. In terms of researching using Google, some students might only search the first three or so options, whereas the confidence students required was to continue to search extensively on that or other sites.

While appreciating many of their students’ advanced skills in ICT use, teachers were not convinced of students’ confidence in e-learning. Jacqueline and Duncan considered students were easily frustrated by complicated procedures required to access work on some websites.

For several participants, student confidence in any learning was perceived as related to their general confidence. Rather than lacking confidence in e-learning specifically, for students disengaged with schooling due to their health, a lack of confidence might be related to a difficulty in seeking assistance from others. For RHS students, this issue was explored in relation to the potential effect of students’ health on their participation in e-learning.

**Effects of student health** As outlined in the introductory section on RHS context, RHS students’ absence from school may be related to mental health or somatic illness.
Some students had conditions which may or may not be associated with their illness, where technology was useful, and instilled confidence. Linda’s experience with the iPad, and use of the Kindle on an iPad or laptop for students with eyesight/light sensitivity problems have been outlined earlier. She considered e-learning and technology might have more significance for RHS students than students in a regular classroom. Liz’ trials of the iPad as an alternative to handwriting for a student with Arthritis, was another example. Jacqueline’s experience of students with Dyslexia was their general resistance to using a computer. Learning basic techniques of the Publisher programme improved their confidence in producing a document superior in presentation. For a senior student studying Graphics, a programme supplied by his SE was difficult to decipher due to his dyslexia. However use of the Sketchup web 2.0 programme successfully supported the subject.

RHS teachers perceived e-learning and the use of technology could assist students in making wider connections, as proposed in the NZ Curriculum document (MoE, 2007). A student of Linda’s was unable to feed herself after a recent operation. Manipulation of her iPad at the side of her hospital bed enabled her to for communicate and participate in e-learning. Supplying students with access to an SE e-learning programme was perceived by Liz and Jacqueline as a means of reducing student isolation. Liz’ preference was for Wiki or a class blog.

Mental health diagnoses or categories were not described individually in this study, but as for somatic illness, they covered a wide range of conditions and varying degrees of severity. For students with long-term or chronic somatic illness, it was also possible their mental health condition might also be compromised. Illness related to mental health resulted in a disengagement from school for all of Anna’s current students. She perceived without efforts to facilitate communication, some of her students in the home situation, wouldn’t have contact outside of the home. Besides not attending school, some had little or no contact with friends.

Judi explained for a student concerned about his body image, communication by phone was more effective than F2F. The students’ mother attributed this to the student being aware no-one was observing him. However Judi considered F2F visits were important in exposing the anxious or disengaged student to contact with people. She considered building confidence in communicating first with the RHS teacher, and then with other students took priority even
over curriculum learning goals for students with mental health needs. Nevertheless, due to anxiety or social anxiety problems, attendance and participation in a group at an RHS unit could be a major challenge.

Encouraging her students to meet with her in a group in the local library, was an attempt by Judi to improve students’ exposure to others. In this group, she noted student preference to use their own, or her laptop within the group, rather than leaving the group meeting room to book and use a computer in the main library area next to people they didn’t know. There was also reluctance in some students to ask permission from another supervising teacher to use library computers when Judi was absent. Duncan’s perception of several of his current students attending the RHS unit was that they would nevertheless lack confidence to participate with other SE students even using a blog, for example.

Experience using the LIVE system, allowed Katie to use technology for online communication with students anxious about attending an RHS class. Students met the teacher online, progressed to meeting other teachers online, then students, before meeting F2F in the classroom. As successful as this had been for Katie’s students with severe social anxiety or phobia, she, Jacqueline and Judi considered using online communication solely, could delay forming a working relationship between teacher and student. Although the student felt comfortable communicating online, they were not afforded the opportunity to relax in the teacher’s presence. All three teachers claimed this occurred in the F2F situation more quickly than online.

Two teachers observed ICT use could be a barrier to participation and communication with others. In the time Andrew had taught in his RHS unit, catering to students with conditions of serious mental illness, he estimated 20% of students would have used the computer as a means of avoiding personal contact, limiting their ability to improve social skills. He was currently teaching a student with Aspergers’ syndrome who constantly asked for time on the computer. The student had trouble focussing on a learning task instead focussing intently and at length on an item unrelated to learning. Therefore behaviour on the computer was educationally unproductive.

Sandra also perceived this tendency, citing a recent problem of a student with Anorexia with an online assignment from her SE. Sandra’s unfamiliarity with the course requirements
allowed the student more authority over what was completed. Sandra was suspicious the student used the excuse of reading or researching to disguise a focus on thoughts relating to the illness. She perceived a need to restrict ICT use, or structure the e-learning activity carefully for students disengaged with other people or with learning.

Interview participants agreed health and treatment for somatic illness could also be a significant challenge to student participation and teacher provision of e-learning. A student of Anna’s was frustrated by an inability to even remember the log on password when his memory was affected by heavy medication. Anna chose to limit e-learning until the medication was reduced. Duncan, Gretchen and Katie also described working with students whose energy and/or engagement in e-learning was significantly affected during periods of severe illness or treatment.

Participants considered the effects of chronic illness, or specific conditions associated with attitude or behaviour could have implications for student ICT use and teacher e-learning provision. On occasions this resulted in a tendency for teachers to restrict e-learning. In other cases ICT and e-learning had improved engagement and participation with others. Attending to individual student needs, and revisiting these regularly appeared to be the best practice adopted.

Factors which might advance RHS teachers’ ability to use ICT and e-learning were important.

4.4. RHS teacher perception of their own ICT adoption

This study presumed teachers who were proficient in their own use of ICT, would tend to include more use of ICT and e-learning for their students. Questionnaire respondents provided a general indication of RHS teachers’ ICT proficiency by rating their perceived level of adoption against one of six levels of a scale adapted from the ICT in schools report (Johnson et al., 2011), in turn adapted from Knezek and Christensen (1999).
Table 5

**Teacher ICT adoption**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>aware of ICT but have not used it</td>
<td>0</td>
</tr>
<tr>
<td>learning to use/lacking confidence</td>
<td>2</td>
</tr>
<tr>
<td>understand and apply for specific tasks</td>
<td>19</td>
</tr>
<tr>
<td>familiar and confident</td>
<td>25</td>
</tr>
<tr>
<td>adapt ICT to other contexts</td>
<td>19</td>
</tr>
<tr>
<td>creatively apply ICT to new contexts</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
</tr>
</tbody>
</table>

Table 5 showed the majority of respondents (71%) rated their ICT adoption at higher levels of ‘familiar and confident’ or better, consistent with findings for NZ Principals’ perceptions of teachers in their own schools (Johnson et al., 2011). The NZ government goal of improving teachers’ skill or proficiency with ICT through improving technical knowledge (MoE, 2002) appeared to have been effective.

Potential factors identified in literature which might affect teachers’ proficiency were investigated for RHS.

**4.4.1. Teacher ICT adoption for gender**

7 males (10%) and 65 females (90%) responded to the questionnaire. The small sample size, particularly for male respondents, made it difficult to comprehensively analyse quantitative data for teacher gender. However, contrary to reports of traditional proficiency or preference for ICT in males (Morgan and Morgan, 2011; Haythornthwaite, 2007), two respondents who perceived they were learning to use or lacking in confidence in ICT skills were male.

None of the two male or nine female interview participants for this research perceived their gender influenced either their level of ICT adoption or their e-learning provision.

**4.4.2. Teacher ICT adoption for age and teaching experience**

Haythornthwaite’s (2007) citation of The Commission of European Communities (CEC, 2005) indicated traditional gaps for gender and older populations in ICT proficiency were
likely to decrease as proficient ICT users aged. Greater experience, and use of technology in the teaching situation, might also improve TPACK (Mishra & Koehler, 2006).

Data was investigated to discover whether RHS teachers’ level of ICT adoption might be related to age or teaching experience.

Table 6

ICT adoption for age group and teaching experience

<table>
<thead>
<tr>
<th>Age Group</th>
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<td>0</td>
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</tr>
<tr>
<td>learning to use/lacking confidence</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>understand and apply for specific tasks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>familiar and confident</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>adapt ICT to other contexts</td>
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<td>3</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>creatively apply ICT to new contexts</td>
<td>0</td>
<td>0</td>
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<td>4</td>
<td>7</td>
</tr>
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<td>Total</td>
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</table>

<table>
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<th>10-20years</th>
<th>20-30years</th>
<th>more than 30years</th>
<th>Total</th>
</tr>
</thead>
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<tr>
<td>aware of ICT but have not used it</td>
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<td>learning to use/lacking confidence</td>
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<td>0</td>
<td>2</td>
</tr>
<tr>
<td>understand and apply for specific tasks</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>familiar and confident</td>
<td>2</td>
<td>8</td>
<td>11</td>
<td>4</td>
<td>25</td>
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<tr>
<td>adapt ICT to other contexts</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>19</td>
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<tr>
<td>creatively apply ICT to new contexts</td>
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<td>1</td>
<td>1</td>
<td>3</td>
<td>7</td>
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<tr>
<td>Total</td>
<td>7</td>
<td>21</td>
<td>23</td>
<td>21</td>
<td>72</td>
</tr>
</tbody>
</table>

**Teacher Age** Table 6 shows more respondents in the highest age group of 50+, an age group unrepresented in the lower levels of self-perception of ICT skills. Four teachers (6%), in the 50+ age group perceived the highest level of ICT skills, creatively applying technology, than in any of the other age groups.
In the 40-50y age group, although two teachers (3%) perceived they were learning to use ICT or lacking in confidence, three teachers (4%) perceived they creatively applied technology.

Teachers in the two youngest age groups of 20-40y perceived their level of ICT adoption within the middle ranges.

The small sample size, and higher numbers of respondents represented in older age groups, made comprehensive analysis of data difficult. Nevertheless an older age for RHS respondents, did not indicate a lower level of ICT adoption, and younger age did not indicate a higher level.

Three interview participants believed their age was a factor in their ICT adoption. Anna, in the youngest teacher age group of 20-30years, perceived she adapted ICT to other contexts. She considered her age was a positive influence because she had grown up in a generation of ICT development, and had never known a time when she could not ‘Google’ something, for example.

Although a familiar and confident user of ICT in the 40-50year age group, Duncan observed ‘digital natives’ possessed an intuition for ICT that he was lacking.

Andrew, in the 50+ age group, perceived he understood and applied ICT for specific tasks due to frequent use of the computer for everyday personal and professional tasks. However he maintained his age was a factor which challenged his ICT use, stating a difficulty to learn ‘these things’ when you are old.

Two participants considered their age was not of great influence in their development. In the 30-40year age group, Judi perceived she adapted ICT to other contexts, but observed she was not considered a digital native as it was not until her final year of school that she used computers, and then only for word processing. Jacqueline, a familiar and confident user of ICT in the 50+ age group commented on people’s perceptions of gender, age and ICT adoption in relation to others. For example, while her teenage son might not consider she had excellent ICT skills, her own appreciation was of constant and purposeful use of ICT within work and home situations. In the RHS situation, it was possible teachers measured their own skills against others they observed.
**Teaching experience** Questionnaire data was analysed for teaching experience, with the intention to discover whether teaching experience might be a greater influence on RHS teachers’ ICT adoption than teacher age.

Respondents mean teaching experience was 22.21 years with a standard deviation of 9.48. Data from Table 6 showed 10% of respondents had up to 10 years teaching experience, and 29% had 10-20 years teaching experience. 61% of respondents had more than 20 years teaching experience, indicating RHS employed an experienced group of teachers.

Two respondents (3%) who perceived they were learning to use ICT or lacking in confidence had more than 20 years teaching experience. However, of seven respondents who indicated they ‘creatively applied technology’, three (4%) had teaching experience of up to 20 years, and four (6%) had 20+ years teaching experience. There was no clear indication that the length of respondents’ teaching experience was related to their ICT adoption.

