Ubiquitous Information

An eFellow report on the use of mobile phones

in classrooms to foster information literacy skills

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Abstract

The technological capabilities of mobile technology such as mobile phones and personal digital assistants (PDAs) are developing at a furious pace. These incredibly advanced pieces of hardware are available readily and for most as must have consumer items, particularly amongst our youth – genY, the iPod generation, the “prod-users”. This technology has seen a fundamental change in this generation from those before. These students are always connected and always available.

This report considers the impact 'anytime' access to information via access to the mobile internet will have on teaching and learning in the future. It explores the potential applications for mobile phones in the classroom and the skills that our students will need in order to cope with the mass of information on-demand that is available to them.

The research conducted for the purpose of this report involved a class set of 30 3G mobile phones being made available for a single unit of work by three different classes; a Year 12 Media Studies, Year 9 Social Studies and a general Year 8 class. Each unit of work ran for approximately 5-7 weeks. The teachers involved in the study were given support to learn how to use various functions of the mobile phones and to plan their unit of work.

The findings of this report indicate the following:

- applications and tools available for use via a mobile phone, including access to the world wide web, have a great deal of potential for use in schools. Currently cost of data is the single biggest factor in limiting this use.

- while as teachers we are constantly being told our students are 'digital natives', many of our students are not as au fait with technology as teachers are led to believe. Students are being labelled the 'net-gen' and teachers who have been told that they are 'digital immigrants' often do not see that the skills they believe their students to have are not always present. While students may seem very 'tech savvy' they still need to be taught the skills to deal with the world that their use of technology gives them access to, namely the world wide web and information

overload.

- key factors identified by secondary school teachers as impacting their ability to teach information literacy included limited access to resources (particularly technologies for accessing the world wide web), access to professional development and the impact of timetabling leading to a highly segmented curriculum.

Introduction

Professional Background

I am a secondary school teacher based in Hamilton, New Zealand. Trained in both English and Media Studies, I was given the opportunity to design my ultimate Media Suite teaching space in 2005. My classroom configuration consisted of 15 G5 Macs on benches around the classroom and an interactive whiteboard. Access to these resources completely changed my teaching philosophy and methods.

Through the technology available to me, I truly had the opportunity to become a facilitator of information, rather than be in the position of holding all the knowledge which I drip-fed to students. I began to create tasks for students which allowed them to tap into the vast amounts of information available online. Students began to develop valuable information gathering skills. My role became one which motivated students to find information and gave them ideas as to how to process this information.

Over time, my classroom teaching style began to focus more and more on how to get students critically analysing the information they were finding. Learning was becoming personalised as students had the ability to follow the angles that they enjoyed within the set of guidelines given.

Learning became collaborative as students were encouraged to share their findings with others in the class through oral presentation and question and answer sessions – initially modeled by me as the teacher, but in time adopted by the students as they took ownership of their own learning and were empowered to lead class discussions.

Ironically while this meant less of me at the front of the class, it lead to much more behind the scenes preparation in order to build tasks that required analysis from the students. The natural progression was for me to look into online learning environments and I established a class *Moodle*.

I realised that the type of learning that my students were experiencing in my classroom

was not possible to recreate in a 'computer lab' environment. The technology was too obtrusive and became the focus of the lesson – rather than the content. The type of technology that was available to me in my classroom is not financially practical in every classroom. However, many of our students are bringing their mobile phones to school everyday, most of which are capable of recreating the teaching style I was employing in my classroom. What's more, the students enjoy using their phones.

As a classroom teacher of a rapidly changing generation of students, I am acutely aware of the dramatic differences in the way that our students are learning. The way that our students access and process vast amounts of information has certainly changed the state of our classrooms and we, as educators, need to ensure we are informed and ready to act to best prepare this new breed of learners for the world that they will be going out into. In particular the new New Zealand Curriculum has highlighted the need for all New Zealand students to develop strong thinking skills as identified as one of the key competencies;

> *"Students who are competent thinkers and problem-solvers actively seek, use, and create knowledge. They reflect on their own learning, draw on personal knowledge and intuitions, ask questions, and challenge the basis of assumptions and perceptions" (*NZ Curriculum pg. 12)

The need for students to be competent in ICT is also highlighted as a key competency, "*They confidently use ICT ... to access and provide information and to communicate with others".*

The question I asked myself then was, "how are students and teachers enabled to meet this directive," and this led to the basis of my research project.

Background to the Research Project

Education now more than ever is at a rapidly changing time. The introduction of the new New Zealand Curriculum at the end of 2007 specifically identifies the requirement for schools to be teaching thinking skills as a key competency as well as fostering the values of innovation, inquiry and curiosity, and community and participation. The challenge for us as educators is to grasp the true capabilities of these technologies, to ensure that we are making the very most of the technology available to us to meet the needs of the New Zealand Curriculum and therefore the needs of our students.

Dr Jamie McKenzie, world renowned proponent for information technologies and how they might transform classrooms and schools to support student centered, engaged learning, further reinforces this initiative. In his lecture to Waikato teachers on 28 February 2008, he said that currently students are simply “scooping and smushing” or going to the internet with their “electronic shovels”, gathering information related to a topic and then simply making it fit the task that was given. He said that information literacy is about “synthesis”, not only gathering and processing the information, but also “locating and presenting to an appropriate audience”.

The technological capabilities of mobile technology such as mobile phones and PDAs are developing at a furious pace. These incredibly advanced pieces of hardware are available readily and for most as 'must have' consumer items, particularly amongst our youth – genY, the iPod generation, the “prod-users”. This technology has seen a fundamental change in this generation from those before. These students are always connected and always available.

Today my students turn up to class equipped with their own sophisticated communication devices through which they can have instant access to others, the web and easily record everyday moments. Some have their own laptops, and at home, many have broadband. Students are spending plenty of time experimenting and engaging with collaborative and social networking platforms such as Bebo and MySpace. They are sharing details of their lives and the real lives of others through YouTube and Flickr. They are meeting other people from all around the world through Skype and MSN.

The next natural development in educational technology is through mobile devices. Most of our students have these incredibly powerful little tools sitting silently in their school bags, shunned from most classrooms. I believe there is more to these tools than what is currently being utilised. I would like to explore these possibilities and answer the question, "is there a place for mobile devices in education?" This technology is so common-place and heavily adopted by our students today that it is timely to explore the potential opportunities.

If we look to overseas trends, particularly in Asia, we can get an overwhelming sense of where our future might be headed. According to Brian Fling, developer for mobile phone content, "there are currently 2.9 billion people worldwide who use mobile devices, mostly for telephone in the United States and Western Europe. (The world population is estimated at 6.5 billion.)" Most relevant to this study however, is the finding that "in factoring the third world, as well as China, 1.3 billion mobile device users reach Internet content through their mobiles" and that "fewer people worldwide access the Internet by desktop (1.1 billion) than by a mobile phone or other pocket device." "By 2010, Fling said, mobile industry insiders project that half the world will have Web access though their mobile devices" (as reported by *The Examiner* 2008).

Rationale for Research Project

The functionality of the mobile phone is numerous. The primary function of the mobile phone is communication. However, mobile phones are now becoming extremely sophisticated devices that offer far more applications including still and video camera, voice recorder, graphic calculator, personal organiser and media players to name a few. When considering communication, the mobile phone has capabilities beyond basic person to person voice calling, including text messaging, multimedia messaging and more recently fully internet access. Development of specifically designed mobile web browsers such as Opera Mini mean the web browsing experience via mobile phone is fully optimised meaning web pages can be viewed fully and interactively and information can be both downloaded and uploaded easily by the user. My research project will explore the ways that teachers could integrate a wide range of these capabilities into their classroom

teaching primarily to improve information literacy skills.

The 'So What' Factor

Today our students have a vast amount of information available to them at their fingertips, creating much more of a need for information literacy skills. Students need to be taught to be information savvy. That is, they need to learn to question the validity of their information sources, but they also need to know what to do with the information in order to make it useful to them. Because access to information is so quick and easy, any time, any place, we need to be teaching our students how to cope with it and to use it in the best way possible.

The Research Question

"In what ways can mobile phones be integrated into authentic classroom learning tasks to foster effective information literacy skills?"

The sub questions that assist in developing answer to the main question are;

- In what ways can teachers use mobile phones in their classes to access information?
- How are mobile phones currently being used in New Zealand schools?
- How is information literacy currently being taught in the case study schools?
- How do students perceive the use of mobile phones in classrooms in the case study schools?
- How do teachers perceive the use of mobile phones in classrooms the case study schools?

I will cover each of these questions in the *Findings* section of this report and then tie in together to present the answer to the main research question in the *Discussion* section.

Literature Review

Information Literacy

While there are numerous definitions for the term information literacy, most can be traced back to an accepted set of skills with which one is able to find, access, process and use information. At its core, information literacy can be seen as a key life skill brought about by our need to communicate effectively. Author of the Australia and New Zealand Information Literacy Framework (ANZIL), Bundy (2004) states that, “information is transmitted between people working together ... therefore communicating ideas and information is integral to information literacy” (p.1).

In all cases, information literacy is having a set of skills through which people access, process and make use of the information available to them. The ANZIL framework outlines information literacy as being “an understanding and set of abilities enabling individuals to recognise when information is needed and to have the capacity to locate, evaluate and use effectively the needed information” (Bundy 2004). The Chartered Institute for Library and Information Professionals (CILIP) outline information literacy as “knowing when and why you need information, where to find it and how to evaluate, use and communicate it in an ethical manner” (CILIP, 2008). The American Library Association (ALA) defines an information literate person as one who "must be able to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (ALA, 2008).

Gwen Gawith, former National Co-ordinator of Information Studies Programmes, Auckland College of Education, provides a slightly different angle when considering what information literacy means. She says, “to be literate with information means to have the skills not to be obliterated by information – to be able to sort, sift, select, reject and use it with critical discrimination.” Gawith says that information is a living, organic, social literacy, responding to social workplace and education needs as well as the evolving capabilities of ICTs to organise, find and disseminate, produce and communicate information” (2004).

According to the ANZIL Framework, information literate people:

- recognise a need for information
- determine the extent of information needed
- access information efficiently
- critically evaluate information and its sources
- classify, store, manipulate and redraft information collected or generated
- incorporate selected information into their knowledge base
- use information effectively to learn, create new knowledge, solve problems and make decisions
- understand economic, legal, social, political and cultural issues in the use of information
- access and use information ethically and legally
- use information and knowledge for participative citizenship and social responsibility
- experience information literacy as part of independent learning and lifelong learning (Bundy, 2004)

It is important at this point to reiterate the fact that information literacy is concerned with information available from all sources, not just those accessed through technology (Bundy, 2004; CILIP, 2008). The CILIP definition goes so far as to list potential sources of information, stating that,

> "information may come from another person, from a paper-based magazine or book, report or newspaper, from a digital source such as a database, a search engine or an e-book accessed through a computer, or it may come from any other form of media: film, video, DVD, radio, television, etc. The definition and skills or competencies above cross all media" (2008).

Bundy too gives a definition of information sources saying

> "information is available through community resources, special interest organisations, manufacturers and service providers, media, libraries, and the internet. In addition, information is available through multiple media, including graphical, aural, and textual. These pose special challenges in evaluating, understanding and using information in an ethical and legal manner" (2004, p. 3).

While all elements of information literacy are important, the point at the forefront of teacher discussion is the ethical and legal use of information, particularly in regard to authenticity of the work that students present teachers. Information literacy can play a key role in promoting an understanding of what constitutes plagiarism and in deterring its practice by promoting integrity and accountability in the use and presentation of information.