Interview participants varied widely in teaching experience related to ICT and e-learning. Jacqueline maintained her ICT and e-learning skills development began 25 years prior, using the first 5 leased computers in a small country school. In contrast, Anna had only 6 years total teaching experience but attributed development of her skills largely to her first four years’ experience teaching at a school innovative in ICT use. Her observation of where she had gained experience being more relevant than length of teaching experience, illustrated the possibility that teaching experience within a specific school might influence teacher ICT adoption.

**Teaching experience within RHS** If relevance of ICT and e-learning use was important for students and teachers as observed by Wright (2010), and Bolstad and Gilbert (2006), among others, then ICT adoption of HS teachers may have developed as a result of specific purpose for RHS context.

With the RHS service established in 2000, the maximum RHS teaching experience that could be reported by respondents was 12 years. Mean RHS teaching experience was 5.61 years with a standard deviation of 4.18 years. 49% of respondents were below the mean. 10% of respondents reported less than one year RHS teaching experience, and 1-5 years RHS experience was reported by 42% of respondents. 26% reported 5-10 years, and 22% reported
more than 10 years. Despite their considerable teaching experience, most respondents had significantly lower experience specific to RHS.

Most interview participants reflected that regardless of prior teaching experience in ICT and e-learning, teaching in the RHS setting had influenced proficiency. For participants working in student homes and other community locations, a need to interact more frequently and effectively with students was a factor of location advancing ICT and e-learning use for communication.

Three participants believed teaching a wider age range of students in the RHS setting improved their capacity to include a range of ICT and e-learning. Prior to RHS teaching, Liz Louise and Judi had experience in junior, middle and high school teaching respectively, and believed their skills would have continued to progress in those situations. However, all three considered teaching subjects at a variety of levels at RHS enhanced their proficiency.

Participants’ regarded attention to students’ individual needs assisted their own ability to assess educational needs and inclusion of ICT or e-learning accordingly. Anna observed teaching students in an individual teaching situation meant she had learned to use technology in a different way to a regular classroom. Whereas regular classroom practice involved using technology with a group of students working together to solve a problem, in the individual situation there was only the teacher to assist if students didn’t know an answer, or couldn’t respond to a problem. Anna used e-learning, in the form of an interactive programme, for example, to provide opinion students might normally receive by collaborating in a group.

Three participants attributed skill development to experiences using specific programmes or technology supporting RHS students with additional needs. Linda’s use of the iPad and Kindle on iPad or laptop for Dyslexic, blind or low and/or light-affected vision students and reluctant readers has been mentioned, as has Jacqueline’s use of Scratch, for a student with Dyslexia. As well as use of the iPad for her student with severe Arthritis, Liz had taught two students at RHS whose learning needs were enabled directly by technology. For one SEN student, Liz was guided by a DTSL (www.assistive.dtsl.co.nz) specialist and Astec (www.astechnz.com) and Spectronics (www.spectronics.co.nz) assistive software to assist the student in learning to read.
Sandra, Katie and Liz stated a desire to keep up with teaching trends or ICT focussed programmes they observed in some SEs enhanced their own ICT and e-learning skills. Requests by individual students’ SEs for technology use motivated Sandra’s participation in activities that might be unfamiliar to her.

For two participants, observing ICT and e-learning practice of SE teachers contributed to a sense of dissatisfaction. Gretchen and Duncan maintained a lack of opportunity within RHS to enable e-learning in the same manner as it was used in regular school settings. In a traditional school, teacher specialisation in fewer subjects, across fewer year levels, warranted research and development of appropriate e-learning. Teaching standards in various subject areas with one or two RHS students, afforded little opportunity to explore subjects in great depth. Anna agreed the difficulty for the RHS setting was identifying activities which could be revisited often, particularly for senior students whose learning needs varied widely. Therefore the nature of teaching individuals and small groups at RHS could be a barrier to development in use of technology in the larger classroom setting, or for continued advance in a specific subject area.

Despite expressions of limited opportunity for advance in skills for the traditional school situation, there was general agreement that RHS experience had enhanced teachers’ proficiency. Their attitude towards aspects of ICT use in the RHS context, were next explored.

**4.4.3. RHS teacher attitude**

Respondents’ perceptions of value of ICT use for the student were shown in Table 1. There was general agreement that ICT was important in providing resources and information for students, opportunities for student learning, and was important to student learning objectives.

Johnson, et al.’s (2011) survey questions assessing teachers’ perceptions of the value of ICT use for themselves were adapted for the questionnaire, with results represented in Table 7.
### Table 7

**Teacher perception of value of ICT use for the teacher**

<table>
<thead>
<tr>
<th>Importance</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
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<tr>
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</tr>
<tr>
<td>Total</td>
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</tr>
</tbody>
</table>
Table 7 shows a majority of respondents expressed agreement or strong agreement for the importance of ICT in providing resources and information for the teacher, teacher practice, for making a difference in teacher and principal practice, and providing opportunities for professional development. Nevertheless there was substantial indecision, or disagreement, that ICT improved efficiency and quality of curriculum delivery.

Categories are addressed in the following discussion of results, with the final category, ‘New opportunities for PD’, discussed in a later section.

**Important for resources and information for teacher** The highest level of agreement or strong agreement (96%) by respondents for any category in Table 7 was expressed for the importance of ICT in providing resources or information for the teacher. Strongest agreement in this category was also found by Johnson et al. (2011) for NZ teachers.

All interview participants strongly agreed. Their varied RHS teaching caseloads prevented specialisation in specific curriculum areas and/or at various year levels. The ability to search extensively on the Internet for curricula, or for clarification of terms via text or instructional video explanations, was a great support for their own CK and TK.

**Important for teacher practice and Difference in teacher and principal practice** Strong agreement, or agreement by respondents that ICT was important to teacher practice (84%) and made a difference to teacher and principal practice (79%) was indicated.

Participants’ comments regarding the importance of ICT for teacher practice have been reported in previous sections. Use of ICT was variously attributed to improving practice in supporting and motivating student engagement and learning, individualising student programmes, providing expert opinion, fostering knowledge seeking, and fostering communication and participation between the student and other parties.

Louise’s specific example of ICT assisting teacher practice was of a five-year-old student refusing to co-operate with the traditional method of solving addition and subtraction problems using materials and writing a number sentence. Identifying the need for alternative
learner preference, Louise used applications on the iPad and the same process was completed without complaint.

Anna’s example of assisting students’ problem solving using interactive programmes to provide an opinion alternative to that of the teacher was an advantage observed for difference in teacher practice. Sandra described similar strategy in working with a student on the Graphics calculator, where the student knew more about the technology but Sandra knew the correct answer. Sandra worked alongside the student on the pretext of learning to use the calculator while the student drew graphs. Knowing the students’ answers were incorrect Sandra was able to point out the calculator had given a different answer, and could assist the student to identify the error and justify her answer. Use of this technique allowed the technology rather than the teacher, to appear as the expert.

Use of ICT was appreciated for communicating, for student planning, and regular reviewing or reporting of student achievement via IEP. The advantage of mobility was mentioned by Judi, in using the RHS SMS facility on her home Wifi via laptop or smart phone. The convenience of recording and reporting remotely was an advantage, particularly if a student cancelled a visit but a later visit was scheduled in a nearby area. Prior to having an iPhone or laptop this was enabled at a public library via Wifi and computer access.

Several participants commented on specific Principal practice, mentioning support and examples set by their respective RHS Principals in use of ICT. As noted by Stuart et al. (2009), these examples could positively influence teachers’ own practice.

**Efficiency of curriculum delivery** Although 52% of respondents agreed or strongly agreed ICT was important in efficiency of curriculum delivery, this was one of two lowest areas of agreement.

Practical efficiencies related to curriculum needs were previously cited by Gretchen regarding student tendencies to use their cell phones as a calculator, dictionary and research resource. Louise also noted iPad applications provided a multitude of resources all on the same device.

Efficiency of curriculum delivery was greatly influenced by the location of the student, and illustrated extensively in previous reporting. Where ICT and Internet resources were available, e-learning was generally viewed as an efficient means of delivering curricula to students who
had less teacher and peer contact than those in a regular school. E-learning could provide the opportunity to access information and develop curriculum activities between teacher visits, particularly for senior, or more independent, students.

E-learning could overcome the problem of isolation from information and people due to the remote RHS environment. The greatest efficiency of e-learning was enabling ease of contact between the RHS teacher and their student, and student access to other sources of information or people.

Besides location though, factors of student illness, management of learning needs such as programme source, accessing ICTs, and particularly the Internet, and the limitations of time for lessons, all complicated efficiency of delivery.

**Quality of curriculum delivery** At 48% agreement or strong agreement, respondents’ perception that ICT was valuable for quality of curriculum delivery was the lowest agreement for all categories in Table 7.

Selection of interview participants was partly determined by their perceived wide use of ICT and e-learning, therefore most reported favourably for their appreciation of the quality of curricula they were able to provide for their students.

Themes of engagement, and the value of e-learning for better understanding of a concept, were repeated by the majority of participants. The quality of imagery afforded via programmes such as Google images and Google maps for a wide range of subjects was noted. Andrew explained in describing a physical object to someone, they might be unable to visualise what was described but viewing it online better assisted understanding. Anna’s example of a student’s recent Te Kura activity requiring knowledge of whooping cough disease, demonstrated the value for the student in forming opinions after viewing an appropriate Youtube video clip. Liz’ experience was for use of quality interactive science activities providing enjoyable and positive learning experiences due to the better understanding afforded.

Participants mostly viewed ICT and e-learning as a better quality alternative to, or a means of enhancing, book-based programmes in teacher absence. In contrast to the book-based programme, Louise contended interactive websites, games, and applications, were more
engaging for reinforcement of learning. Anna compared the experience of sitting at home with a textbook, to the preference for using an interactive e-learning programme allowing immediate access to opinion, answers etc.

Lack of quality of curriculum delivery via specific websites with complicated interfaces or navigation processes have also been previously noted. Duncan reiterated his dislike of the StudyIT website for these reasons, and the Maths section in particular for its’ lack of appeal to students in using practice activities unrelated to the NZ context. Despite this criticism, and because of their wide use of ICT, participants in general considered ICT use enabled them to provide improved quality of curriculum delivery.

Teachers’ attitude towards ICT and e-learning, besides being influenced by issues of resources and location, and perceptions about their students and themselves, might be formed by their perception of their own role in the e-learning situation. For example, a possible explanation for respondents’ perception of less quality of curriculum delivery using ICT and e-learning was the potential reduction in F2F time with students. The lack of F2F time involved in e-learning, rather than ICT and e-learning use itself, might be considered by respondents, as affecting their quality of curriculum delivery.

Interview participants’ opinions regarding their own role in e-learning were examined.

4.5. Learning and teaching with e-learning in RHS

4.5.1. RHS teacher role in e-learning
Results and discussion in previous sections have shown RHS teachers believed most of their students were proficient in ICT use, and teachers saw definite benefits in e-learning for teaching, learning, and communication. Interview participants believed their own teaching role, added a dimension e-learning could not deliver on its own.

Essentially, in facilitating access to ICT, teachers were assisting to reduce the effects of the digital divide. Louise considered a vital role was to bring ICT and e-learning to the student, or find a way to enable student access to ICT, especially for students who did not have access in their home situation. Judi maintained the opportunity to use e-learning was valuable for all
students, but particularly for students who weren’t confident with technology due to lower exposure.

As indicated by Wright (2010), implementation of meaningful use of ICT and e-learning was a priority. Participants acknowledged their role in identifying relevant skills or methods of technology use for students, and providing opportunities to learn or improve. Katie maintained activities such as ‘brainstorming’ or drafting of essays were frequently required. Students might do a first draft by hand, but subsequent work was encouraged on the computer, due to the convenience of editing using ‘cut and paste’ options for example. Judi linked e-learning use to a relevant curriculum topic, introducing more tasks as student confidence increased. She maintained teaching senior students to create revision materials with online tools was a more valuable aid to study than the traditional reading or ‘swotting’ of notes employed by many students. Accessing websites to create crosswords, or for learning games was effective in assisting revision.

However, indications of substantial teacher support required to assist students in e-learning were expressed. This paralleled Bolstad and Lin’s (2009) observation of dependence on the teacher in the classroom situation, being more obvious in the VC situation. Participants considered it rare that many commonly used websites could be successfully navigated by a student unless they frequently used a computer, tablet, or smart phone. Unless the student was very capable, participants concurred an important teaching role was to introduce more complex websites, and guide students to eventually navigate them on their own. Duncan’s experience of students accessing support for coursework via Studylink or Kahn Academy (www.kahnacademy.org) was that the exercise needed to be driven by the teacher unless the student was among his estimation of 5-10% independent computer users with advanced research skills. Liz, Sandra and Duncan admitted it was very rare for individual students to work towards or complete coursework using Sparknotes or the Te Kura OTLE site without teacher assistance. Websites such as the Te Kura OTLE, and SE LMS site must be introduced and re-visited with the RHS teacher for students to have success. For their chronically unwell, less academic, less confident or disengaged students, this role was even more important.

Participants maintained a specific need to support students by modelling or guiding the practice of accessing websites for research or resources. Gretchen contended this was largely
due to research being a common component in many curriculum areas for senior assessment. Duncan’s observation that resources were randomly accessible and sometimes inappropriate, requiring students, like teachers, to search in a variety of places for relevant support. Teaching students to be discerning in items they read and selected was an important role for the teacher. Katie claimed while some students might be good at finding information, they were not so good at sifting through what was beneficial and what wasn’t. Both she and Judi found it helpful to direct students to sites initially, or other times observe the students’ Internet researching skills. Judi maintained a need to teach students strategies to identify what they needed to know, and whether information was reliable.

Skills such as being time efficient, staying on task with research, and selection of material at an appropriate level were examples of other skills mentioned by Judi and Gretchen. These required guidance, and often supervision by the teacher, for successful student research.

Developing student independence in e-learning was a strong priority for participants. In order to provide successful e-learning experiences for students in teacher absence, much of the F2F student-teacher time required interaction in e-learning to advance the student. Very young students needed parent permission and assistance in teacher absence. Many senior students might have sophisticated skills in some uses of ICT and e-learning, and some might have advanced understanding or academic skills for CK, but it was rare to have both.

Therefore teachers recognised vital roles involving significant learner support in e-learning. How much support was due to the e-learning environment and how much was due to issues of RHS context enabling fewer opportunities for participation, for example, was unclear.

With the role of the teacher perceived as important, any observations of changes in teacher and student roles was another consideration for participants.

4.5.2. Changing roles in e-learning

Although they believed students required considerable support in e-learning, interview participants agreed their own e-learning development was frequently enhanced by what they learned from their students.

Some had learned skills as a result of direct student instruction. Liz was currently being supported by a student in spreadsheet use, and Duncan’s student had taught him new features
of the most recent Windows programme. Gretchen, Anna and Katie attributed awareness of many new websites to their students.

Andrew accepted his general ICT skills had significantly improved due to his older students’ ICT competence and willingness to teach him, and Katie mentioned the regular support her RHS unit students gave to her and to each other in solving ICT or e-learning challenges. Katie and Linda agreed younger students could also be knowledgeable and could have discovered different, or improved, methods of ICT proficiency they passed on to their teachers.

Several participants credited the more individualised RHS teaching situation in affording opportunities for students and teachers to compare and exchange ideas on curriculum and ICT use. They talked about the learning that occurred ‘together’ rather than the teaching they ‘did’. Louise mentioned reciprocal learning with a student when both she and the student were new owners of iPads. Linda described her recent experience with a student and the Te Kura teacher, where all three combined skills to record the student’s speech on the iPad, and store it ‘in the cloud’, for retrieval by the Te Kura teacher.

Without an awareness of CK for each subject their students were required to study, participants seldom presented themselves to their students as experts. Liz maintained having access to ICT and e-learning helped her foster independent learning in her senior students by demonstrating how they could find solutions to a CK problem. Anna agreed that modelling the use of Google for example, helped students understand the way adults researched things they didn’t know about. Judi sometimes used a strategy whereby she might, or might not, understand a concept initially. Judi often asked the student to search on the Internet or watch Youtube to teach Judi the concept the student was required to learn. In doing this she claimed she facilitated student learning better than passing on expert knowledge. As indicated by researchers (Lai, 2008; Haythornthwaite & Andrews, 2011), most participants viewed their role as a motivator or facilitator rather than a knowledge provider, particularly for senior students.

A change in the traditional roles of teacher and learner in e-learning was acknowledged. Although recognition of a transformation in roles as discussed by Bolstad and Gilbert (2006), and Lai (2008) was not addressed, there were indications this might be the case in teacher reflections of the individualised RHS teaching situation. The researchers’ suggestion that a
different teaching environment might enable such a transformation will be revisited in the concluding section of this study in relation to RHS context.

Researchers’ claims were that success in e-learning might be less dependent on what happened in the e-learning environment, than on who was doing the teaching, the learning, and how this occurred. (Bolstad & Lin, 2009; Rice, 2006; Wright, 2010). Nevertheless, tendency and appreciation for a change in teacher and learner roles in e-learning was expressed by participants in examples described. Questions about teaching and learning appeared to be grounded by a definite sense of pedagogy, and were of interest in observing what did occur in their teaching in the e-learning environment.

4.5.3. **Pedagogy and e-learning**

Attitudinal and pedagogical statements of participants in relevance to their perception of their e-learning practice represented themes of learning and change to facilitate improvement both in students’ learning and also in their own teaching.

Sandra, Linda and Andrew expressed their pedagogy in their ability to relate to a wide range of students and ascertain their interests and ability in order to engage them with an appropriate educational programme. To gauge when a student was learning, or not learning, and know what to do to foster student learning was important in their teaching. Both Sandra and Linda expressed confidence in their ability to provide an e-learning programme to motivate unwell or disengaged students.

Louise and Liz shared the view of teaching as continual change, requiring the teacher to, ‘move forward and keep up with developments’ as described by Liz. She claimed her goal in relation e-learning was to facilitate an individualised e-learning programme which allowed her to communicate regularly with each student. Louise’s perception of her teaching role was of constant learning. She observed her passion and confidence for learning about and using ICTs developed quite recently, at an older age, was an indication of this. E-learning advances involved experimentation with opportunities afforded for her and her students.

An ability, or near-ability, to use ICT and e-learning seamlessly in teaching was claimed by Anna, Katie and Judi. All observed an increasing ease in accessing and using e-learning resources without the need to consult a guide or another person for assistance. Katie and Judi
both believed other valuable tools were available, and teachers should be confident e-learning was the best choice in relation to function or purpose for an activity.

Anna thought of e-learning as how she taught, rather than something she was able to do. She considered pedagogy was formed through teaching experiences and opportunities. Whereas she began her RHS teaching with prior ideas and skills, in the RHS situation she had different experiences and would take ideas and skills developed there into a new teaching situation. Individualised teaching in the RHS made her appreciate the usefulness of her own skills as well as affordances of technology or e-learning for her and her students.

Like other participants, Duncan and Gretchen appreciated both an advance in proficiency in ICT and e-learning, and a definite desire to learn more. How well this was enabled in the RHS context needed to be addressed.

### 4.6. Fostering e-learning in RHS

Previous sections covered RHS teachers’ practice, and barriers and challenges observed for e-learning. At this stage of the study, there appeared sufficient evidence that ICT and e-learning had the ability to improve learning, teaching and communication in RHS. Fostering e-learning was the next question related to RHS context.

Despite challenges, RHS students appeared to be generally inclined to use e-learning, however the transient nature of their stay on the RHS roll suggested attempts to foster e-learning were best targeted to teacher development.

PD was described as organised opportunities for teachers to access training, skills and knowledge, with a responsibility of NZ school leaders for provision of PD for their staff (Timperley et al., 2007). Results shown in Table 7 for teacher perception of the value of ICT use for themselves had shown 93% of agreement or strong agreement, and no disagreement, that ICT enabled new opportunities for PD. Therefore teacher involvement in ICTPD would seem an appropriate way to foster e-learning.

Questions addressed in Table 8 gauged respondents’ opinions of their own involvement in PD.
Table 8

*Teacher attitude to ICT PD*

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<table>
<thead>
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*Totals are out of 72 for first response, but out of 60 for subsequent responses where 12 respondents had not attended RHS whole school ICT PD.

Results for the first question addressed in Table 8 showed a definite majority of respondents agreed or strongly agreed ICTPD was a priority for themselves. Several options for ICTPD might be possible, with whole school PD describing the scenario of all teaching staff of one
RHS combining for training at one site. Questions targeting teacher attitudes of usefulness, enjoyment and confidence in RHS whole school ICTPD, were completed only by the sixty respondents who had attended this within RHS.

**4.6.1. Whole school PD**

80% of respondents agreed or strongly agreed whole school ICTPD was useful and 74% agreed or strongly agreed they enjoyed it. A much lower number (59%) agreed or strongly agreed they felt confident in whole school ICTPD. There was very little strong disagreement in any category.

Interview participants found whole school ICTPD enjoyable, useful and sometimes inspiring. PD in her RHS’ government supported ICTPD cluster (Ham, 2005; 2009) several years prior, was attributed by Katie as an early motivator in her e-learning practice. She noted success in this situation for a range of learning opportunities in a small group situation. In ICTPD since then, learning a few items which had immediate application, and practicing those following the PD session had proved worthwhile.

Another successful example of whole school ICTPD in each RHS had been previous training in use of the schools’ student management systems (SMS). This began with whole school ICTPD, followed up at unit or regional meetings, and use of other communication such as phone, audio conference, email and desktop sharing for support between staff. An immediate and ongoing need to use the SMS meant training was relevant. Four participants perceived immediate follow-up on learning was as important in consolidating skills as regular follow-up, both of which occurred in this situation.

Liz found aspects of her RHS’ whole school PD inspiring. Observing the potential of course creation on Moodle through a colleague’s presentation of a course creation activity within a tertiary education context was one example. Similarly, inspiration came from hearing colleagues describe practice using specific technology or applications for very disabled or unwell students. These examples demonstrated the recommendations of researchers for sharing examples of innovative practice. (Bolstad & Lin, 2009; Ham et al., 2002; MoE, 2006; Wright, 2010)
Reflecting Ham et al. (2002) and Bolstad and Lin (2009) recommendations, most participants perceived a need for more frequent PD, rather than the established pattern of whole school PD over a one or two day period once or twice a year. In the two day period a ‘taste’ of what could be done in e-learning was possible, but there was too little time to establish thorough learning of the programme or facility. Gretchen claimed having more time and opportunity to use the programme presented, and a commitment to use it through goal setting within the Appraisal process could be beneficial. Judi believed training on a more regular basis than meeting once or twice a year, and Anna suggested regional or small group meetings for staff to follow up on what had been covered at the previous PD.

Participation in small groups with colleagues and peers was also recommended by Ham et al. (2002), and Stuart et al. (2009). However some participants believed RHS PD situations had become too large. Jacqueline considered large numbers at PD and a range of competencies, meant only some staff were willing to experiment independently. Two participants commented on the frustration with technology problems, often occurring with large numbers of staff in one space using their own devices.

Participants’ comments also reflected Bolstad’s (2004) recommendation to consider individual needs and understandings and start at the level of the teacher. From the perspective of proficiency in terms of ICT skills, Anna and Andrew agreed it was preferable for staff in the same learning group to be at the same level. Anna perceived it could be frustrating for more proficient staff to have to wait for others. Andrew expressed a personal perspective that it was difficult for someone of lesser ability in a group of proficient teachers, because the person presenting the course usually presumed others in the group were of equal proficiency to the more proficient staff who asked questions.

Some participants’ views that a lack of relevance of the PD either for themselves or current students, meant disinclination to follow-up on what was taught. Duncan, found that some ICT PD wasn’t as relevant for the senior age group he worked with. While Liz had presented the opportunities of using Wiki to her RHS staff, she considered staff may have been slow to adopt because they didn’t appreciate the potential or had no immediate need. Andrew considered frequent turnover of students with diverse learning needs meant he might not have
the immediate need to practise an activity with a student, and this contributed to his lack of follow-up and progress.