Research does suggest that students do understand that it is unethical to pass off information that is not their own without citing the source from which it came. However, they often do so anyway. Reed, Kinder, and Farnum, (2007) say of their research findings, “our surprise was, in part, due to the fact that many students express this knowledge but do not always show it in their work. For example, they fail to cite sources.” The research does not go on to give possible reasons why this might be the case. One might expect that this is due to a lack of understanding as to how to approach citation correctly, but also a lack of understanding of how to approach and use information or perhaps even an authentic context for doing so.

Information Literacy in the New Zealand Curriculum

The revision of the New Zealand Curriculum has seen a move away from information literacy as being what was referred to as an 'essential skill' within the former New Zealand Curriculum Framework, to a set of skills that are woven implicitly and inextricably through the Values and Key Competencies.

Specifically the concept of information literacy fits within both the Key Competencies of 'Thinking' and 'Using Language'. Specific elements that constitute information literacy (such as those which make up the ANZIL framework) come through in the values, particularly those of 'integrity' (for the way in which information is ethically used and shared), 'innovation, inquiry and curiosity' and 'community and participation' Ministry of Education (p. 10).

Generally, the information literacy standards that have been developed, have been done so for the main purpose of supporting information use in academic institutions. Schools are able to adapt these standards for their own use within the curriculum. Generally,

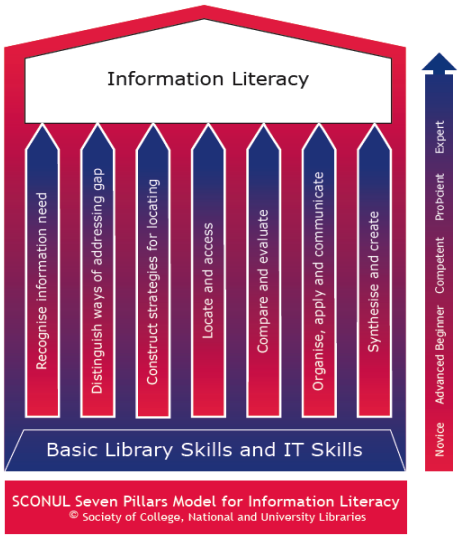
schools tend to follow models of information literacy that provide students with a formula or a set of steps for accessing and using information.

There are a huge range of models for teaching information literacy skills from which either individual teachers or whole schools can develop an approach to information a selection of the more well known include:

The Big 6 – developed by Robert Berkowitz and Mike Eisenberg, The Big 6 is envisaged as a cross-curricular process that can be integrated school-wide. It involves students working through six key steps:

1. Task Definition
2. Information Seeking Strategies
3. Location and Accessibility
4. Use of Information
5. Synthesis
6. Evaluation

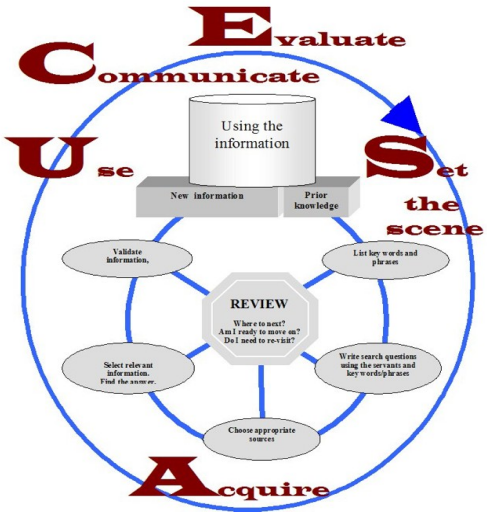
The Seven Pillars of information literacy, designed primarily for use in higher-education, this model identifies and shows the relationship between information skills and IT skills.



Research Cycle, developed by Jamie McKenzie focuses on getting students to ask "essential questions" before jumping head first in to information gathering.

New Zealand models include:

SAUCE, developed by Trevor Bond and is a "process that facilitates pupils into inquiry learning, thinking and information literacy.



3 Doors to InfoLiteracy, developed by Gwen Gawith where the three doors each named, Aim, Claim and Frame open to a different set of skills:

AIM opens to knowing what you need to learn, how you need to learn it, knowing how to access information, knowing how to plan and manage the learning.

CLAIM opens to being able to 'process' information - analyse, evaluate, synthesise and interpret it to build understanding and knowledge

FRAME opens to frames for designing and communicating learning processes and knowledge clearly, concisely and accurately, using a range of media and technologies

A School-Wide Approach to Information Literacy

Most agree that information literacy must be institution or school-wide – cross-curricular and taught throughout all levels of formal education (Bundy, 2004; Bruce, 1994; McGuinness, 2007). It should be taught as part of the curriculum rather than as a separate curriculum. Bruce (as cited in Bundy, 2004 p. 11) states that, "information literacy

cannot be the outcome of any one subject. It is the cumulative experience from and range of subject and learning experiences which creates the information literate person" Bruce. McGuinness (2007) points out that "evidence still suggests that information literacy is treated as an elective skill set on the periphery of the core curriculum in most disciplines" (p. 26).

There is also concern, particularly in higher education circles, that while tasks are being set that require students to access information, the actual skills involved in information literacy are being left for students to access independently (Reed, Kinder, and Farnum, 2007) and, that some of what passes for information literacy is merely a "bibliographic instruction that focuses only on information acquisition" (Badke, 2008).

Information Literacy as a Key Skill for Enabling Lifelong Learning

The revised New Zealand Curriculum (2007) outlines a vision which sees young New Zealanders as "confident, connected, actively involved, lifelong learners" (p. 8). Lifelong learning can be defined as "all formal, non-formal and informal learning whether intentional or unanticipated which occurs at any time across the lifespan" (Candy, Crebert and O'Leary, 1994, p. xi). The 'vision' of the New Zealand Curriculum envisages all students as lifelong learners who are "active seekers, users and creators of knowledge" and who become "informed decision makers" (p. 8).

Information literacy is regarded by all authors consulted for the purposes of this report as the key skill in enabling lifelong learning. CILIP (2008) states that while an "information literate person should have an ability to be a lifelong learner and to reflect on what they are doing. That is not part of information literacy; rather it is a necessary attitude, as you cannot develop information literacy without it". The Australian School Library association states that, "information literacy is synonymous with knowing how to learn" (2008, p.1). And finally, Bundy (2004) states that "information literacy initiates, sustains and extends lifelong learning through abilities that my use technologies but are ultimately independent of them" (p. 4).

New Technologies Impacting Change to the Information Landscape

As many schools move towards a student-centered constructivist pedagogy and the 'values' outlined in our revised New Zealand curriculum demand that we are producing students who are engaged and curious lifelong learners, it cannot be denied that information literacy has an extensive role to play in our education system. However, with the rapid rate of technological change over a very short amount of time are educators being given the skills to keep up with teaching students to deal with accessing information that is increasing at an almost incomprehensible rate. While I have not accessed any very recent statistics, in the early days of mainstream internet access, between 1999 and 2002 (Gaunt, J., Morgan, N., Somers, R., Soper, R. and Swain, E., 2007), it is estimated that the amount of new information stored electronically doubled . If one projects out and adds to this the wide adoption of home broadband and more recently the content generating abilities brought about by the Web 2.0 revolution over the time since 2002 we can safely say we are dealing with an ever changing information landscape.

An increase in technologies, particularly personal, means that access to and availability of information has changed our lifestyle. It is pointed out that, “sheer abundance of information and technology will not in itself create more informed citizens without a complementary understanding and capacity to use information effectively” (Council of Australian University Librarians, 2001). While it is easy to automatically relate this to our students, we must also consider our teachers who also need to be provided with access to professional development opportunities which encourage and teach them to understand and use information effectively within the new information landscape.

If not the sheer abundance of information now available, the key change to the information landscape that is prompting a major rethink on the part of teachers is that the rise of Web 2.0 or user generated content freely available on the internet means that information now comes unfiltered, raising questions about “authenticity, validity and reliability” (Council of Australian University Librarians, 2001) that in the days before the internet one did not need to consider so much as information was generally peer reviewed and students – particularly in schools more so than universities had a very limited selection of texts to choose from, largely limited to the school or local library.

Research findings now support that, “in general, more people turn to the internet (at home, work, libraries or other places) than any other source of information and support, including experts and family members” (Estabrook, L., Rainie, L., Witt, E., 2007). Add to this the ability to now search the internet any where at any time on a device that the majority of the global population now owns and access to information and there fore information literacy becomes essential in a way that previously would never have been imagined possible.

> *“The key characteristic of the post industrial 21st century is that it is information abundant and intensive. information literacy is thus required because of the ongoing proliferation of information resources and the variable methods of access.”*
> *(Bundy, 2004 p. 3)*

mLearning

The term mLearning has been coined to give a name to the learning that is enabled by and incorporates the use of mobile technologies. It is seen as the next step on from electronic learning – or eLearning by extending eLearning to being portable and mobile. It can be seen as a convergence of mobile, internet and eLearning. The focus of mLearning is on “just-enough, just-in-time, on-location learning support” (Valentine, 2004, p. 31).

mLearning is not about replacing laptops. Nor is it about finding a solution to education using the mobile phone as the only device. Rather, it is looking at the use of mobile phones to enhance and extend the learning that is already taking place. Future Lab's *Literature Review in Mobile Technologies and Learning* (Lonsdale, P., Naismith, L., Sharples, M., Vavoula, G., (2005) explains this saying, “being mobile adds a new dimension to the activities that can be supported, both because of the personal and portable nature of the devices themselves and because of the kinds of interactions they can support with other learners and the environment” (p. 9).

Mark Prensky has been a great proponent for the use of mobile devices in the classroom. However, he points out that in order for effective teaching and learning to take place, educators will need to consider new or different ways for using the tools, and potentially an approach to learning that might be quite different from the traditional method may be

applied. “Using cell phones as a learning device, whether in or out of school, requires a good deal of rethinking and flexibility on the part of educators” (Prenksy, 2004).

Mobile phones for learning fit only part of the education model. They are not the stand-alone classroom tool. However, they are available to use as a tool should teachers wish to supplement the learning activities that are already taking place in their classrooms. Prensky says, “fully-featured as they are, it has also been pointed out that cell phones are not powerful enough to be students’ *only* learning tool” (Prensky, 2004). The beauty, and also the challenge, of mLearning is to enhance student engagement and learning opportunities using all of the tools available.

Pedagogy

Confidence in the potential for mLearning is strong and gaining momentum in academic circles. Elizabeth Valentine's summary report on the proceedings of the 2004 mLearn conference in Rome reports that educators and professors of education are beginning to see that mLearning provides opportunities that cannot be achieved by tethered machines and can provide a true advantage to traditional learning methods. It is this flexibility in location, the way learners can both receive and collect data and how they share information that Valentine's points out is of most interest. Conference participants generally felt that mLearning can be a means to enhance the broader learning experience, not (as was predicted for eLearning) as a primary method for delivering courses/distance learning. Proceedings from the 2007 mLearn conference held in Sydney show the case for mLearning continuing to evolve to include mobile web connectivity, with papers on mobile blogging (moblogging) and the role of mobile phones in assessment (Norman, A. and Pearce, J., 2007).

mLearning in itself does not necessarily have its own “over-arching 'theory of mobile learning'” (Future Lab, 2005 p. 19). What it does offer is the ability to change and enhance current teaching practice. The Future Lab (2005) report stated that we need to be working towards a “blended integrated approach” and that the power of the mobile phone in an educational context can offer this by “being able to combine different elements in ways that are appropriate to the learning activities to be supported” (p. 19). Aggarwal (et al) agree

stating that the 24/7 nature of mobile accessibility will force a change in pedagogy, particularly as mobile networks advance (Aggarwal, A., Turoff, M., Legon, R., Hackbarth G., and Fowler, D., 2008, p. 281).

mLearning strategies and applications lend themselves to enhancing a constructivist approach to learning. Mobile devices, unlike wired devices, allow learning to take place in authentic environments. "Mobile tools give us a unique opportunity to have learners embedded in a realistic context at the same time as having access to supporting tools" (Lonsdale, et al, 2005 p. 12). Therefore, as teachers, we are able to make use of those 'teachable-moments' that so often occur outside of normal learning spaces.