Ham et al. (2002) also perceived the challenge of many ICTs for various levels, and different purposes. Gretchen agreed despite previous participation in PD, she had been slow to develop her use of Mathletics and Power point until required to use them more frequently with students. Similarly for Katie, a presentation on ‘cloud’ storage of information had been exciting, but had not been followed up due to lack of immediate need for use for herself or a student. Judi considered if she had a certain caseload of students, in terms of age, or of low numbers of students completing the same course she would not be inspired to create a complex e-learning activity or unit on Digistore or Moodle for example, because it might be a considerable time before she used it again. Duncan agreed, suggesting after the period of training, staff be given a simple task they should be able to complete. Both Gretchen and Katie recommended revisiting some items previously covered at PD.

On some occasions, the concepts introduced were too new. Anna thought it was preferable to relate PD to a well-established e-learning initiative, rather than one which was too innovative or experimental and might disappear as a website or option. She considered it could also be useful when a topic was selected, to see how this had developed in other schools, and what problems had occurred.

In other cases PD was too advanced, or difficult to understand its’ usefulness. Sometimes the proficiency of presenters was perceived as a disadvantage by Gretchen, Duncan and Andrew. Gretchen noted even some of the more knowledgeable presenters lacked skills in teaching people unfamiliar with the content and use of the strategy, and Duncan described a recent PD presentation by ‘experts’ where the use and purpose of the e-learning programme being presented was not clearly explained.

Despite criticisms of several factors in whole school ICTPD, participants concurred there had been some excellent opportunities presented. What they chose to participate in outside of organised PD in the whole school setting was next investigated.
4.6.2. Other PD

In this section, other PD was defined as courses or training not directly arranged by the RHS.

Participants considered much ICT/e-learning development came from within the context of teaching in the school. Gretchen pointed out there was no option other than to use the computer for daily administration, communication and recording tasks, therefore introductions of updated versions of programmes such as Word, or developments on the SMS or LMS assisted in building up knowledge over time. Andrew conceded he was unaware how much requirement to use computers there would be in a regular school but agreed his own skills might be ‘abysmal’ without having to use ICT within RHS for daily purposes.

In all units, a need for communication and reporting with other RHS teachers further afield than their own unit, as well as students, and support people within the community, was a direct contributor to teachers’ advance in ICT skills of text message, phone and email.

Some courses targeted at general classroom teachers and organised by other providers were relevant to participants. Linda had just completed a course on new websites, and Katie had observed a demonstration of the Availll reading programme which she was exploring for use in the RHS situation.

Five participants had researched or studied at tertiary level in online environments, claiming the process of accessing resources online and participating and working in an online environment had improved their ICT skills. Liz’ and Louise’s interest in communicating using Wiki, blogs and their respective RHS Moodle facilities had developed through using a Moodle site to complete University courses.

Two participants followed current professional discussion in ICT. Louise subscribed to twitter (https://twitter.com) and linked-in (nz.linkedin.com) for professional ideas and to follow ICT experts. She subscribed to e-learning feeds (elearningstuff.net, integrating-technology.org/), and wiziq.com which notified her of availability of online conferences. She followed specific Podcasts e.g. virtualstaffroom.net. Duncan followed discussion on e-learning through online documents such as the ‘World Internet Project New Zealand’, and dialogue such as occurs on the MyPortfolio (www.myportfolio.co.nz) website discussion board.
In discussion of whole school or other PD, the opportunity to meet and learn together was particularly appreciated by participants. All interview participants agreed working in collaboration with others enhanced their skills. Opportunities to learn from others were of interest in respect to RHS context.

4.6.3. Collegiality

Questionnaire data showed 11% of respondents worked in situations with no other teaching colleagues, 38% worked in RHS units with 1-3 teaching colleagues and 26% worked with 4-5 teaching colleagues. Only 25% of respondents worked in RHS units with more than 6 teaching colleagues. In terms of unit staffing, RHS teachers appeared to have limited opportunity to work closely with a reasonable number of staff.

Anna was the only participant who had experienced participating in a more formalised e-learning community such as a CoP with stated goals of ICT and e-learning inclusion (Wenger, 1998). This had occurred in her first years teaching.

All interview participants cited good ICT support from at least one ‘expert’ individual, senior or management staff somewhere in the school whenever they needed it, but not often, nor immediately accessible. When the expert had a recognised role in the ICT training this was appreciated, as staff felt entitled to make approaches for support.

Some participants attributed their development in e-learning skills directly to immediate RHS colleagues or opportunities. Gretchen regarded the senior teacher in her unit as a role model for ICT and e-learning use. Inclusion of discussion, and trialling and use of ICTs and e-learning was incorporated into regular team meetings. Anna had participated in specialised training with some RHS staff prior to one whole school PD, and subsequently assisted in the larger PD group. Louise’s online University e-learning course was with other RHS colleagues who together produced a course on their RHS Moodle for the rest of their staff.

Gretchen noted email support from subject experts within the wider school, and benefits in increasing use of her RHS Moodle site to share ideas and website links in courses and discussion forums. However opportunities to share information or practice had been missed, as demonstrated by the example of the ‘co-construction and editing via email’ practice developed by several teachers in isolation from each other. Notably, these teachers were all in
different RHS schools or units, and the practice may have been more effectively developed with the opportunity for teachers to discuss and improve methods.

Some participants shared knowledge with people outside their RHS. Sandra valued meeting with a former colleague who she credited with having influenced her in a specific subject area and related ICT use. Liz recently observed an online Education system for health students in Israel shown to her by an Israeli teacher, which inspired her appreciation of the potential future directions within RHS. Liz also enjoyed ICT challenge and co-operative learning in her attendance at Moodle moots.

Duncan’s contact with former colleagues at a local high school allowed him to observe e-learning practice in other schools, and ascertain how it might adapt for use in the RHS context. He was also working privately with a group to develop an online website to suit students who were not operating at a high academic level – Studybox (www.studybox.org). The project was developed between Duncan and other participants in a higher education training course.

Interview participants in larger units appreciated opportunities to observe other teachers’ expertise and practice in e-learning. Sandra commented that sharing of teachers’ workspace in her unit worked particularly well for retaining skills and sharing of new information. She had used other staff strengths in developing proficiency for specific e-learning skills or programmes. Like Sandra, Katie noted staff collaboration in her larger unit, was instrumental in progressing training or problem solving. Problem-solving among the group was also more time-efficient than for one person to work on a solution.

Participants in smaller units cited difficulty in finding common time to get together in person with other staff. This was sometimes overcome by teachers, meeting in a central location for combined training, but personal meetings were not practical for teachers working too remotely from others.

Despite appreciating the benefits of working with others, for many RHS staff this was infrequent, and determined by the need to solve an immediate problem.
4.7. Chapter summary

In addressing questions of RHS teachers’ current practice in e-learning, many benefits and challenges to e-learning provision were identified. Results of research findings are summarised for each section, firstly according to benefits and specifically the potential of e-learning for improving learning, teaching and communication within RHS. Challenges in e-learning are summarised at the end of each section.

4.7.1. RHS teacher practice in e-learning

At least 97% of survey respondents were providing some form of e-learning for their students, with highest provision for subject areas of Maths, English, Careers and Science respectively, but also for other subjects.

NZ’s DE provider, Te Kura, was used for sourcing student curricula by a majority of respondents. Te Kura options for e-learning continued to improve in quality. Although the student SE was less used to source curricula, access to SE LMS by students was perceived as increasing.

All three RHS LMS were in the early stages of development in providing resources for teachers and students. E-learning was commonly sourced on websites such as Youtube, Google, Kahnacademy, Sparknotes and TED. There was high use of the commercial Mathletics programme, with options for setting up the programme through RHS or the student’s SE. Well-established programmes such as Word, Publisher, Powerpoint and Paint were commonly used, with innovative use targeting student learning needs increasingly demonstrated. For junior Science, BBC bitesize, Science hub, and LearNZ were useful websites. For senior secondary students in particular, use of Government websites such as NZQA & NZCareers was frequent.

RHS teachers were trialling the use of laptops, iPads, iPods, smartphones, and other mobile devices. Trials of the iPad showed potential for development and management of individual student programmes, and for specific student needs. Although iPad ownership was still not common among students, student ownership of iPhones was perceived to be increasing.

In considering its potential for improving learning and teaching within RHS, respondents’ main use of ICT was for provision of resources for students. However indications that e-
learning improved student learning and student learning outcomes were observed. Over one half of respondents used web 2.0 programmes with students, enabling interactivity in student learning. Interactive, online activities were credited as engaging for students, and enhancing student learning. Interactivity and skills development for students from primary through to junior secondary levels was supported in Maths via the Mathletics programme, effective in individualising the student programme according to ability. In Science, particularly at year 10 and below, websites containing interactive activities and games were useful for targeting specific topics.

Student and/or teacher CK in many subjects was improved with quick access to expert knowledge via web searches. For senior English students, websites provided notes and opinions to support achievement of NCEA assessment standards.

Using Government websites such as NZQA and NZCareers provided opportunities not only for senior students to plan current learning options, but also to inform future learning and career goals. Searches for knowledge or activities on these and other websites provided an opportunity for teachers to guide or model critical research skills for students.

In terms of improving communication, use of Wiki, Powerpoint and simple email contact was enabled between students and other parties. The emergence of practice such as editing and co-construction using Word and email, and the exploration of cloud computing to send documents, were of note. Use of SE LMS could be an effective way for students to remain in contact with SE coursework, teachers and peers. The perceived increase in student ownership of iPhones meant increased ability to access their RHS teachers, SE LMS and peers and teachers, as well as learning applications.

Interview participants also perceived challenges in e-learning provision. The Te Kura OTLE site, government supported TKI and StudyIt sites, and many other websites, could be difficult for students and sometimes teachers to navigate. It was rare the student could use websites independently, and teachers themselves had little time to learn about all possible websites available, or all facilities on some popular websites.

With RHS LMS in the early stages of development, their potential for teaching, learning and communication with students was not yet realised. There was a reluctance expressed by
participants to plan individual courses on LMS for students who might not be on the RHS roll for long, and had very specific learning needs. As for several other websites, navigation to access coursework on LMS could be cumbersome.

Only a small number of participants, mostly those teaching younger students, noted the value of game-based learning activities for students. Opportunities for students in virtual meeting and collaborative environments, was limited.

Overall, teacher practice in e-learning continued to improve, along with an improvement in skills and resources. Teacher practice was greatly influenced by locations of learning and teaching.

4.7.2. RHS location

Location affecting RHS teacher practice was a two-fold issue, comprising where the RHS teacher mainly taught, and the variety of places e-learning was provided to students. Success of e-learning provision was dependent on resources such as ICTs and time allocation, but primarily Internet access.

In terms of places of e-learning provision, 72% of respondents had provided e-learning in an RHS class situation. Classes or unit spaces were well-resourced for Internet access, and equipment, and there was more time for the student lesson than in the home. Ease of supervision was greater than in a traditional school, and in some cases peer support could be facilitated. Although this location was viewed as the best option for enabling e-learning in RHS, it was the main location of only 12% of respondents.

68% of respondents had provided e-learning in the home situation, the main location of 33% of respondents. Most participants considered Internet connections and ICT resources in homes were continuing to improve. The capacity of e-learning to motivate the student in teacher absence was appreciated as increasing the amount of time home-based students might choose to spend on the learning programme.

36% of respondents had provided e-learning at SEs. Teaching in SE libraries could be successful for availability of equipment, access to the Internet, and to the SE LMS.
25% of respondents had provided e-learning in a hospital/residential ward. For 7% of respondents mainly teaching in an RHS unit or classroom onsite, conditions for e-learning were similarly successful as for other RHS units. Without the need to travel to see students, teachers based in these settings usually had more student contact time.

19% of respondents had provided e-learning in public spaces. Teaching in community spaces such as public libraries was successful for individual students, or for groups of students unable to travel to an RHS unit. NZ Government strategy to provide wireless enabled Internet access and use of library computers was appreciated, particularly in enabling e-learning for students with limited resources at home. Establishing habits of ICT use in libraries was an effective means of introducing ongoing options for e-learning to students.