For teachers, it is having an awareness of the tools most of our students already have in their school bags and that potentially could be available to use in the classroom that is key. mLearning opportunities, like changes brought about to education through eLearning, will challenge the traditional role of teachers. Specifically teachers teaching in a way that is suited to taking advantage of the flexibility that mobile devices allow for learning that is truly student centred. Lonsdale et al (2005) say, "the challenge for the educators and technology developers of the future will be to find ways to ensure that this new learning is highly situated, personal, collaborative and long term" (p. 36). Valentine backs this up saying, "the key to this shift is in redefining traditional views of learning for their application in this medium. If we mean personally attending a teacher-lead class or lecture then there's a problem. However if learning also means using a blend of mediums appropriate to enhancing the learning experience, then hand-helds begin to be serious contenders" (2004 p. 30).

Mobile Phone Adoption and Rates of Penetration

Mobile phone penetration in New Zealand is already at over 100%. This does not necessarily mean that every single New Zealander has a mobile phone; what it does mean is that there are now more mobile phone subscriptions than people in New Zealand (Australian Mobile Telecommunications Association, 2008). This would support anecdotal evidence from talking with teenagers who often have more than one mobile phone – one on each of the two main New Zealand networks – in order to gain the best calling and

texting rates.

In a recent survey conducted by Vodafone New Zealand, using mobile phones to send SMS messages and make phone calls was the number one way New Zealanders chose to communicate with their friends with nearly three quarters of respondents. However, in the work place, over half of respondents stated that email was their preferred form of contact with colleagues followed by calling people on their mobile phones (28% compared with only 8% of calls to landlines). People were less keen to contact colleagues via text message, with only 10% saying it was their preferred method.

When it comes to keeping up with the latest technologies, three quarters of all involved in the survey had upgraded their mobile phone more than 3 times in the last 10 years, and a third of all people had upgraded 6 or more times. Three quarters of survey respondents had used a mobile phone to access the internet, with a third of all people doing so at least once a week, (Vodafone NZ personal communication, 2008).

While not all New Zealand students have mobile phones, with over 100% market saturation, it is safe to say that mobile phone use in New Zealand is becoming ingrained into our everyday lives and routines and that the time is certainly right to be considering how these tools which the large majority of our students – regardless of socio-economic status - already have (Castells, 2007). Globally mobile penetration is predicted to hit 60% by the end of this year and it is claimed that mobile has done in 16 years what landlines did in 100 years in spreading to 80% of countries in the world (Mobileactive, 2008; Google, 2008).

Many commentators have noted that our current teen generation who have been dubbed many terms from 'generation c' where the c stands for connected, to 'generation iPod' have taken to mobile technologies and appropriated them in, at times, unexpected ways. Castells (2007) states that this may be explained by the fact that young people are very open to concepts of new technology and have an ability to appropriate it for their own purposes. Castells also puts forward that young people have a far greater interest in non-voice uses of mobile phones – in particular SMS or text messaging and wireless internet.

Mobile technologies are having a profound affect on the way that we communicate and it is acknowledged that social etiquette regarding mobile phones is “still controversial and being socially negotiated” (Hanson, 2007 p. 1). Hanson explains that the instantaneous nature of mobile phone technology means that not only do we send and receive information more quickly, but our concepts of physical space become blurred as the “technology intrudes on the reality of the space around [us]” (ibid). It would seem then that the school system would be an ideal place to support and guide digital citizenship with particular regard to mobile phones.

Mobile Phone Capabilities

There has been much lauding about the speed with which technological advancement has been achieved in the field of mobile telephony. Motorola claim that their “smallest mobile phone today, has as much computer power as the largest, most expensive computer did less than a generation ago” (Plant, p. 12). Prensky (2004) states that “today’s high-end cell phones have the computing power of a mid-1990’s PC” (p.1).

People are beginning to credit the internet and therefore mobile internet access potentially having the most profound impact on our lives, much more so than that of the wired telephone. “The ubiquity of the internet at home as well as at the office has become more influential in changing how people access and exchange information than the wired telephone was in the twentieth century” (Hanson, 2007, p. 4). Hanson goes on to say, “cellphones and the Internet have in their short histories brought about more changes to tradition behavior, attitudes, and values than any other technologies or services in history. They do this because they are small, portable, fast, increasingly accessible, and relatively affordable” (p. 14).

The speed at which mobile phone capability has developed becomes glaringly obvious as one conducts reading on the topic of mobile technologies. Many of the books accessed for this report, although written within the last decade, are already outdated in terms of the latest technologies they write about. In *Brave New Unwired World* (2002), Lightman questions the potential of 3G asking can it deliver the bandwidth? Less than five years later not only has 3G become standard in even the most basic mobile devices, mid-range

phones are we are now coming out with 3.5G which is a similar speed to current wired home broadband speeds.

The reason mobile phones have and will continue to have such a profound impact on society and the way we connect with others, more so than that of a the home telephone, is the key factor of portability. “The cell phone is not just a more portable version of our traditional wired telephone. It is a small, portable technology that allows us to make phone calls and participate in a wide range of media interactions anywhere, anytime” (Hanson, 2007, p. 2).

The idea of instant and ubiquitous information access via a mobile device is a reality for our lives today. This year has seen the introduction of the affordable and ultra-small 'netbook' (UMPC – Ultra Mobile Personal Computer) to the consumer laptop market and the iPhone. Both devices developed with 'anytime' access to information in mind.

Sales of 3G (internet capable) mobile phones have continued to increase with Vodafone New Zealand estimating that well over half of their customers have 3G phones and that nearly half of these devices fall in to the smartphone category which includes both PDA and iPhones. Vodafone New Zealand say the trend for 3G and smartphone sales are increasing as they become more accessible for customers due to a reduced cost for hardware (personal correspondence 2008). Also, this year Vodafone New Zealand has introduced a casual flat rate of $1 per day for up to 10 MB of data making casual browsing the internet on a mobile phone a much more affordable option.

Mobile phones on the market today can be considered in three groups. Basic 2G mobiles mainly for voice calling and sending text messages, 3G with fast mobile broadband internet access and the more advanced smartphone which includes devices such as the iPhone and Blackberry. While there are currently new technologies on the market that are less expensive in some cases than a smart phone and with arguably better web browsing capability, such as the new tiny 'netbooks' like the Asus eeePC which is currently retailing for under NZD400, the fact of the matter is that our students do not already have these in their school bags.

The full range of functions of today's mobile phone is extensive. Even the cheapest entry-level phones come with cameras and bluetooth file transfer capability. (Vodafone 2008; Telecom 2008). When talking about the future of mobile technologies, the Google Blog talks of the current high end mobile phones as having "a range of sensors that would do a martian lander proud: a clock, power sensor (how low is that battery?), thermometer (because batteries charge poorly at low temperatures), and light meter (to determine screen backlighting) on the more basic phones; a location sensor, accelerometer (detects vector and velocity of motion), and maybe even a compass on more advanced ones. And most importantly, it is by its very nature always connected" (Google, 2008).

Common features of a mid-range mobile phone include:

Phone calls SMS and PXT send and receive Voice Messaging 3G internet eMail	Calendar Memo/Reminder Calculator Currency and unit converter World clock	Still camera Video camera Music or Audio Playback (MP3)

As Prensky (2004) states, "cell phones are not just communications devices sparking new modalities of interacting between people, they are also particularly useful computers that fit in your pocket, are always with you, and are always on" (p.1).

School Policy

The trend at most schools both in New Zealand and internationally is to ban mobile phones from the classroom. Prensky (2004) refers to this saying that "educators' knee-jerk reaction" is to view new technologies as a "huge distraction" from the education they are trying to provide"(p.1).

Having a position on the role of mobile phone use in schools is a hot topic not only for educators, but for communities and society in general also. In New Zealand, problems caused by student mobile phone use at school have been widely reported; from cheating in examinations, concerns over literacy due to abbreviated 'txt language' to text-bullying

and filming school yard fighting to be uploaded to the web (Stuff, 2008; NZ Herald, 2008). In America, similar problems have also been heavily reported with 'teacher baiting' (where students antagonise a teacher and then film their reactions) highlighted as a key example.

Recently in Australia, the Sydney Morning Herald ran an article about Presbytarian Ladies' College who were trialing a programme which allowed students to use their mobile phones during English assessments. The article, which began “A Sydney girls' school is redefining the concept of cheating by allowing students to "phone a friend" and use the internet and iPods during exams,” generated 71 comments from the general public with a strong opinion that this was not what should be happening at schools. Contributors questioned whether the school had “taken leave of their senses” and one called for the “educator that raised the idea to be removed from the system” (Sydney Morning Herald, 2008).
In June this year, New Zealand news website stuff.co.nz ran an article declaring a “call for total school mobile phone ban” reporting that parental concerns were prompting a policy to potentially ban mobile phones at school (Stuff, 26 June 2008). The article stated, “as well as cellphones distracting from learning, there are also worries that common use of text language can lead to a deterioration of literacy and writing skills.” To provide somewhat of a balance to the article, a high school principal was quoted as saying, "we have to embrace the fact that cellphones are part of life now ... you can't ignore that they exist. It's a matter of using them appropriately".

It is interesting, then, to consider that this societal approach to the role of mobile phones in schools extends to and and is reflected in the formation of school policy. A study last year into the way that New Zealand schools develop policy for mobile phone use found that for most of the twelve high schools involved in the study, policy was not driven by technical knowledge or values of digital citizenship. Rather, school policy was dictated by “the social constructs of positive attitude, social acceptance, technical acceptance and impact knowledge.” One of the two schools that had chosen to embrace mobile phones said that they did so because they wanted to “enhance student learning with the advantages that mobile phones could provide”. They were of the opinion that so long as a positive outcome for learning was achieved, they were happy to have policy to support this (Fielden and Malcom, 2007, p. 6).

Schools which have brought in policy that allows for the use of mobile phones during school time are currently the exception rather than the rule here in New Zealand based on anecdotal evidence. For those schools looking to include mobile phones within the school environment, based on their own experiences, Hartnell-Young and Heym (2008) recommend that in order for school wide adoption of mobile phone use, school policy must address the following key areas:

- ownership of computing equipment and access to network connections
- tools to support curriculum and its personalisation
- appropriate behaviour in school and other contexts
- privacy and security of data, including photographs and video clips

Conclusion

While there have been a number of forays into the potential of mobile learning, mLearning is yet to become mainstream. Much of the reading that has been done for this literature review suggests that while the technology has evolved, many of the findings from three years ago still stand today. The sheer availability and cost of technology means we are on the cusp of a new form of learning. However, it is my belief that this will not be the status quo for long, as teachers look for new ways to engage their students, and as eLearning pedagogy becomes grounded and takes hold, teachers will look for ways to extend their eLearning principles which will inevitably involve a shift to including mobile devices to make the most of learning opportunities.

Methodology

The Participating Schools

School A is an urban, multi-cultural, decile 6 secondary school. The study focused on a Level 2 Media Studies class and a Year 9 Social Studies class over the period of one unit of work (approximately 6-8 weeks).

Level 2 Media Studies

The particular unit of work for which this study was investigating was preparing students for an external NCEA examination based on genre. Students were required to study the specific conventions of a specified media genre and explore changes in the genre over time. This class studied the American television sitcom genre.