19% of respondents had provided e-learning online. Teacher/student communication options, such as email, text, Wiki, blog, and co-construction using Word were used, allowing communication for the student needing educational support outside of teacher visits. Use of an online system, LIVE, had been effective in enabling remote or anxious students to participate with teachers or a wider group of RHS peers.

E-learning in all locations appeared to be effective in improving learning, teaching, and communication for RHS students and teachers. The greatest advantage was the opportunity provided for student participation in e-learning in their absence from school. In RHS classrooms or units, ICT use enabled students to work on different e-learning programmes at the same time. In student homes, an engaging means of continuing learning in the absence of teacher and peers was provided.

Individualised programmes, and smaller student numbers in various locations, afforded the teacher the ability to target e-learning to student needs. Interaction between RHS teachers and students was student centred, and opportunities for learning, teaching and communication between the student and SE teachers, RHS or SE peers, could be encouraged.

Considerable challenges in location existed for respondents who mainly taught in a mix of locations, and for respondents where the home location was the main location for teaching. Conditions were likely to be variable for each location, and conditions for each student home also differed.
In the RHS classroom or unit there was still a challenge of time constraints for teachers needing to cover several subject areas and attend to individual needs of all of their students who were present. Various levels of student programmes and courses meant a lack of ability to combine ICT or e-learning opportunities with other students.

Outside of RHS classrooms or units, key challenges were Internet connections and resources. Although these issues were increasing and improving for students in general, many were still without Internet connections or sophisticated equipment. If a major source of e-learning for their students in the form of Te Kura courses became completely online, then options for students with digital divide issues might further decrease.

Teachers were innovative in using their own, or students’ computers or mobile devices, and Wifi or 3G to enable Internet access. Nevertheless setting up and accessing resources, and downloading high use applications, could be time-consuming and costly for the RHS. While the use of mobile devices by students was becoming more common, these were sometimes unreliable.

In student homes challenges included establishing permission and access to the computer, Wifi or Internet, and placement of the computer for ease of use. Home visits were regarded by the teacher as their contact time with the student, and e-learning activities introduced had to be continued in teacher absence. Therefore student independence, or family support, was relied on to complete learning activities.

In SEs, if the lesson occurred in a space other than the library, the RHS teacher or student often needed to be prepared with their own laptop/iPad or mobile device, and sometimes 3G Internet access. Hospital or residential settings without an RHS unit needed the same teacher/student attention to preparation, but were usually challenged for Internet access.

Although Internet access was available for e-learning provision in a public place, and teaching online, these options occurred less than in other locations. The public library option could be effective for students lacking facilities in homes, or to overcome difficulties in travel distance for teachers. Considering a lack of time spent with the student expressed by participants, and difficulty in travel, few participants used online teaching methods. Those who did so regularly
still preferred F2F learning environments for providing learning cues and building teacher-student relationships.

**4.7.3. RHS teacher perception of their students and e-learning**

Teachers could individualise the student programme for student needs and according to IEP goals, therefore e-learning had the potential to cater for various learning preferences including any related to gender, age, attitude, health, or other preferences.

The majority of participants did not consider student gender was an issue affecting e-learning, though some conceded boys and girls might have different habits. For example, boys’ possible preference for gaming, for drawing programmes, and for reading digital rather than printed text was noted. Girls were perceived by some participants as preferring word processing, email communication, and completion of work online.

Proficiency in ICT and e-learning skills was perceived by participants even in younger students. Positive student attitude defined by student enjoyment, perception of usefulness, and confidence in ICT and e-learning, was agreed by participants for all ages. Respondents’ greatest agreement was for perceptions of student enjoyment, and sense of ICTs’ usefulness. Interview participants’ appreciation of e-learning for its’ capacity to motivate students was stated. The availability of images of superior quality to those in books, and the interactive nature of e-learning programmes generally determined student preference for e-learning over a paper based programme. Freedom to select learning topics to interest junior students was observed. E-learning programmes could be more learner-centred, interactive and enjoyable, while still targeting skills development. Participants perceived attitudes of usefulness of ICT and e-learning, particularly in older students. Access to ICT resource tools such as dictionary, calculator, and research options via Internet, and communication options of text, phone or video were becoming common practice in students’ personal use.

There were challenges to RHS teachers in providing e-learning in terms of students’ age. Respondents mainly taught secondary students, and NCEA requirements took priority and often determined both the selection and amount of e-learning activities provided. While some sites such as TK OTLE and StudyIt might be useful, they were not always appealing to students. For younger students, permission and programme support requirements were concerns, particularly in teacher absence.
What the teacher perceived as enjoyable was not necessarily the case for students. Unless the programme was highly interactive, there was a sense that some students might be becoming blasé in their attitude. Some student habits, such as constant online gaming presence, were not considered good learner practice by teachers.

Although still perceiving student confidence in e-learning, this perception was lower than for enjoyment. Some students’ proficiency in typing skills, website navigation, or academic aptitude gave them confidence in these areas, but not necessarily in the combination required for complete confidence. Participants perceived students might have greater confidence in a paper based programme, allowing time for reflection in turning back pages to reconsider answers etc. A preference observed for paper based programmes by older students, was their use in providing reference notes for further study. While some participants observed students might have confidence of specific use, for example for Facebook or Youtube, they agreed a lack of confidence existed in necessary research skills of finding websites and appropriate searching within those sites. Independence in website use for education was not obvious until very senior year levels.

Students’ health often affected their motivation, confidence, and subsequent participation, in e-learning. Medication effects could cause memory loss, tiredness, and a general lack of energy or motivation for all things educational or otherwise. Mental health or illness causing disengagement from their SE usually caused student reluctance to participate with others. Sometimes student anxiety was apparent in the group situation, where students did not ask for help, or to use ICT. In a small proportion of RHS students, teachers suspected use of computer ‘activity’ to avoid social contact with teacher or peers.

4.7.4. RHS teacher perception of their own ICT adoption

Questionnaire respondents were mostly female, highly represented in age groups over 40, and with significant teaching experience. Most respondents perceived they were familiar and confident, or better, in their ICT adoption. Few were in the category of learning to use ICT, or perceived they lacked confidence in ICT adoption.

No interview participants perceived their gender affected their ICT skills or e-learning provision to students. One older participant stated age was a reason for less confidence, and one younger participant attributed their age as digital native status, being advantageous in e-
learning proficiency and provision. Otherwise, RHS teacher age group or general teaching experience did not appear to indicate greater or lesser ICT proficiency.

Teaching experience within RHS influenced ICT adoption and e-learning provision for interview participants. They attributed proficiency in use of some ICTs as specific to the RHS setting, and for individual student needs. Sometimes skills already acquired, were extended in teaching in the RHS setting. For example, some participants noted an ability to use e-learning for a wider range of subjects and levels, for various communication options, and to use it in different ways than in a traditional classroom.

However the same attention to individualise student programmes was also perceived as disadvantageous in devising generalised programmes to suit a wide variety of students. There was a difficulty to develop programmes successful for re-use each year, or at different times during the year, for a variety of students.

The majority attitude of respondents was that ICT was important in providing resources and information to improve learning, and important in teacher practice. Interview participants cited accessibility to resources, delivering a programme in alternative ways to paper based activities, replacing the teacher as the ‘expert’, introducing extra stimulus in times of teacher absence, and assessing and reporting students’ progress online anywhere/anytime, as improving teacher practice.

Respondents were not convinced of the value of efficiency of curriculum delivery enabled by ICT. Interview participants agreed challenges in efficiency of curriculum delivery could be caused by student location, student illness, and teacher management of student learning needs in terms of resources such as programme source, accessing ICTs, Internet access, and time management.

There was least agreement by respondents, that ICT enabled provision of a higher quality of curriculum delivery. Interview participants appreciated more engaging resources, and rich imagery in some programmes, but criticised features such as the complexity of front page interfaces and unappealing, text-based activities of some recommended websites.

Although increased communication options with the RHS teacher, other RHS students, SE teacher and SE students were possible, the main priority for RHS teachers was between
themselves and the student. Strong preferences were also stated by participants for F2F teaching opportunities with students, with or without the inclusion of e-learning. For teachers in the home situation in particular, limitations of F2F time, meant emphasis for ICT and e-learning was given to its’ intended use in the situation of teacher absence. Lower quality of delivery might have been perceived in association with a decrease in F2F time available.

4.7.5. **Learning and teaching with e-learning in RHS**

In examining the roles of RHS learner and teacher in e-learning, participants recognised a definite role for themselves. Their facilitation to enable access to ICT and e-learning could be critical in increasing their students’ access, use and confidence with technology.

Respondents generally rated their own levels of ICT use strongly. Three participants considered they were at the stage of ‘seamlessness’ or ‘unconscious’ adoption in e-learning, without the necessity to use additional advice or support. Two others aimed for this. Modelling or guiding this seamlessness in their students was a priority for several participants. Introducing complex websites and improving independent access to resources and knowledge, was perceived as an important role for participants in developing their older students’ use of ICT. Most viewed this as critical for developing independent skills in students’ research and study. Creating tasks to reinforce student learning, or for revision items, were emphasised.

The individualised or small group learning situation within RHS was valuable for exchange of ideas and setting of learning goals. This gave the learner a more active role in learning in general, but also in e-learning. Purposeful or meaningful use in developing specific e-learning skills in their students was possible. Within RHS, the individualised situation meant different ICT skills were required, and it was important to develop those.

There was a participant view of teaching as continued change in relation to the teacher and learner. Participants perceived in particular, that their own development was often enhanced by their students’ knowledge of ICT. Despite evidence of ICT skills, participants didn’t perceive themselves as experts in TK. Therefore they occupied a learner role in some e-learning situations with their students. Nor did they perceive CK for all subjects, due to the ranges of ages and sometimes unfamiliarity of subjects taught. Participants claimed this was not always necessary, particularly with the affordances of ICT and e-learning. Many who had no CK in a specific subject area, considered it valuable to model a process of searching for
expert advice. This often resulted in a situation where teacher and student might learn together in the e-learning environment.

In this respect, many RHS teachers might not possess TPACK (Mishra & Koehler, 2006). However, expressions of their pedagogy provided the best indication of participants’ perception of the potential of e-learning for improving learning and teaching. Concentration on specific needs of the student, identifying purpose, and developing seamlessness in e-learning were repeated themes.

Three participants expressed their pedagogy as the ability to gauge student learning needs, including when to foster any learning for unwell students, and how to do so. For Liz, e-learning presented an opportunity for student engagement in educational activity. Keeping up with goals stated for students on IEPs and access to a teacher in some capacity every day, were ideals that e-learning might assist in achieving.

Anna’s view of pedagogy was that the learning experiences or opportunities teachers had were carried on to the next situation. Judy stressed the importance stated by Wright (2010) of using e-learning for a specific purpose, not just as an isolated activity. Judi and Anna both noted as beginning teachers their respective schools’ ICT use was innovative and extensive. Having begun their teaching with the expectation of use of technology and e-learning, they had both continued this way.

A major challenge perceived by participants was the lack of teacher presence for their student, considered to be too brief in many locations. They considered even advanced students often needed substantial support from the teacher. Furthermore, although there were some opportunities for collaboration with the RHS teacher in e-learning, there were fewer opportunities for collaboration or participation with other individuals or in groups.

One participant attributed gains in confidence to working within the specialised RHS environment had bred a love of ICT. However, another claimed the students were proficient anyway. Therefore ICT skills might not be as necessary as being able to gauge the best purpose for ICT use, especially in terms of the [health] needs of the student.

While a change in teacher and learner roles was perceived, it was not clear that a transformation in learning was recognised by participants. The concept knowledge seeking
fostered through knowledge age/21st century learning principles was appreciated, but the importance of learning and teaching in collaboration with others was less so. Possibly this was due to less ability to enable collaboration in their various RHS settings.

4.7.6. Fostering e-learning in RHS

In terms of their own learning, a majority of respondents viewed ICT or e-learning PD as a priority for themselves. Most appreciated ICT as enabling new opportunities for PD, with majorities indicating perceptions of usefulness, enjoyment, and confidence in ICTPD. Very small percentages strongly disagreed with these opinions. All interview participants wished to learn more.