Year 9 Social Studies

This study followed the progress of an inquiry based unit that required students to research the movement of migrants to New Zealand. Students each investigated an individual migrant group and looked at the reasons for leaving their home country and the reasons for moving to New Zealand.

School B is an urban independent full primary school. The study focused on one Year 8 class. While a four week unit of work was specifically designed for the purpose of this study, the phones were kept in the classroom and so also used from time-to-time throughout the school day over the duration of the study.

Year 8

Students used the phones as part of a study on the New Zealand government in the lead-up to the 2008 election.

Both schools and the teachers involved participated based on their voluntary willingness to partake in this project.

Researcher as Participant Observer

This study used the researcher as participant observer model. The researcher was closely involved in planning individual units of work with the teachers, providing suggestions for possible learning activities within the unit. All of the hardware and any necessary web applications to meet the teachers' requirements were set up by the researcher. For example, creating web based email addresses for each phone; setting these as the default email address on the phone; and, setting up user accounts with various web applications. I also delivered an introductory lesson on navigating the mobile phones to all classes involved in the study. I was also available to as a troubleshooter and to support the teachers with any technical issues during the lessons which the students were using the phones.

Data Collection

Initial data about the ways in which mobile phones are currently being used in New Zealand schools was gathered by way of interview. Online networks of teachers were used to identify and make connections with teachers who are using mobile technologies with their classes. Identified teachers were then interviewed either via email or in person.

In order to gain an insight into the way information literacy skills are currently being taught in the schools involved in the study, 8-10 teachers across a range of curriculum areas and year levels conducted an anonymous online survey. Survey questions asked teachers to define information literacy and inquired as to the way they taught information literacy skills. Teachers were also questioned on their perceived barriers to teaching information literacy in their classroom (see Appendix 1).

Focus group inquiries were held to gauge the perception of both students and secondary teachers of the potential for the use of mobile phones in lessons. Focus groups involved 6-7 participants. All groups were audio recorded and the student focus groups were filmed by another adult so as to improve accuracy of transcription. The teacher group was not video recorded in order to ensure they felt they could comment as freely as possible.
Initially each of the teachers involved in the study were given a mobile phone to begin

exploring the capabilities of accessing the mobile internet. Each teacher was given assistance to re-develop their unit plans in order to achieve the original objectives of the unit through making use of a range of applications available on the mobile phone. The re-developed unit plans were gathered as evidence as part of the data collection process.

During the teaching of the units, most lessons were observed by the researcher. Some lessons were video recorded for evidence purposes depending on the type of task being undertaken by the class. Students were at times informally interviewed about the work that they were undertaking during class. These conversations were recorded.

Each teacher was involved in regular interviews in order to evaluate the progress of the unit and to explore potential ways of using the mobile phones further. The interviews were recorded and transcribed.

With the secondary school students, focus groups involving 6-7 students were held both mid-way through the unit and at the end of the unit of work for each class involved in the study. In the Primary school, a focus group was held with 7 students at the beginning of the unit and then again at the end of the unit with the same students. Each focus group was around twenty minutes in duration.

Data Analysis

All interviews and focus groups were transcribed and responses were coded under different themes according to the sub-questions asked. The information was then split under the sub-question categories and included in the subsequent findings section.

Research Findings

Using Mobile Phones in Classrooms to Access Information

The purpose of this study was to simulate the potential use for having 'on-hand' access to tools and information made available through the use of mobile phones during class. Teachers involved in the study used a mixture of highly planned learning activities involving the mobile phones as well as allowing and encouraging impromptu and personalised student use.

Teachers were shown how to use a number of different web-based applications that they could select to use with their classes. During initial planning stages, teachers decided on applications that they thought were best suited to their students and the context of the unit of work they were teaching. Having individual internet access for every student meant teachers could support their teaching with a blended learning approach through either a learning management system, blog or wiki and also allowed the flexibility of any time access to information on the internet. All teachers used a web based application to create polls for their class. Teachers also experimented with integrating various audio and video recording features of the mobile phones with web based platforms.

The key message that came through from the students was that they enjoyed using the phones and could see the potential for their use, but only when they were given very structured, well-organised activities with which to use them. This was evident as by the end of the unit of work, Year 9 students had self-selected not to use the phones at all. In Year 12 a similar result was also evident. Students were given an ongoing task in which they could use the phones to assist them. However, by the end of the unit, all students in the class selected not to use the phones, but rather to make use of the few computers available in the classroom to achieve the desired outcome.

Accessing the Mobile Web

The function of the mobile phones that students felt had the most potential value was the ability to access the internet. Students saw this as being useful in two main ways. First, they liked the ability to have personalised access to information that they wanted to look at and use, but secondly, they had access to the full, unfiltered internet.

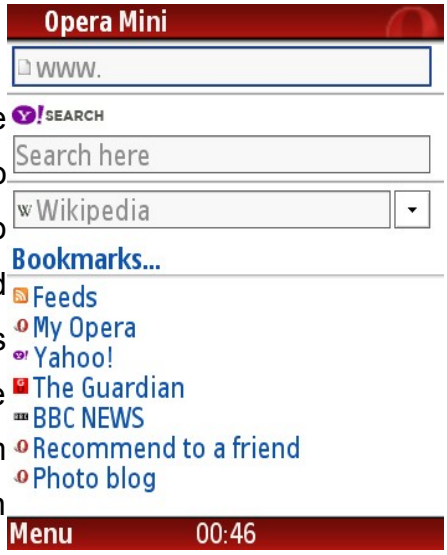
Around two thirds of the students in each of the secondary school classes involved in the study had previously accessed the mobile web on their own or a friend's mobile phone. This was largely due to a recent Vodafone New Zealand promotion that offered free mobile internet access to a number of selected web sites for four weeks. The websites included *YouTube*, *Bebo*, *Facebook* and *Trademe*. Most students reported being unsatisfied with past web browsing via their mobile and were not particularly interested in pursuing using their mobile phones to access the internet further. Students also cited cost as a reason that they did not use their own mobile phone to browse the internet. Very few of the Year 8 students had previously used the mobile web.

Students saw the biggest advantage in using the internet via the mobile phone being that sites were not blocked by the school system. One of the features most appreciated by Year 12 was the ability to view *YouTube* videos which were otherwise blocked at school. However, students also pointed out that using the unblocked internet access on the phones would also be useful in art and design.

The mobile web browser *OperaMini* was installed on to the phones and was used by all students as the primary tool for accessing the internet. The advantages of using *OperaMini* over the phone's standard web browser are numerous:

- Clarity of text on the screen
- Customisation of viewing settings
- Customised home page that can be synchronised with the teacher giving quick access to class bookmarks and key web pages
- Any website is able to be viewed – does not have to be 'optimised' for mobile
- Website compression to reduce download data usage
- Easy intuitive access to links and text entry boxes

Right: The OperaMini start page



This is the startup screen for *OperaMini*. This page can be synchronised with the teacher. The top bar allows a URL to be entered directly. The search bar can be set to default to a preferred search engine. Bookmarks are easily accessed and can also be synchronised between both the students and the teacher. There is space for 9 quick links that are fully customisable. The menu button visable on the bottom left of the screen is present on every page to quickly return users to the start page or to access the various settings.

Right: An example of a standard web page as viewed through OperaMini

This is the BBC News full website. The whole page is presented and the user navigates to the place they wish to read using the box with the cursor as seen in this image. Hitting the 5 key on the numerical keyboard will zoom in to the desired place of the page. The content is then optimised for the mobile screen.

Year 8 Case Study

The Year 8 class had access to the mobile phones throughout the day and used them in a number of different contexts. While the main use focused on the upcoming New Zealand election, the students did also occasionally use the mobile phones throughout other lessons as needed.

The election unit of work was based on a *Waikato Times* Newspapers in Education unit of work. Students were able to use the mobile phones to access the internet to answer some of the questions. They used party websites to find out which parties candidates belonged to and what different parties stood for. They also used the internet to find out which electorate they belonged to. When asked what was the best thing about having access to a mobile phone during class, Year 8 Student 4 said, "just like going on to *Google* and searching information when you needed it in class. If we had questions and we didn't know it we didn't have to go to a computer just go on the mobile phone. When we were doing questions in the politics paper about the election booklet we had to find out our electorate and stuff like that. And we searched it just on *Google*."

The students also used the phones to read the newspaper. Most students in the focus group said that they didn't usually read the newspaper unless there was something interesting on, but that they enjoyed reading it on the mobile phones. They were given time during class to do this.

The students used *YouTube* in order to put together their class dance project. The class had decided that they would copy the 'Evolution of Dance' movements for their own class dance to be performed for the school at the end of the year. Each student had a different section of the dance. Being able to view the clip on *YouTube* meant that every student could take the video clip with them on the mobile phone and watch only the part that was relevant to them, rather than having to sit through a whole eight minute clip only to see their section of the dance once for 20-30 seconds. One student said, "the internet was really helpful. We did go on for our dance that we were doing on *YouTube* and it loaded up extremely quickly so that was really good and we could all look at it by ourselves get it to our part that we had to learn" (Primary Student 2).

Year 9 Case Study

Having access to the internet allowed the Year 9 Social Studies teacher to develop an inquiry unit that was heavily web based. The students were conducting a research assignment based on migrant groups to New Zealand. In the past, students had conducted their research and presented their findings on a large free-standing cardboard display.

The teacher set up a class blog at www.edublogs.org. The objective of the class blog was as a way to deliver instruction, as a focal point for gathering resources and to connect the blogs of the students within the class.

Students each had their own blog hosted at *edublogs*. The front page was for their reflection where they would discuss the research process that they were going through in order to answer each of their key questions. This would also be the place any MP3 recordings from *Utterli* would appear. Students then made additional pages – to share the information for each key question.

The presenting of research findings is a key component of this unit of work, and is widely regarded as a key element of information literacy. Having on-going access to the internet, meant the teacher found it easier to justify to the Social Sciences department the change of presentation mode to an online model. Students were able to access and edit their blogs using the mobile phones to access the internet.

It was estimated that without the phones the students may have access to the internet through the school computer lab about once every 4-5 lessons. Using the phones meant students could access the internet every lesson. Therefore, lessons in the computer room could be enhanced by students having on-going access to the internet via the mobile phone in subsequent lessons. While the internet experience via a mobile phone is far inferior to that of a full size computer, it certainly offered a means to an end in a situation where accessing the internet might otherwise not be possible.

Without having the phones to access their blogs, this project would probably not have

been possible using the resources currently available in the school. However, once the students began to have difficulties with using the phones, the teacher had to make more time than she probably would have previously to get students to access computers around the school. This is because once they had begun their projects online using the internet on the mobile phones which they then struggled to use, they needed to have computer and therefore internet access to finish their project.

Students did however, find the mobile phones useful for a number of key reasons. Initially when there was no extra computer time students said that they could use the phones to "do far more work on your blog" (Year 9 Student 5). Students also talked about the advantages of being able to easily share information that they were finding online across to their blog through the phones, "it's good for research too because if you're in class and you find some of your information and you don't want to write it down you can quickly put it on your blog" (Year 9 Student 2). Another student commented that she was able to share links with others in the class by text message.

The teacher also made a number of books sourced from the National Library available to the students. One student liked the way that she could use the mobile phone to add notes to her blog as she was reading the texts, "if she [the teacher] gives you a book and you can't take it home ... we could put the notes [on our blogs]" (Year 9 Student 4).

The students also liked the portability of having their blogs on hand at any time; "if you want to ask your teacher about a thing on your blog you couldn't go and ask her if she didn't have a computer in front of her" (Year 9 Student 6).