Some perceived they developed skills with daily RHS activity, particularly in administration, communication, reporting on their SMS, and LMS discussion forums. Use of SMS PD had been an example of purposeful training requiring staff to use the system continually, and with good support.

Participants chose targeted learning opportunities for themselves, such as web 2.0, Apps, and iPAD education. Some participants had attended courses and training outside RHS. Some had learned from prior tertiary experience involving research and online study. Novel ways to support teacher development in person and online through ICT discussion, reading, and their own e-learning, appeared to be developing.

Methods of support or professional development were available for RHS teachers in e-learning through attention to Professional Development and promotion of whole school ICT PD within RHS. Participants appreciated the PD they had attended, and had even found some experiences inspirational.

In terms of potential for improving learning, teaching and communication, interview participants agreed closer collaboration with colleagues reinforced their learning. In larger sites, due to higher numbers of staff, wider collegial support was available and problem solving was shared by participating with others.

Collegiality of whole school PD was an enjoyable aspect. Collegiality outside of school existed for some participants who were already participating in learning groups or groups with a shared purpose. Some participated online, subscribed to feeds, discussion boards, etc. Some
forms of CoPs did appear to be occurring – within the RHS unit, region, or whole school, or in groups outside of RHS.

In considering the value of collegiality, and potential for PD participation for RHS teachers, a major challenge for almost 50% of respondents was their teaching in units on their own or with less than three other teaching staff. Relative isolation from others reduced collegiality, or opportunities to meet, let alone share or observe. Participants stated although ICT expert advice within RHS was accessible, it was not instant. Sometimes isolation assisted improvement in communication but teachers generally struggled to improve without support.

For ICTPD there were many recommendations. Large numbers of staff were present, with different levels of adoption, and some technical issues were still experienced. Whole school PD needed to be more frequent, as little could be achieved in two days, twice a year. Smaller sessions involving groups, for regional or online PD, could be better explored.

Respondents’ confidence in ICTPD was the lowest majority. Some participants didn’t understand the usefulness or purpose, or see immediate application for some ICTs studied. If they were not required to use them, or if they didn’t suit students on the roll they were easily forgotten. Some programmes studied were too new or too advanced.

For future ICTPD, descriptions of short, targeted, purposeful, frequent, ongoing or continuous activities were recommended, within the real school context, and with positive, relevant practice of teachers communicated.

Finding ways to enhance the benefits and address the challenges RHS teachers perceived, would be the best way to promote e-learning within RHS. How to do this within RHS context was the main focus of the concluding section of the study.
5. CONCLUSIONS

5.1. Progressing e-learning within the research context

My interest in exploring the topic of RHS teacher practice in e-learning was in determining the potential of e-learning to address four perceived issues of RHS context. My belief that student illness, student location, managing student learning needs, and teacher location, challenged student and teacher participation in e-learning, was confirmed. Conclusions of the study are highlighted for each of these issues.

5.1.1. RHS student illness - challenging participation in e-learning

McNeish (1999) had identified illness in individuals as inclined to cause barriers in terms of low confidence and low self-esteem. This was also observed for RHS chronically unwell students in general. For a small number of students, medication or treatment needs, or the nature of their health conditions, caused lack of energy, memory loss, or lower aptitude. Participation in any learning was challenged. In some students, particularly in those with illness affecting mental health, use of ICT and e-learning could provide a negative focus or absorption.

Several researchers perceived opportunities for shared learning were limited in alternative environments such as VC, VHS, and DE (Bolstad & Lin, 2009; Kozma et al., 2000; Rice, 2006). For RHS students, prolonged periods of absence due to illness reduced opportunities for participation with teacher and peers in both SE and RHS environments. This limited opportunities for learning, as well as e-learning, with others and could cause marginalisation.

Benefits of e-learning in addressing issues of RHS student illness The NZ Curriculum recommendation for e-learning to “assist in the creation of supportive learning environments by offering resources that take account of individual, cultural, or developmental differences” (MoE, 2007 p.36) aligned with teaching unwell students.

Attention to student/learner needs or personalised learning as recommended by Bolstad and Lin (2009) should support RHS students. In this study participants acknowledged both the RHS individual or small group teaching environment, and the IEP goal setting process
assisted in individualising programmes. E-learning could be included to cater to individual student needs, preferences, and learning styles. For those students with specific medication, treatments or health concerns, or whose health caused a negative focus, e-learning could be altered, limited or withdrawn.

Wright (2010) and Haythornthwaite and Andrews (2011) appreciated the potential for e-learning to provide student engagement and sustained concentration, key factors in success for all learning. Indications by Prensky (2001; 2004) and Netday (2006) were for extreme motivation and engagement for e-learning on the part of all students. Constant searches were encouraged for new, motivating, engaging solutions incorporating interactivity and game-based learning such as predicted by Johnson et al. (2010).

RHS participants also believed that motivation and engagement were generally present in students for e-learning. Attendance to learner needs enabled them to provide relevant learning programmes which sustained concentration. A consideration of some participants was that unwell students potentially had less motivation due to illness. Therefore, it may be even more important to include e-learning. Some participants perceived e-learning programmes were more engaging or motivating when complementing or replacing book or paper based programmes. Many recognised the interactive element of specific programmes or websites such as Mathletics and NZCareers as particularly engaging, and these were frequently used with students.

Themes of shared learning and descriptions of co-constructive pedagogies encouraging collaborative learning, communication, sharing and problem-solving by students for effective learning (Bolstad & Lin, 2009; Wright, 2010), were observed. Johnson et al.’s (2010) predictions were for increased collaborative environments for interaction. The value of participation with others was also important in respect to mental health, according to the Mental Health foundation (2010). Peterson et al. (2008) believed peer involvement was a key factor in improving self esteem.

In the RHS setting shared learning might occur between teacher and student, and sometimes for a small group with similar learning goals. Attempts were made to foster communication with RHS teachers and SE teachers and peers through Wiki, blogs, use of SE LMS, and LIVE conferencing.
**Fostering e-learning to address challenges of RHS student illness** RHS teachers were successful in providing individualised, relevant programmes affording engagement and motivation in the learning programme. Continued searching for such options should ensure the wide variety and changes in individual learner needs in terms of student health, ability and preferences, are catered to. Developing proficiency in online searching would be advantageous to all RHS teachers.

Some participants stated their attempts to improve students’ participation and communication with others was greater than their attempts to include e-learning, especially for students with mental health needs. RHS teachers should explore e-learning opportunities which require participation in e-learning with others both F2F and online. In the RHS classroom setting, peer involvement to assist problem solving for a quiz activity was a successful example explained by Andrew.

More frequent attempts should be made at an earlier stage of students’ illness to encourage SE or RHS connections through Wiki, blogs, Mathletics etc. For a student in the home environment lacking contact with others, a gradual increase in communication from home to teacher, then with RHS individuals and groups, was a successful example recommended by Katie, of using ICTs to overcome student anxiety.

Motivation, engagement and participation with others in e-learning could be critical for chronically unwell students’ future health and well-being, considering illness might continue to be a part of their lives after their period of compulsory education was completed. RHS teachers should try to include e-learning and ICT use which promote these three factors.

**5.1.2. RHS student location - challenging participation in e-learning**

School was a driver of e-learning (Haythornthwaite & Andrews, 2011; Wright 2010), but RHS students’ limited school attendance constituted a remoteness of location. Haythornthwaite and Andrews (2011) and Wagner (2005a) agreed this could be marginalising. Haythornthwaite’s (2007) observation was that less traditional, place-based, learning could be limited by location. Issues of access to ICT and the Internet, and quality of ICT and Internet provision, were of particular concern in relation to various places learning occurred.
For RHS place-based learning, success of e-learning was highly dependent on the location of learning. Digital divide effects of location were still evident for some students without computer or Internet access in their homes. In most hospitals Internet connections were still challenged.

Challenges of RHS location highlighted the same issues of participation with others as stated for student illness. Due predominantly to the need to travel to individual students F2F lesson time was limited for learning, but certainly for e-learning, in all locations.

In the VC situation, Bolstad and Lin (2009) described issues of independence and support as more obvious than in the traditional classroom. Kozma et al. (2000), and Rice (2006), concluded that DE environments were complicated due to ICTs. In RHS, issues of independence and support arose mainly through factors of student age in relation to ICT and e-learning use. Younger students needed permission or supervision to use ICTs, and complicated uses or designs of ICTs or e-learning activities meant older students did not take interest in or ownership of e-learning until advanced senior levels of schooling.

**Benefits of e-learning for RHS student location** If challenges for e-learning in terms of student location were alleviated, this would support the NZ Curriculum (MoE, 2007) recommendation to:

> “assist the making of connections by enabling students to enter and explore new learning environments, overcoming barriers of distance and time; facilitate shared learning by enabling students to join or create communities of learners that extend well beyond the classroom.” p.36

RHS participants observed ICT resources and access to the Internet were improving, probably due significantly to government strategies (MoE, 2002). For all RHS locations apart from hospital wards, these predictions proved to be valid. Students able to attend a RHS class or unit were guaranteed similar access to ICTs and e-learning as students in a traditional school environment. Some participants believed access in the RHS environment might be superior due to fewer students and more teacher assistance available.
Digital divide issues of e-learning location for other RHS locations were also reducing. A definite benefit for students unable to attend RHS classroom or unit, was participants’ belief the situation in schools, homes and communities was becoming more even.

Improvement in ICT resources and programmes was observed, as Kozma et al. (2000), and Rice (2006) were confident they would. Johnson et al.’s (2010) predictions were for an increase in use of mobile devices. RHS participants observed students’ personal ownership, particularly for smartphones, was increasing. Teachers’ and students’ own mobile devices were used to access e-learning in a wide variety of locations.

**Fostering e-learning to address challenges of RHS student location** As perceived for other individuals RHS students would need to continue to access learning, as well as e-learning, and support after their years of compulsory education. Modelling ways to do this aligned with knowledge seeking or 21st century goals for all learners (Bolstad & Gilbert, 2006; Lai, 2008; Brown & Adler, 2008). Teachers should continue to guide students in ways of accessing information and knowledge, outside of their homes or RHS teaching locations, and encourage the students in this practice during teacher absence.

RHS teachers should continue their practice in addressing inequities of location. Taking e-learning to the student, for example to the home, or enabling student access to e-learning through meeting at RHS class, SE, or in public spaces, exposed students to its benefits.

In the F2F time with the RHS student, participants focussed on strategies to support and engage students’ learning during teacher absence. Phone, text message and email were common methods of communication observed with students. However, use of all of these methods was often more common in F2F time, or for communication, than for delivery or receipt of the educational programme. Wiki, and practice such as co-construction via email were less used, perhaps due to limited ability for teachers to share examples of use. While the cost of VC equipment to RHS units and student homes was no doubt prohibitive, other options for virtual meeting between teacher and student should be explored.

The observation of reduced use of social software in NZ schools (Johnson et al., 2011) was also indicated in RHS. No participants acknowledged of use of social software for communication with, or between, students. Some participants described meeting students F2F
online via communication such as Skype or LIVE. However, online learning in a group situation, synchronously or asynchronously, was rare.

Attendance to teacher-student F2F lessons in person were to be commended. However, opportunities for RHS students and teachers to meet individually or in groups through increased emphasis on improving methods of CMC, online meetings, DE and mobile e-learning in teacher absence would be worthwhile in providing more frequent, ongoing support to students.

To develop learner independence in the VC setting, Bolstad and Lin’s (2009) recommendation was for teachers to identify pedagogies and resources assisting this goal. Students’ need to develop independence in times of significant teacher absence was also noted in the RHS context. Replacing the feedback traditionally provided by the teacher, with interactive methods of using technology as described by Anna, or online searches for support, could assist. Repeated use of engaging, brief, targeted activities or programmes, could assist student and teacher competence in the online environment. Assistance from others, for example parent support for younger students, and encouragement to seek assistance from peers or teacher outside of F2F meetings, synchronously or asynchronously, could be further encouraged.