Throughout the unit, students accessed a number of different websites to support their research. One which was particularly useful was the New Zealand Government supported www.TeAra.govt.nz website. Through using *OperaMini* as a web browser on the mobile phones, students had access to every website that they could normally access on a full-size machine.

The Year 9 students also used the internet to access *YouTube* videos about migration. These videos were sourced by the teacher and entered in the bookmarks for the students to quickly access. There were a variety of videos available and students could select one

or two that appealed to them to watch and then complete a task in relation to these. This meant that students had some autonomy over the videos that they chose to watch and that they could stop and start the videos in their own time.

Students also used the mobile phones to read the daily newspaper as both the *New Zealand Herald* and the *Waikato Times* were bookmarked for them on the *OperaMini* start page. Students commented that while they were not directly suppose to be reading the news, they enjoyed doing so even though it was outside of what they should have been doing. Year 9 Student 1 said, “I liked going on the internet and reading the news and stuff.” When asked if she would normally read the news she replied, “no but it's been cool to do it in class and on the phone.”

Year 12 Case Study

The teacher of the Year 12 class involved in this study decided to take the opportunity to develop a blended learning approach to her unit of work. Work done during class would be shared and supplemented by a wiki hosted at *www.wikispaces.com*. The teacher wanted to experiment with using a teaching style that encouraged students to co-construct their learning and she felt she was able to best do this with the support of an interactive and participatory online presence in the form of a wiki.

Through *OperaMini*, students had full access to their *wikispace* page. However, it was difficult to add content via the phones so this component was left to be done either on one of the eight computers in the classroom or for homework.

The teacher also wanted to make the lessons very activity based, where students were encouraged to access the internet if they wished at any time throughout the class. Initially the students took great advantage of this. However, by the end of the unit, all students had decided not to use the phones. The students found the phones too slow and too difficult to navigate. Students were also concerned about the lack of 'notes' written in to their books for exam preparation as a result of lessons based on co-construction and inquiry. This is discussed further in the student response section at the end of this question.

Initially, when the students were using the phones to access the internet, their behaviour

was extremely collaborative. They were helping each other and sharing web-links but were also discussing the information that they had found and comparing it with that found by others. Even though the students were reading, there was a lot of conversation going on at the same time.

The first internet task required students to come up with synonyms for the word genre. Most did not know what the word genre meant and therefore the internet was relied on for this task.

The particular unit of work required students to have a very good understanding of at least one media text. As the text chosen was popular television programme, *Scrubs. I*t was very easy to find numerous clips from this programme on *YouTube*. Students were given tasks that required them each to explore a different element of the programme. Using *YouTube*, the students found clips of the show from which they found specific examples to support their particular element that studied. For example, one student was looking at a particular element of humour. They were able to find numerous examples of this through watching short clips on the mobile phone. The students then shared their findings with the class. Students felt that, "it was worth having it because we were able to watch videos and do the research but it was just frustrating how long it took" (Year 12 Student 6). When asked what was useful when using the mobile phones another student added, "using *YouTube*, because it is easy to use. It doesn't load very, very fast but it still gives you an OK quality for the video and you can still watch it" (Year 12 Student 7).

Students found it very useful not having to worry about sites that would be blocked as even their class wiki site hosted at www.wikispaces.com was blocked at the beginning of the unit. Year 12 Student 5 said; "I think it was useful that we didn't have blocked sites and we could go on YouTube ... cause I tried to go on the wiki when we started, but it was blocked and so I couldn't do anything at school so I had to do it all at home."

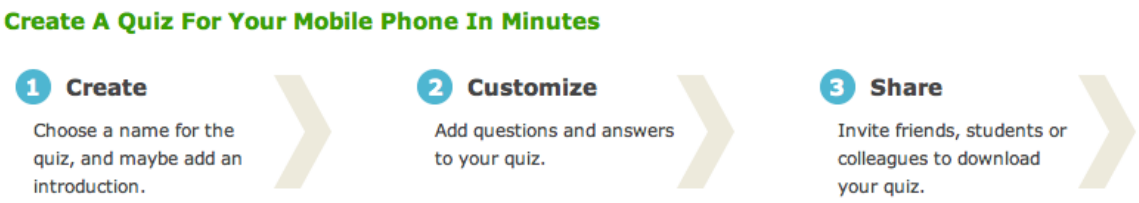
Students accessed www.wikipedia.org as it had an extensive bank of information about the shows that were being studied in class. This was largely due to the fact that fans of the shows spent a large amount of time adding information to the site.

Mobile Quizzes

The year 8 class also used the mobile phones to take quizzes about their unit of work.

www.MobileStudy.org is a website that allows users to create multi-choice quizzes to be used on a mobile phone.

The quiz can be created online by either the teacher or students. The quiz is given a name and description and then questions with the right answer plus any number of other possible answers are entered. When the quiz is completed, it is able to be downloaded to a mobile phone. There are two main ways of doing this, either by going directly to the URL of the quiz using the phone's mobile web browser, or by downloading the quiz to a computer and sending it to a phone via bluetooth or USB. While the quizzes are free to create, there is a data charge associated with using the the mobile web to download the quiz – alternatively, downloading directly to a computer and then sending via bluetooth or USB to phones is free.



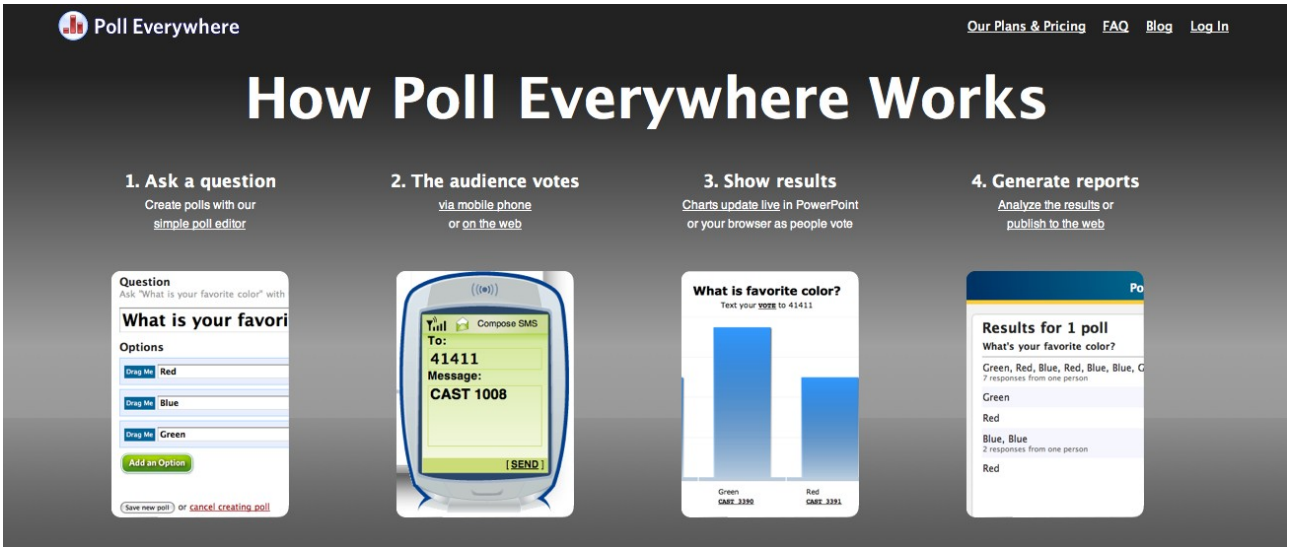
In groups, students each had an aspect of the New Zealand government that they had investigated. They then worked on the four classroom computers to create their quiz which was then shared with all the other students in the class via the mobile phones.

Mobile Phone Polling

Students and teachers across all year levels agreed that having the ability to participate in polls was one of the best ways to use the mobile phones during lessons. Students highlighted the fact that everyone participated, and the anonymity of the polls as being the main reasons they enjoyed this activity.

While there are a number of applications available that allow polling via mobile phone, the application selected for the purpose of this study was *Poll Everywhere*.

Poll Everywhere is a free web application that allows the user to create a poll online that participants can respond to either online or via their mobile phones. If using mobile phones, responses can be sent either texting via SMS or through accessing the poll using the mobile web. While the poll service itself is free for educational use, there is cost associated with either sending a text message to an international number (New Zealanders are able to use the Australian SMS number) or as a data charge incurred through accessing the mobile web.



(image from www.polleverywhere.com)

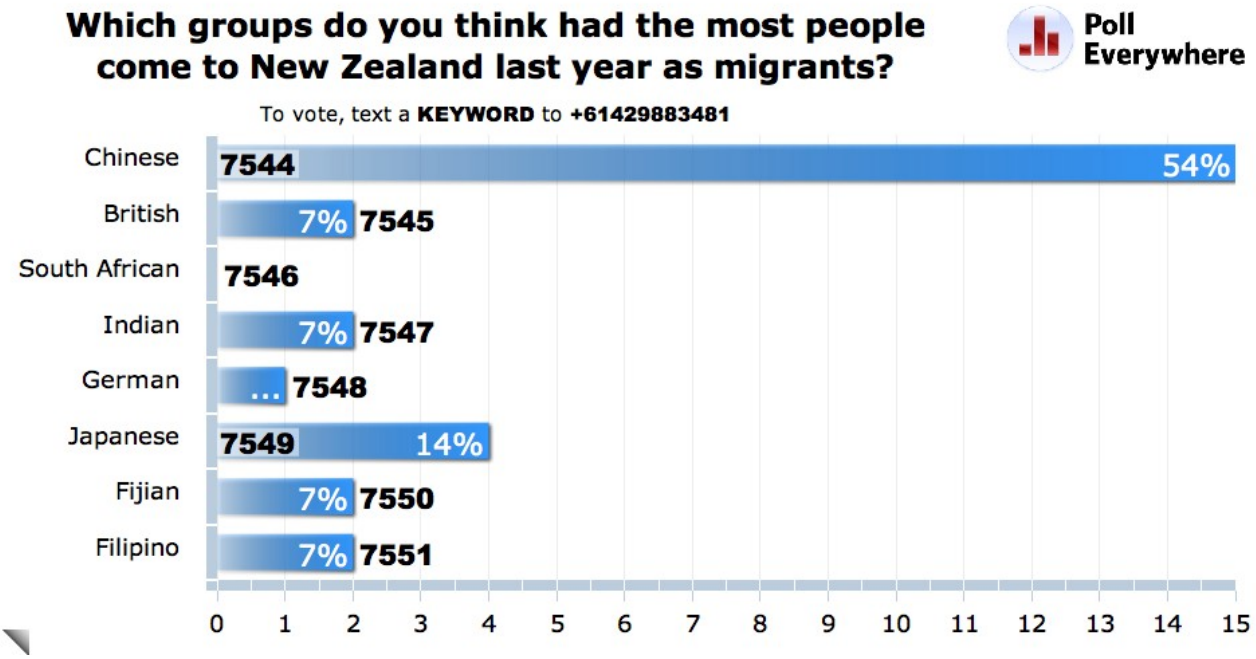
Polls can be set up as either a multi-choice bar graph type poll or as a 'free text' poll where participants are invited to answer a question or provide text information. Both types of polls change and update in real time as responses are sent in.

The teacher (or students) are able to set up a poll through accessing *Poll Everywhere* online. They simply create a free account, select the type of poll they wish to create and then enter their question (and multi-choice options if applicable). The poll can then be projected or displayed for the class to see complete with instructions as to how to respond and real-time updates of the responses as they are received.

The teacher in Year 8 used a number of different polls with the class. As the class was studying the New Zealand elections, the students were required to use the phones to access the internet to find out which electorate they were in. Students then participated in a poll to see where different people in the class were from and to consider who their local MP was.