5.1.3. Managing RHS student learning needs - challenging participation in e-learning

Aside from issues of student health and location, managing student learning needs comprised a variety of factors affecting the potential and tendencies both of students, and of teachers, to use e-learning.

Although an indication of differences in student use of ICT and e-learning according to gender were noted by Thomson and De Bortoli (2007), student gender was not regarded by participants as a significant influence on e-learning in RHS.

Regarding student age, Johnson et al. (2011) perceived e-learning was less used in primary schools than secondary. Morgan and Morgan (2011) encouraged investigation into the proficiency of very young students due to their perception that online programme development had been targeted to teen and older age groups. Bolstad and Lin (2009) found in the VC environment, older students’ participation in NCEA examinations limited e-learning
options. In RHS, very young students requiring adult support, and older students involved in NCEA examinations were perceived as having reduced or limited opportunities for e-learning.

Student attitude of motivation towards e-learning was viewed by McCombs and Vakili (2005) as necessary for success in online environments. Whereas Thomson and De Bortoli (2007) considered that e-learning might be reducing in its capacity to engage learners due to constant use. However, RHS respondents’ majority perception was of student enjoyment, confidence, and sense of usefulness of ICT. Participants’ ability to engage and motivate students through personalised or targeted learning meant factors such as student gender, age, source and requirements of curricula, and other attributes or preferences of the student could be supported through various e-learning activities.

To enhance student learning ERO (2001) recommendations were for teacher focus on educational outcomes in student ICT use, and MoE (2002) observations were of limited teacher use of ICT in classrooms and learning processes. RHS respondents’ majority belief was for the value of ICT in opportunities for student learning, and importance to student learning objectives. A general perception that ICT and e-learning could make a difference in student learning was indicated.

**Benefits of e-learning for managing RHS student learning needs** Teachers provided or enabled the opportunity for e-learning, therefore their own potential and tendencies towards e-learning were more likely to influence provision and practice than student tendencies.

RHS participants did not perceive their gender was a significant influence on their practice, and few perceived their age was a significant influence. Wright’s (2010) stress on the importance of teachers actively engaging or facilitating specific e-learning, was relevant to participants’ belief that experience of e-learning, particularly specific experience in relation to RHS context, influenced their e-learning practice.

The greatest influence on their practice and provision of e-learning was in terms of teacher attitude. For this study, teacher attitude was defined by confidence, skills, and proficiency. ICT reporting of Johnson et al. (2005) and Johnson et al. (2011) emphasised high use of e-learning by teachers for resources. These findings were similar for RHS teacher use. Bolstad and Gilbert’s (2006) proposal of justification of government investment in ICT as improving
efficiency to access, share, and reuse resources was valid in practical terms due to the nature of RHS teacher location in various sized units throughout NZ. The variety of students, and the transient nature of their stay on the RHS roll, required differing resources on a frequent basis.

A majority of RHS respondents reported high levels of ICT proficiency. For some, this was through their RHS participation in such opportunities as ICTPD clusters or TELA laptop schemes provided by NZ government (MoE, 2002). Committed and regular use of ICT and e-learning was demonstrated, as recommended by Wright (2010) for specific purpose. Mishra and Koehler’s (2006) observation for TPACK was evident in some participants’ aims for seamlessness, or unconscious adoption of ICT and e-learning in their teaching.

Evidence of NZ Curriculum (MoE, 2007) recommendations to “…enhance opportunities to learn by offering students virtual experiences and tools that save them time, allowing them to take their learning further…” (p.36), were observed in teacher use of websites such as Google, Youtube, Kahnacademy, NZCareers and NZQA. How widespread this practice was, was unclear from results.

**Fostering e-learning to address challenges in managing RHS student learning needs** In considering student learning needs, the MoE recommendation that, “Schools should explore not only how ICT can supplement traditional ways of teaching but also how it can open up new and different ways of learning.” (p.36) should be addressed.

Participants definitely perceived that ICT supplemented traditional ways of teaching. They stated e-learning F2F was more easily enabled than in the traditional classroom, and it appeared to be common practice between RHS teacher and student.

RHS teachers were aware of limitations in the e-learning they provided, reflecting a wider preference for F2F opportunities, but increasing use of CMC. This suggested an appreciation of issues such as a loss of development in oral skills observed by Kanuka and Rourke (2008), or limitations in picking up learning cues observed by Katie in the LIVE environment. Further exploration of ICTs or e-learning enabling interaction with students online, synchronously and asynchronously, would be important in developing practice.

Use of web 2.0 programmes or activities involved interaction and problem solving on the part of the learner, as opposed to simple access of resources. Although this supported some RHS
participants’ observations of different or higher forms of learning occurring, it was unclear whether sufficient use or examples occurred, to indicate a widely accepted view. Use of interactive web 2.0 programmes should be encouraged for students, as well as activities such as accessing resources.

High use of the Te Kura programme for longer stay students or those with specialist subjects, and praise of some uses of e-learning within specific courses, reflected the success of the MoE (2000a) decision to progress the Te Kura online facility. However, knowledge of other options should be encouraged. RHS’ LMS use should be further developed and SE programmes should be better observed for RHS teachers to keep up with trends in traditional schools.

Teacher use of ICT clearly supplemented traditional ways of teaching, but did it open up new ways of learning? Haythornthwaite and Andrews’ (2011) observation that frequent use of technologies meant CMC should not be a challenge in e-learning, was a clear encouragement for situation of learning in different contexts.

For e-learning in general teachers set up their students for ICT use, introducing students to more complex websites, and modelling access of information and resources. Their use of Web 2.0 and interactive programmes with students indicated RHS respondents’ ICT adoption at higher use levels as for other NZ teacher use reported by Johnson et al. (2011). More innovation would be necessary due to predicted advances in technology and use of collaborative, game-based learning and mobiles (Johnson et al., 2010). Innovative use of virtual activities such as Liz’ description of a student virtually performing a heart operation, could be better explored within RHS.

Modelling effective research behaviour for many senior students was noted by several RHS participants. This demonstrated Haythornthwaite and Andrews’ (2011) claim that student approaches to information and evaluation were different in e-learning, to more traditional methods of research. Providing skills for students to seek knowledge in the future was only expressed by some participants, but their own desire to learn was recognition that they too were learners, with their own opportunities for 21st C learning (Bolstad & Gilbert 2006).
An appreciation of changed roles in teaching and learning with e-learning was expressed. RHS participants agreed they frequently learned from their students, and as Lai (2008) observed, did not perceive themselves as experts, but more as motivator or facilitator.

Greater attention to the roles of learner and teacher, particularly in the e-learning context, could assist in illustrating the importance of Knowledge age/21st Century goals to RHS teachers, both for their students, and for themselves.

Pedagogy above all other factors was influential in teacher appreciation of e-learning. Rice’s (2006) claim was that who is teaching, who is learning and how the learning was accomplished was more relevant in e-learning than the medium. Participants’ pedagogy demonstrated Wright’s (2010) claim of teachers’ pedagogic actions as a prime indicator of successful e-learning provision. Although many traditional e-learning programmes were used, the ability to target activities to the student, and innovative use or adaptation of ICT for both communication and learning activities was apparent. Continued encouragement should be given to RHS teachers, to explore innovations and adaptations in ICT and e-learning.

5.1.4. RHS teacher location - challenging participation in e-learning

Fostering e-learning in RHS was essentially an issue of teacher location and limited contact with teaching colleagues. Teacher location in various sized units around the country was an issue of context which greatly affected teacher potential to develop proficiency in e-learning. 50% of respondents taught in units on their own or with less than three other teaching staff. Unsurprisingly, stronger colleague support was found in larger sites. Most participants in remote or sole teaching situations expressed a preference to meet with others F2F for ICT or e-learning support. Closer collaboration with colleagues to reinforce learning was agreed.

Timperley et al. (2007) claimed focussing on engaging teachers in learning, and motivating them to promote positive student outcomes ensured the relevance of PD. However, opportunities for PD in e-learning were affected by RHS teacher location. Without the ability to meet regularly in the whole school situation, PD for individual RHS was limited to lengthy but infrequent meetings F2F in one location. Participants stated challenges for large numbers attending meetings, and inconsistency in staff proficiency.
RHS teachers worked in relative isolation, to the extent that the service constituted a remote community. Sharing of practice with others was key, but availability of other teaching colleagues for teacher advice and support, and opportunities to share and improve practice with others, were limited. How could best practice examples of teaching and learning be promoted within this context?

**Benefits of e-learning for RHS teacher location** Remoteness of location was viewed as disadvantageous in literature (Wagner, 2005a). Nevertheless, RHS participants acknowledged that their situation of remoteness, or isolation, had assisted proficiency in text, phone, email and video communication to remain connected with students and colleagues.

Collegiality and support developed outside of RHS for some, as their situation of remoteness, a wish for connection with others, or a need for assistance encouraged contact with staff of organisations in or near where their units were located. For example, F2F ICT expert advice was accessible but was not instant. Therefore, alternative methods of support in person and online were explored.

**Fostering e-learning to address challenges of RHS teacher location** PD in the whole school situation was most common, and majorities of RHS respondents expressed perceptions of usefulness, enjoyment and confidence for ICTPD. Participants particularly enjoyed the collegiality of meeting F2F, but several suggestions for improvement were offered.

Attention to short, targeted, purposeful, frequent, ongoing, continuous PD, were suggestions of participants which aligned with recommendations of Bolstad (2004), and Ham et al. (2002).

Additional or alternative methods of meeting altogether F2F should be explored. Some options, such as VC, were limiting in terms of the expense of setting up several RHS units with costly equipment. Smaller, more frequent meetings F2F or online should also be explored since new technologies may continue to improve facilities to operate online. Options of webinars, and video communication via phone system, should be encouraged.

Reviewing literature indicated the potential value of CoPs initially described by Wenger (1998), to enable participation in PD for RHS teachers. Some participants were already members of learning groups within and outside of RHS.
Nesbit’s (2008) conditions for the emergence of a CoP amongst e-learning students included having shared or similar experiences, familiarity with each other and with using technology to interact, and a drive to interact with others in understanding a specific topic. These conditions appeared to be relevant for RHS context, making the option an avenue to explore for ICT PD. Parr and Ward (2005) claimed CoPs were difficult to manage in a regular school, but even more challenging online. However, their use for teachers in this remote location, to enable or extend participation could also extend to students if proven successful.

Attention to Bolstad and Gilbert’s (2006) loop or spiral development model depicting stages of little or no use of ICT in teachers, to becoming more capable, and progressing to innovative 21st century learning and teaching or transformational use, appeared to be occurring within RHS. Promoting the idea of the knowledge age and 21st century learning, or a Web 2.0 form of learning (Brown & Adler 2008), could provide a similar goal for RHS teacher practice in e-learning.

5.2. Relevance of the research

In seeking to increase educational opportunities within the remote setting of RHS, the research attempted to answer three questions - What is RHS teachers’ current practice in e-learning? What are the benefits of, or challenges to RHS teachers’ e-learning provision? If it has the potential to improve learning, teaching and communication opportunities for RHS teachers and students, then how can e-learning be fostered within RHS?

RHS teacher practice in e-learning indicated that for the majority of RHS teachers and students, use of e-learning was effective in improving learning, teaching, and communication. In particular it could help address some context issues of student ill-health, student location, managing student learning needs, and teacher location.

As recommended by Haythornthwaite and Andrews (2011), the research focussed on humanitarian and social development aspects of RHS students and teachers, and their relationship within the e-learning process. The research was relevant in examining Rice’s (2006) contention that who is teaching, who is learning, but mostly ‘how’ that was happening, within RHS.
Examining the role of the learner assisted in identifying how well RHS students’ programmes were individualised in RHS, allowing ease of purposeful e-learning inclusion. This was a particular strength. However, opportunities for learning or collaborating with others in e-learning were complicated, mostly due to student isolation, a mix of individual student learning programmes occurring in RHS group settings, and sometimes student illness. Learner independence was also an issue of context, with students spending extended amounts of time in isolation, but not necessarily engaged in e-learning during teacher absence.

Key benefits of e-learning relevant to RHS students included the potential for increased engagement in learning; the potential to communicate and interact with other learners or teachers; and the potential to take their learning ‘further’ i.e. out of the home, RHS class or community setting.

For RHS teachers, collaboration was also difficult. Many were located, or taught, in relative isolation. Although whole school PD was generally enjoyed, more frequent and ongoing methods of support to enhance practice in e-learning were necessary. Improving participation and collegiality of RHS teachers could assist them to share perspectives on their teaching role. Reflecting on their own, and others’ successful pedagogy in ICT and e-learning, might further identify and enhance pedagogical skills.

If RHS students and teachers could participate in e-learning in this way, the MoE (2007) goal of e-learning not only supplementing traditional methods of teaching, but also opening up new and different ways of learning within the RHS and other remote contexts, might be discovered.

### 5.3. Limitations of the research

In relying on RHS teacher perception of their students’ and their own use of ICT and e-learning, a lack of RHS student ‘voice’ or involvement was a limitation. A lack of RHS management opinion or involvement was another.

Due to a research focus on successful or effective uses of ICT and e-learning within RHS, and selection of a participant sample generally indicating high use of ICT, participants held mostly
positive tendencies and opinions towards e-learning. Alternative viewpoints were stated, but not researched in as much depth as positive views. For example, claims such as government investment in ICT due to economic concerns for a technologically literate workforce (Selwyn, 2008) were not explored. RHS teachers with potential problems, concerns or objections to e-learning, such as the respondent who stated they didn’t use e-learning, were also unable to voice their concerns.

Negative aspects of participation with others, such as cyber bullying or predatory behaviours in use of social software, were not explored.

Due to a tendency for rapid change in ICTs, technologies themselves were not investigated in depth.

5.4. Recommendations for future research

Further research could investigate RHS student engagement or disengagement in e-learning caused by illness.

Identifying methods to develop RHS learner independence in e-learning, for all student ages, would be valuable in situations of teacher absence.

A focus on developing essential skills of research and study in the e-learning environment would be particularly useful for older RHS students.

Research into the use of e-learning to assist support and collaboration should be undertaken. Besides investigation into the use of F2F or online CoPs for teachers, their potential for RHS students studying similar topics or subjects should be explored.
# Questionnaire of RHS teacher provision of e-learning

Please complete the following survey, which should take up to twenty minutes.

When you have completed the survey, please return within 3 weeks, in the pre-paid addressed envelope, or if preferred scan and email to:- kwat069@aucklanduni.ac.nz

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## Section A. This section is about you.

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<td>3. Teaching experience</td>
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<td>The sum of my teaching experience is closest to ____________ years</td>
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4. Regional Health School (RHS) teaching experience

The sum of my RHS teaching experience is closest to ____________ years
### Section B. This section is about your teaching location and your student caseload.

#### 5. RHS unit location – collegial

The RHS unit location you are mainly based is with

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<th>(how many other RHS teachers besides yourself? Please choose one option)</th>
<th>No other RHS teaching colleagues</th>
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#### 6. RHS location – teaching

The location you spend most time teaching RHS students is

- □ In a ward or room (not a classroom) at a hospital or residential facility
- □ In a classroom situation at a hospital or residential facility
- □ In a classroom situation at a RHS site
- □ At the student’s home
- □ At the student’s school of enrolment
- □ At a public place such as a library
- □ Online
- □ A very even mix of one or more of the above (please list)

________________________________________________________________________

- □ At a location not mentioned above
  (please describe)________________________________________________________________
7. RHS student caseload – Please select according to your typical caseload throughout the year.

<table>
<thead>
<tr>
<th>Year 0-6 students</th>
<th>Mainly</th>
<th>Sometimes</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Year 7-8 students</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Year 9-10 students</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Year 11 and above</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

8. RHS student programme – Please select the main origin of the programme for the majority of your students throughout the year.

<table>
<thead>
<tr>
<th>RHS Student’s school of enrolment</th>
<th>Mainly</th>
<th>Sometimes</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Te Aho o Te Kura Pounamu (the Correspondence school)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>A very even mix of two or more of the above (please list)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Another provider not mentioned above (please</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
### Section C. This section is about your general use of Information and Communication Technology (ICT)

<table>
<thead>
<tr>
<th>9. Teacher adoption – ICT</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ I am aware of ICT but have not used it</td>
</tr>
<tr>
<td>□ I am learning to use the basics in ICT but lacking in confidence</td>
</tr>
<tr>
<td>□ I understand the process of using ICT and apply ICT for specific tasks</td>
</tr>
<tr>
<td>□ I am familiar and confident using ICT</td>
</tr>
<tr>
<td>□ I adapt ICT to other contexts, using the computer in many applications and as an instructional aid</td>
</tr>
<tr>
<td>□ I creatively apply ICT to new contexts and in the classroom, using the computer as an instructional tool and integrating it into the curriculum</td>
</tr>
</tbody>
</table>

Please indicate how much you agree with each of the following statements regarding your ICT use as a RHS teacher:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT is important to improve teacher practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT is important to improve student learning outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT enables access to quality learning resources and information online for teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT enables access to quality learning resources and information online for students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT offers new opportunities for professional development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT is important in providing opportunities for student learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT makes a difference in teachers’/principals’ professional practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Please indicate how much you agree with the statement 'The integration of ICT is making major improvements to the **efficiency** of curriculum'.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Please indicate how much you agree with the statement ‘The integration of ICT is making major improvements to the quality of curriculum delivery for my RHS students’

- □ Strongly Disagree
- □ Disagree
- □ Neither agree nor disagree
- □ Agree
- □ Strongly Agree

13. RHS teacher provision of e-learning

Please choose any e-learning activities or practices you have used for your RHS students in the last 18 months

- □ I do not use e-learning with students (If you have chosen this option please go directly to question 18.)
- □ I have supported students to access online resources (e.g. Mathletics, Literacy learning progressions, TKI)
- □ I use Web 2.0 tools with students (e.g. Google apps, YouTube)
- □ I have supported students to use an online Learning Management System
14. Teacher provision of e-learning – subject area

☐ Mathematics

☐ English

☐ Science

☐ Careers or Transition

☐ subjects other than those listed (please state) __________________________

15. Teacher provision of e-learning – location

Please choose any location in which you have provided e-learning for your RHS students in the last 18 months

☐ in a hospital or residential ward or room (not classroom) setting

☐ in a RHS classroom setting

☐ at the student’s home

☐ at the student’s school of enrolment
16. Teacher provision of e-learning – origin of e-learning programme

Please choose any origin/source of e-learning you have used with your RHS students in the last 18 months

- [ ] source is a commercial provider (e.g. Mathletics, Careers)
- [ ] source is a government provider (e.g. MoE e-portfolios, TKI, NZQA website)
- [ ] source is student’s school of enrolment (e.g. on their school’s learning management system)
- [ ] source is my RHS (e.g. on my RHS learning management system - Moodle)
17. **E-learning – teacher perceptions of your RHS students’ attitudes towards e-learning.**

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Unsure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, my RHS students find e-learning is useful (important)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall, my RHS students enjoy e-learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall, my students display confidence in e-learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. **E-learning provision - Professional development (PD) needs**

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Unsure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I consider PD in the area of e-learning to be a priority for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The e-learning PD I have participated in has been useful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(If you have not participated in PD please do not</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The e-learning PD I have participated in has been enjoyable
(If you have not participated in PD please do not answer)

☐ ☐ ☐ ☐ ☐ ☐

I have been confident with the e-learning PD I have participated in
(If you have not participated in PD please do not answer)

☐ ☐ ☐ ☐ ☐ ☐

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.
Please return it in the envelope provided.

After analysis of the questionnaire I will select a sample of up to 10 participants for a one to one interview via phone, video conference or in person.
The sample will not necessarily be of teachers who are utilizing a large number of e-learning tools, nor those using tools most frequently. They may be selected according to e-learning use in range of settings, type of e-learning etc. I would like to hear from you if you would be prepared to participate further in this way.

*Please complete the following contact details ONLY IF YOU ARE PREPARED TO PARTICIPATE FURTHER IF SELECTED*

Name:

Phone contact:
Appendix 2

Interview

NB. Question wording in italics change for each participant.

About the Student

Question 1: E-learning, initial inclusion - When you first admit a student to your RHS roll and decide their learning programme, do you consider the inclusion of e-learning at that initial stage?

Could you explain why you do/don’t consider this?

Question 2: Student Gender - The gender of the student, has been a focus of past studies of e-learning. What about the gender of your student(s), do you consider this influences whether you provide e-learning, and/or what you provide?

Question 3: Student age and e-learning experience - You indicated that you e.g. may teach all age groups – does the age of the student influence your e-learning provision? Particularly consider such things as competency/skills of younger students and exam syllabus requirements of older students.

Question 4: Student location – You indicated e.g. you spent an even mix of time teaching students in their homes and SE and provide e-learning at those places or at a public place such as a library. How is e-learning enabled or challenged for each setting?

Question 5: Teacher perception, student attitude – The questionnaire #17 asked about your perception of your students’ attitude to e-learning, their confidence, enjoyment and sense of e-learning’s usefulness. You e.g agreed that the students found it useful/important but were unsure that they enjoyed or displayed confidence in e-learning. Could you elaborate on your perception, using any examples you may have observed?

Do you think e-learning has the same, more, or less significance for students in the RHS settings you teach than for ‘well’ students in a regular classroom environment?
About the teacher

Question 6: Teacher adoption of ICT - Your response for question #9 (adapted from RNZ scale) stated you e.g. ‘adapt ICT to other contexts, using the computer in many applications and as an instructional aid’. Could you explain your choice of this statement as compared with the other options?

Do you believe there is anything in your career/life that has influenced this level of competence?

Question 7: Teacher Gender – Returning to the gender question, this time in terms of the teacher, do you consider your own gender has any relevance to your ICT skills, but especially your provision of e-learning?

Question 8: Teacher experience and pedagogy - Some literature discusses the challenges or enablers of age/teaching experience in terms of e-learning provision and pedagogical skill. I am covering the statistics regarding age in the quantitative analysis of the questionnaire, but do you consider your teaching experience of e.g. 30 years has any relevance to your ICT skill or the e-learning you provide?

Do you consider your RHS teaching experience of e.g. 10 years specifically/for this setting has relevance either to your ICT skill or e-learning provision?

If you consider your pedagogical skill – how well you teach- do you consider your teaching experience informs your pedagogical skill? If so, in what way?

About teaching and learning with ICT/e-learning.

Question 9: Teacher provision, location of e-learning – Returning to the variety of locations of e-learning provision: e.g. Student home, SE or public place. Could you consider examples of teaching in these locations which stand out for any innovation in provision and describe how you managed this?

Are there any benefits you see in your own teaching or in your student learning as a result of e-learning use in these locations?
**Question 10: Teacher practice e-learning** – In question #13 and #16 you selected *e.g. a variety of e-learning provision: accessing online resources, web 2.0, online LMS, Publisher and email, use of commercial, government, and TK*. Could you consider 1-2 of the most innovative and describe how you implement these?

Could you describe in particular, any benefit you see in your own teaching or in your student learning as a result of this use?

**Question 11: Teacher provision, subject e-learning** – In question #14 you selected *e.g. a variety of subject areas of e-learning provision: Maths, English, Science, Careers/Transition, Classics, Economics*. Again, could you consider 1-2 examples and describe how you implemented these? Again - could you describe in particular, any benefit you see in your own teaching or in your student learning as a result of this use?

**Question 12: Collegiality** – You have *e.g. 1-3 other teaching colleagues in your RHS unit and more colleagues accessible further afield*. Has contact with any of those colleagues influenced your provision of e-learning? If so, how?

**Question 13: E-learning PD needs** – You have *e.g. disagreed that PD you have participated in was useful or enjoyable, and indicated you lacked confidence but that this remains a priority for you*. Could you describe what people or experiences (not necessarily PD) you consider have been most effective in enhancing your e-learning skills during your teaching career?

What do you think would be most effective in enhancing e-learning skills for RHS staff?
References


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World summit on the Information Society Tunis, 2005. Retrieved February 2012 from infodev@worldbank.org