Students also conducted a poll towards the end of the unit of work which required them to consider all of the different ways that government money is spent in New Zealand. Students sent these in to a free text poll and the results were exported to wordle for students to analyse.

In Year 9, the polls were used initially to get students to think about migrant groups coming to New Zealand. The teacher set up polls which firstly asked the students to estimate which migrant group they felt had the largest percentage of migrants to New Zealand last year. She then offered a 'free text' poll asking students to discuss the results.



The above image shows the initial responses given by the students (the black number next to each bar is the 'keyword' students use to log their choice via text). Following this, students were given the actual statistics which showed Chinese as being one of the lowest migrant groups to come to New Zealand and the overwhelmingly largest group as being those from Britain. The teacher then asked students to think about on what grounds they had made their initial selection and to reflect on what surprised them the most about the statistics.

Students responded in a free text poll. The following comments are what they texted in to the poll:

Most students commented that they were surprised that migrants from Asia made up such a small percentage:

THAT THERE IS HARDLY ANY CHINA PE OPLE IN NZ
I DIDNT THINK THAT CHINESE HAD SUCH A SMALL PERCENTAGE
THOUGHT DA CHINESE PEOPLE WERE DA MOST PEOPLE IN DA COUNTRY
I TH0UGHT CHINESE W0ULD BE HIGHER UP THE LIST
japan was tha lowest country

Some students expressed their surprise that British migrants made up such a large percentage:

> I WOZ SUPRISED COZ I NEVA KNEW THAT DEREWAS SO MANY BRITISH.
> That there are such differences between British and Chinese.
> THAT THE UK HAD THE MOST PEOPLE LAST YEAR

Some students reflected as to why their initial perception was so wrong and provided very honest feedback to the class:

> coz deaz loadz of asianz around nz.
> BRITISH PEOPLE DO not look diffrent here

The polling allowed all members of the class to participate and to give very honest, anonymous feedback that they might otherwise not have shared. Some of the responses gave an insight to the way that some students felt about the issue and led to a class discussion about the appropriateness of comments and an inroad to discuss some prejudice surrounding the topic:

> Never knew that chinese didnt try to take over our country !
> They are everywhere !

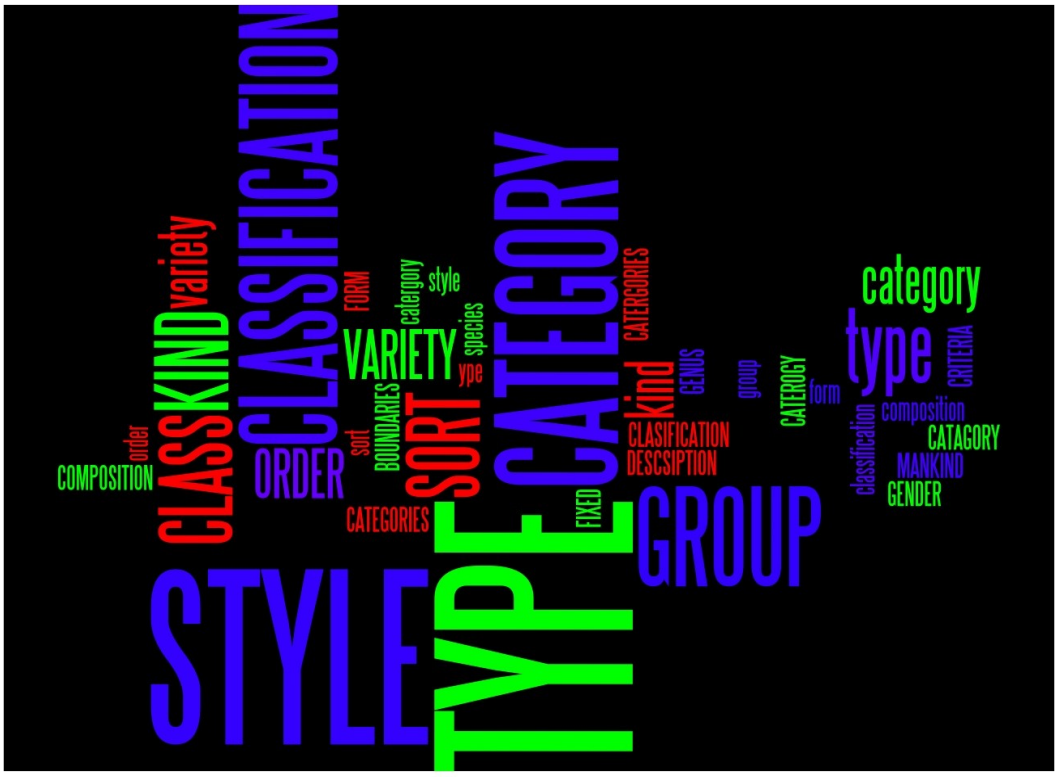
The teacher felt that the polling was very effective and acknowledged that she would have made more use of this application had the students been working on a different, less self-directed unit of work.

Students commented that they too enjoyed the polls and saw benefit in their use. While students couldn't initially say what it was about the polling that they specifically enjoyed, they pointed out that the anonymity of the poll allowed them to have their say and a chance for their response to be debated in a much more objective way than if they had to own the response, “it was just interesting - you got to find out what everyone thought but you didn't know who they were...” (Year 9 Student 2).

Students put responses through the poll that sparked discussion – it was interesting that they didn't necessarily want to own their responses but most were keen to discuss others' ideas.

The poll application was used extensively in the Year 12 classroom, particularly for the teacher to assess the prior knowledge of the class, but also to allow students to contribute to a class body of knowledge.

The first lesson required students to have an understanding of the word genre. In groups, students were instructed to access the internet via their mobile and through doing a little internet searching, come up with five key words that could be either synonyms for or could define the word genre. The teacher set up a free text poll to which the students texted their 5 key words to. The words were then copied in to a *wordle* word cloud which highlighted the most commonly used words which was saved on to the class wiki. Students then used this visual to come up with their own definitions for their own notes.



A key factor in successfully using *wordle,* is ensuring students use an agreed format for things like spelling and spacing. Variations in the formatting may mean that words may not

be grouped accordingly.

Students needed to think about the context of their genre study which was to be American sitcoms – television shows that they are all familiar with, but that many did not acknowledge as falling in to the 'sitcom' genre. After giving the students a quick 'recipe' or formula for sitcoms, the teacher wanted the students to text in all of the sitcoms currently on television that the students could think of. The students submitted their answers using the web version of *Poll Everywhere* via the mobile phone so as they were not limited in the number of characters that could be typed. As students knew that their responses were to be input into *wordle*, they first came up with an agreed set of conventions to ensure that their answers could be grouped together. For example, sitcom titles with 2 or more words should be written without a space between each word, no capital letters were to be used etc.

Because the teacher wanted the students to be posting as many titles as possible, she gave the students the question but withheld the poll number, meaning that students could not send in the results until a set amount of time had lapsed to ensure they had enough time to respond fully to the question.

During the task, the students were extremely engaged. As they were working in groups, they would often ask another group member to check an answer on the internet before submitting it. Students would often repeat the questions that the teacher had modeled, applying the theory to individual shows before submitting their answer.
Student 1: is the hills a sitcom?
Student 2: is it funny?
Student 1: no
Student 2: then it's not a sitcom....
This showed a level of ownership, and that the students felt it important to ensure the accuracy of their answers as they were on show to the class, but also because they contributed to cumulated knowledge.

Frustration was expressed from students who accidentally pushed cancel when they were nearing the end of their list as there is no save function.

When the students were able to submit their responses they did so slowly so they could see other groups' responses. It was interesting to note the level of debate amongst students as answers appeared on the screen. There seemed to be a real sense of ownership of the answers and students were keen to discuss the answers shared by others. Students continued to text in their answers even after the class had ended.

Another activity required students to investigate in groups an aspect (convention) of the sitcom studied in class. The convention being studied was character. Each group was given a character from a selected show whom they had to define in terms of their stereotypical behaviour. One group decided to poll the class to get adjectives about their character. Although they had to access a computer to set up the poll, once it was set up, they spoke to the class who abandoned their task momentarily to send in their answers, and then continued back with what they were doing. The students were able to gather a response from the class and then use this as the basis for their argument.

The teacher really liked the ability to poll her students. Although she had used an audience response system before, she was interested in the ability to have students send text to initiate discussion. She also acknowledged the sense of ownership that the students had about their responses and could see the value in getting the students to initiate discussion by submitting responses first.

> "I really liked the polling thing that we did. You can set up a poll on *Poll Everywhere* and the students can text in a response and then on the screen you can see their answers appearing on the screen and they can text you can get thirty responses to the poll and their responses seem to be as long as they want them to be - like we were just getting the kids to text nothing too adventurous - like not an essay or anything but they would get their own responses appearing on the board. They really liked it when their own answer came up and then we copied and pasted it in to *wordle* which then created word maps and all the kids thought that that was quite pretty and I thought that was quite fun I really enjoyed doing that with them."
> (Year 12 Teacher)

The Year 12 students, similar to the Year 9 students, couldn't initially articulate why they enjoyed the poll activity; "I thought that doing the polls one was probably the best one -

don't know why." However, on reflection this student felt that there was a certain level of 'novelty value' in doing the polls and that this led to heightened student engagement; "because the whole class did it and it was something you weren't bored of because you'd never done it before" (Year 12 Student 8). Other students also acknowledged that there was a certain amount of novelty value but that this made them engage with the task; "If we were just doing it on the board, if we had to write it down ourselves, probably no one would do it - I wouldn't do it. But it was just more fun and that's why I did it" (Year 12 Student 3)

As with the younger students, students in this group also appreciated the anonymity of the poll and felt that this anonymity gave extra credibility to the results. Year 12 Student 2 said that "it is a fun way to do a survey as well, like they don't feel like you are watching what they are writing down ... it anonymous so people would give their actual opinions." Another student said that "if people don't want to - you know how some people are quite shy - I think it would be quite good if they can just do it that way (being) anonymous" (Year 12 Student 9).

One student also appreciated the fact that requiring you to participate in the poll made you think about the answer as at times during class discussion it easy to opt out. Saying she felt like she was almost being tested which got her thinking about what was being asked of her; "they are good to get you thinking" (Year 12 Student 11).

Students felt that there was real value in having the ability to poll, but wanted the polls to be quick and direct. One student saw a drawback with using the poll, "because people just muck around sometimes and not really pay attention or not vote" (Year 12 Student 7). However, other student cited the fact that everyone participated as being a positive outcome of using the polls, "it's like using the *Smartboard* we all get involved because we all want to have a go" (Year 12 Student 1).

Voice Recording

The mobile phones used in this study all had audio recording and playback functionality. This was used in a limited capacity across all of the classes involved in this study. Had students been using their own phones and had on-going access to their own recordings, this function may have been further utilised. Teachers also expressed frustration at the time and inconvenience it took to extract the audio recordings from the phones in order to use them in a meaningful way.

A web based application called Utterli was used by one class in order to automatically send student created audio files directly online to a designated class web space, thus reducing the problems associated with removing the sound files from the phone and uploading them to a common site.

Primarily, *Utterli* is a social networking service that allows you to update and connect with friends and followers through short voice messages that are shared online. Signing up for a free *Utterli* account requires entering a phone number. Users are given a local phone number to call in order to leave their messages. In New Zealand, this is an Auckland based number so is a toll call for anyone outside of Auckland or anyone calling from a mobile phone – in which case, normal call charges apply.

The benefit of *Utterli* in the classroom is the cross-posting function. Upon sign up, users are able to enter their blog details and voice recordings from *Utterli* will be cross-posted as MP3 recordings in to their blog. This could be useful for posting short voice updates to either a class blog or to individual student blogs.

The Year 8 teacher saw a lot of value in being able to have the students create short MP3 messages that could go straight to the class blog. Unfortunately as the user name contained the @ symbol, *Utterli* would not recognise this and therefore cross-posting was not able to be set up. Instead, students used the recording feature on the phone to ask questions of politicians. It was envisaged that these questions would be uploaded to the class blog. However, due to time and logistics this did not happen.

In the case of the Year 9 class, students each had their own blog with attached pages for each of their key questions. The front page contained a blog where students reflected on the inquiry process as they worked through their research project.

For each lesson, a question was written on the board for students to reflect on and at some point place a phone call to *Utterli* and leave a short message to answer the question. This answer was then posted as a short MP3 file on the student's blog. The potential of this tool is incredibly powerful, particularly for capturing a student's thinking at a particular moment and for allowing them an alternative way of articulating their ideas. In this particular classroom, the tool was under utilised for two reasons. One was due to the logistics of setting up accounts for students and their assigned phone and organising the cross-posting feature. The second was the need for further scaffolding from the teacher for the students in order for them to get the most benefit from the tool.

In order for students to sign up to *Utterli*, they needed an email account. We decided to use the students' own school email accounts and spent a period getting the students to set up the accounts. This did not work well. A large number of students struggled with the sign up process although it is relatively simple. Some students struggled with accessing and entering their blog details. This took a whole period of class time and resulted in very few students completing sign-up. The teacher had concerns that the students were running out of time to be working on their research. Due to the social networking nature of *Utterli*, with students' posts made public on the *Utterli* website and the ability for others using the website to 'follow' and reply to students, it was decided that for the purposes of this research, accounts would be set up for each of the phones, tied to an email account that was not accessed by students. Students did not need to know how the service functioned, they just needed to follow the instructions to create their recording and it would appear on their blog.

Students needed to be carefully scaffolded through creating *Utterli* posts in order to encourage them to reflect in a meaningful way. At the beginning of the first lesson when *Utterli* was used, the teacher told students that they must make a call to *Utterli* and leave a message at some point through the period. The students were reluctant to call as they did not know what to say. It was suggested that the students might need to be given a question to answer. The question, 'what has been the most useful source of information so far?' was written on the board. This resulted in a number of students calling *Utterli* and leaving a one word answer which was usually *Google*. Students needed to be given a question that required them to reflect on their most useful source of information and explain why they thought it was useful or how it had contributed to their research. Over time, these questions needed to progress to get students to critically reflect on and analyse the research process. The teacher would then have a record of and be able to track the progress of all students through tracking their blogs.

Utterli was used very little in this class as students required more guidance in its use. Towards the end of the unit the teacher gave the students a checklist for what their research blog should include. One point was that the blog must include five *Utterli* updates. As there was no further guidance on this, the students did not know what to say in their post and the result was that very few students chose to use *Utterli*.

Image Capture

Both the still and video camera features of the mobile phone were used at various times.

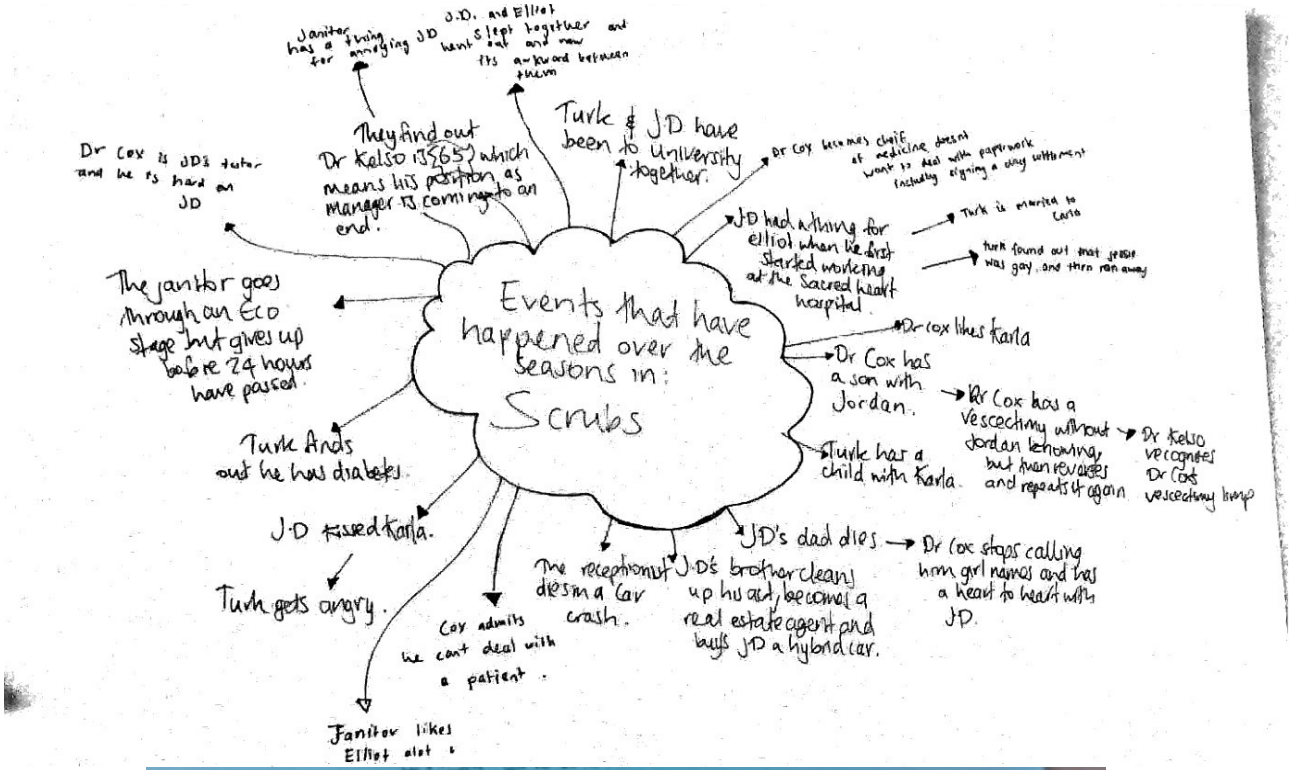
Qipit, web based application was available for teachers to use in conjunction with the mobile phone camera.

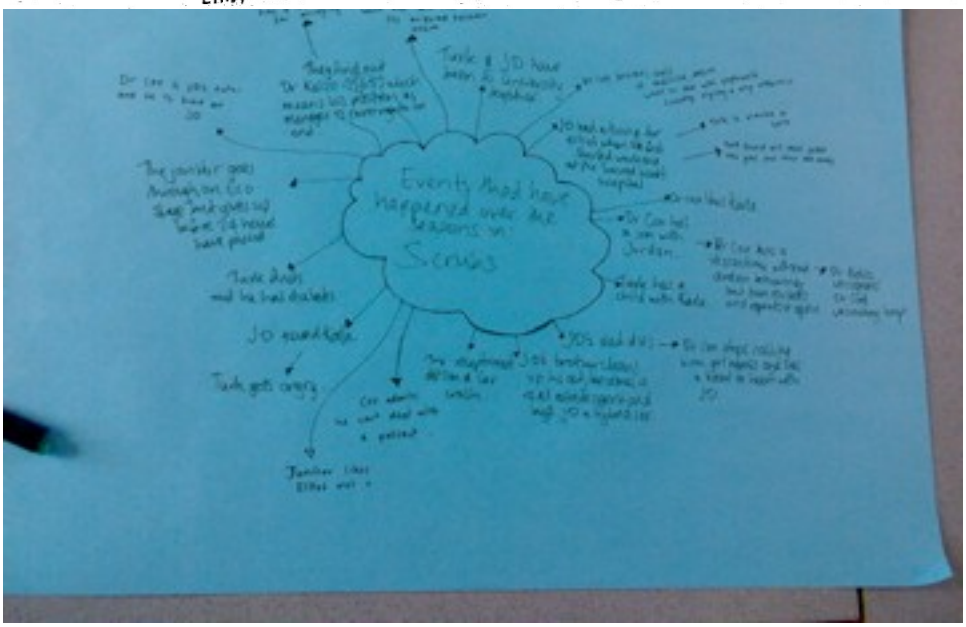
Qipit is a free web application which turns photos in to PDF documents. An account is created online at *qipit.com* where users enter either an email address or mobile phone number. Photos taken using a mobile phone camera can either be emailed directly from the phone if an internet capable phone is being used, or sent as a MMS (pxt) to qipit. The picture is then converted to PDF where it can be viewed online or automatically emailed to nominated recipients.

The beauty of *Qipit* is that for those classrooms not equipped with an interactive board, brainstorms, notes and workings from a standard whiteboard can be captured and shared the same way as they would be through using an interactive whiteboard. This means that notes from the board can be emailed to students or posted on a class website for students to access at a later date.

Students in the Year 12 class used *Qipit* to capture group brainstorms which were then posted on the class wiki. Groups were each given an area to explore in-depth. They were

required to brainstorm this area and share their findings with the class. In order to ensure that all students had access to each group's brainstorm, each group used a mobile phone to photograph their brainstorm which was then converted to PDF through *Qipit*. The images below show the contrast between the quality of the photograph and that of the PDF produced by *Qipit*.





Student Response

The fact that students in both the Year 9 and Year 12 classes chose not to use the mobile phones by the end of the study suggest that there was an element of novelty factor initially in the use of these devices as learning tools.

At the beginning of the unit Year 9 Student 5 said that “it's like a different way of learning - normally we would have to sit in class and copy something off the projector. But we can go on the internet on the phone and everyone can go on [at the same time]”. Year 9 Student 4 added that “because cause you're not actually allowed phones in schools so it's pretty cool - it's different - like a fun way of learning.”

Students could see the advantages in having access to the internet on hand during their classes; “instead of booking out the computer room you can stay in the classroom and everyone can be involved” (Year 9 Student 5).

While students initially thought that they would make use of the mobile phones throughout their classes, in the end this was not the reality. Year 12 Student 5 said; “it would be real good [to be able to use mobile phones to access the internet] because sometimes you just suddenly think of something and it would be real good to know the answer. Like if I was writing an essay and I decided I needed a specific thing I could just look it up then - not have to write it down and think about it later.”

There were a number of reasons why the students did not embrace using the internet. Students did struggle to navigate the mobile phones in order to access the internet and they found them too small and often too slow, “sometimes it goes too slow and you get impatient and we don't want to use it ... so you don't use it all the time but you can use it for some subjects” (Year 9 Student 3).

The Year 9 and 12 students wanted to use the phones in ways that were much more closely directed by the teacher. Year 12 Student 3 said, “you had it there when you could have been doing something else. It would be alright if we were just given it when we were needed it - because when I wasn't listening - I was on *Bebo*.” Students commented that

they wanted the teacher to given them small tasks that they could use the phones for, rather than ongoing access throughout their lessons; “pretty much it could be useful but it has to be more structured and around a programme. We got long as time to search so you were kind of just like yeah found the answer and then did nothing” (Year 12 student 5).

Other students also felt that they were not happy with the way the class content was created and stored online. One student said that because she had done no formal notes she did not realise that they were working towards an assessment. Year 12 Student 6 said, “that's the thing about having the internet on the cellphones, you can look at what you want to not what everyone else wants to but we still need our books to write notes.” When the student was asked if all of that information was not available for her on the wiki she replied, “having all the information on the wiki is hard - I can't figure out how to do it like download all the powerpoints and stuff. I can do it on *My Classes* [the current school intranet] but on the wiki it's too hard. So I don't actually have any information except for what we did today”.

Students also felt that perhaps with their own phones they might have had a different experience. Students cited that they would know their way around their own phones better, “you would be a lot faster - using your own phone” (Year 12 Student 1). They also thought that the continuity of being able to store their own information on their own device would be beneficial, “with your own phone you could keep what you have done because it stays on the phone - you wouldn't have to go home and download” (Year 12 Student 5).

The Year 8 students had a very different response to using the mobile phones during their unit of work. Not only did they continue to use the phones right up until the last lesson, they often instigated the use of the phones asking their teacher if they could use the phones to assist them with specific tasks throughout the day – such as finding out information from the internet, or running a class poll. While the students had similar frustrations with speed and the limitations of a small screen, on the whole the personalised nature of being able to access the internet when they wanted to seemed to out weigh these factors.

Teacher Response

Both secondary school teachers involved in the study felt that if they were to use the phones again they would do it completely differently next time.

The Year 9 teacher noted that her class was generally of a lower ability than Year 9 classes that she has taught in the past and that this impacted the students' ability to use the mobile phones fluently to search for and access information. The teacher stated that many of the students lacked the self-confidence to direct their own investigation and many wanted close guidance in the basic use of the phones – for example which buttons to push. Based on the reading for the literature review (in particular Prensky 2004), it was assumed that the students inherently understood and could use the mobile devices and a range of internet applications. However, this was not the case and resulted in the students struggling to use the technology effectively and ultimately choosing not to use the mobile phones. The teacher also felt that the students did struggle with the small screen size, navigation and the speed of the internet connection when using the mobile phone. She stated, “I've been surprised at how limited their use of technology is actually - some of them are really limited”.

However, the Year 12 teacher also shared the same experience, commenting on the digital divide that became so apparent when observing the students using their phones. She stated,

> “I've always known there was a digital divide, but there was one girl in the class who just couldn't handle the cellphone. She got the person next to her to do everything – even voting on the poll ... it was really interesting and you could really see that divide so much more.”

On reflection, both teachers felt that using the mobile phones for small and specific tasks during the lessons was far more effective as a learning tool than encouraging the students to access the mobile phones at any time throughout the lesson.

> “The polling is really good and maybe if they had did it with a different piece of work that was less inquiry focused it would change things again too. So if I had done it with a completely different unit then you could have lots of little mini-tasks

rather than like a big task. It's been useful but the big task stuff has been quite hard" (Year 9 Teacher).

Using the mobile phones gave the students the opportunity to undertake research on the internet that would largely otherwise be done in the students' own time (at home or in the library during lunchtime) due to limited computer access. Having ongoing internet access allowed the teacher to observe the way the students accessed and interacted with the information they were finding and highlighted the students' weaknesses in information literacy. The teacher felt that she ended up teaching ICT and information literacy at a cost to her subject content,

> "I feel like I'm teaching two different things - I feel like I'm teaching social studies and I actually feel like I'm teaching ICT and that's where an integrated subject would be really useful cause I like the idea of the blogs but I feel like I've take on this role of ICT and I don't necessarily think that that should be my role but we don't have ICT skills taught at Year 9. Every year 9 student should go to an ICT class and be taught how to search the internet, how to find a valid site etc. so that it would be useful for every subject whether they were doing science or languages or whatever I think that those kids don't have those basic skills that I just assumed that they had and they didn't" (Year 9 Teacher).

The Year 12 teacher found a similar experience, noting very early on that her students struggled to differentiate between when they needed to access information and when they already knew the information themselves. She felt that when the students had internet access 'on-demand' they would default to trying to answer questions with information on-line rather than drawing on their own prior-knowledge, she was surprised by "their inability to go I know part of this answer but I don't know this part so I'll just search for this side [students just] typed in the entire question".

Both teachers stated that they would be willing to use the mobile phones in class again and that they would use them in a very different way depending on the unit of work and the skills that they had learned as a result of this research. In particular, they wanted to make more use of the camera and voice functionality and to use bluetooth for file transfer.

Both teachers felt that they had achieved their unit objectives and that the students had benefitted from the use of the mobile phones. The Year 9 teacher in particular pointed out that every student in her class produced something, in comparison to other Year 9 Social Studies where by the end of the unit, some students had handed in nothing. The teacher thought that this was due to the blogs as "they were constantly adding to them [their blogs] and every kid has got something or has shown some kind of understanding to the question because it was right there [on their blog]".

The teacher stated that her students had met the requirements of the subject and had also gained a lot from using the internet to blog,

> "if I asked them one of the things from the Achievement Objective 'how does moving effect or why do people move?' I think that most of them would still be able to answer my question but maybe not perhaps as in-depth as I would have wanted ... I still think that it's been worthwhile as they learned how to do something new that lots of then would have not done before. For some of them doing this is big - lots of them would hardly have used the internet before and it's been quite a big deal and it's been really interesting."

For the Year 9 teacher, having internet access on the mobile phones encouraged her to use blogs with her students which had a profound effect on student engagement.

> "I got an email from ... on the first day of the holidays and she asked for another two weeks - they are still working on it all the time, there's about 10 of them who are still going on and tidying things up so to me, the whole blogging thing has really meant that they have been quite independent but in terms of independent learning it has meant for some of them that they have become quite independent and for others who are always dependent on me in the classroom it has kind of meant that because there is 22 of them and only one of me that it has forced them to get on and try and do it themselves."

The Year 12 teacher also felt that her students had a good understanding of the Media Studies concepts taught during the unit and that they also learnt more about the capabilities of new technologies. The mobile phones allowed for internet access this enabled the teacher to facilitate sharing of content and ideas within lessons. However, the students all stopped using the phones and most did not like the change in learning style,

“they want the notes - they don't want to generate the content they don't want to co-construct knowledge” (Year 12 Teacher).

The Year 8 teacher appreciated being able to use the phones to enhance student engagement and for improving the way students can collaborate with each other stating that more than anything it was the students' own motivation to use the devices that was powerful within the class. The teacher stated that there were a number of reasons that computer access had changed his teaching style and mobile phones in the classroom can add a certain flexibility to this.

> “I've quite enjoyed just using computers in this classroom for discussions and forums and wikis as a way of collaborating together. Using computers and web2 you can get that bigger audience - you can collaborate with people on the other side of the world or in another class whereas if you are trying to do it a few years back you were getting on the phone and calling people whereas today you can get on *skype* [for making phone calls on-line]” (Year 8 Teacher).

The teacher saw the benefit of students having individual devices in order to personalise their own learning, saying that the research project was a good opportunity for the school to trial one-to-one device access as this is the direction that they are hoping to move in the very near future.

> “But I think more than anything it was the motivation and students actually using them. It was something a little bit different and we are also doing a dance and having the YouTube was super quick - they all had individual access to the dance and that was brilliant.”

The teacher said that towards the end of the unit of work, rather than the use of the mobile phones dropping off as had happened in the secondary school, the students themselves were initiating the use of the phones and coming up with new ways to use them to assist them with their classwork.

> “I think by the end they were wanting to get them out more. Quite a few of them were coming in and asking are we using phones today? So I think probably more than anything they wanted to use them more ... a couple of times the kids came up and wanted to use the phones – one was for watching the dance on YouTube and another time where we were doing something on the election

topic and they just wanted to use google. I think they saw it as an easier way to access information."

All of the teachers involved in the study noted that it wasn't until they had been given the opportunity to actually use the mobile phones that they could see the potential for their use. The Year 8 teacher said,

"*I didn't think you could use a cell phone to do that at the start it wasn't until we explored things that we found that there was so many things you can do."*

Current Mobile Phone Use in New Zealand Schools

In the space of this year, I have witnessed the attitudes of educators towards students' mobile phones changing. Current policy in most New Zealand secondary schools is to ban mobile phones from school grounds – or at least adopt a policy which means mobile phones are not seen or heard throughout the school day. However, school policies surrounding mobile phones and their use are starting to change.

It is interesting to note that of the teachers interviewed about their use of mobile phones in the classroom, most did so somewhat surreptitiously, knowingly breaking school rules banning the use of mobile phones during school time but considering the outcomes to be worthwhile. It was difficult to find teachers who were actively using mobile phones for learning. However, often when probed, teachers realised that they were times where in fact they had made use of either student mobile phones or their own personal mobile phone for school based activities. In particular, the use of mobile phones as safety devices when off site was popular.

Of those teachers interviewed who are actively employing the use of mobile phones in their classroom, most are doing so out of necessity due to the lack of technology resources available to them in their classroom environment.

Nathan Kerr, Geography Teacher

Nathan was awarded 2008 Microsoft Innovative Teacher of the year for the work he has done in using students' mobile phones to store short clips that they have made about course content in order to revise for their examinations. Nathan says “my personal feeling about mLearning is that if you follow where eLearning is going it ultimately turns to mLearning - smaller, easier, more compatible, more ready.“

Working in the subject area of Geography, students are required to answer examination questions based on data they have gathered from a field trip during the year. Students were gathering information in a variety of ways including taking still photos and then using this information to create powerpoint slideshows containing images, text and an audio

voice over. The problem that Nathan found was that the students were engaged with the content, but the only place they could watch their completed slideshow was on the school computers as many students did not have computer or internet access at home.

Nathan came up with a way for students to compress their slideshows so as students were able to easily share their clips via bluetooth or micro-SD card and store on their phone for review later. An interesting flow-on saw students sharing their clips with each other and then critiquing and challenging other students' work. Students were actively engaging with the content of the slideshows through sharing them via their mobile phone. Students were found studying for their exams by reviewing their slideshows right up to the point when they had to walk in to the examination hall and surrender their phones.

“A lot of the kids were going around showing them off to others so started getting a whole line of kids who I don't even teach asking me to do that for them - but I didn't have time. But the kids are interested and I've seen them at lunchtime - teaching other kids how to bluetooth etc. so the kids are really really into it - there's no two ways about it.”

The beauty of the work that Nathan has done is that everything he uses in his classroom is free. Students are making use of the tools they already bring to class. He has sourced free compression software and students are transferring the files via free means.

He says, “schools' policies on hand-held devices hold you back. I know why and I agree with them but I am urging schools not to but a ban in - put a clause - ie if it's school related. Must have a clause that allows it - because the kids are driving it.”

On considering why the mLearning strategies he has adopted are successful he says, “my feeling is SMS has got its limitations - you can't use it in exam situations. Also you have the same problems of miscommunication. So digital lessons have to be visual. Also if you are going to get the young people who just totally adapt and live their life on their computer and their cellphones - a lot of them have learning disorders as well so you have got to have visual material that they can pick up. It must be relevant - like how would you answer this exam question in a movie - the kids will want examples - what's a process - transformation - how does a beach transform after a storm - half the sand is gone and away they went. And that was good.”

Greg Howitt, Technology – Hard Materials

Greg states that the use of mobile phones in his hard materials classes has proven invaluable in creating the link between student and stakeholder. A key aspect of the assignments in this subject area require students to seek feedback from the stakeholder group throughout the design and production process. In the past it has been too difficult for students to do this practically due to the time constraints of working within timetabled school hours – often the time to get information to a stakeholder and for them to respond could be a couple of days. However, allowing students to use their own mobile phones to make contact with the stakeholders this process is now instant and much more authentic.

Students work on producing product and are using their own mobile phones to make contact with the stakeholder throughout the design process. Students are able to call, text or send a picture to their stakeholder and have feedback within the hour of their lesson. This means that students do actually consult with their stakeholder and act on the feedback they are given. Without the instant access to the stakeholder – students do tend to cut corners or just push on with the project as the time delay in gaining feedback and being able to act on it is too slow. Students are able to contact their stakeholder to ask questions, clarify the brief, gain feedback on the product so far. The learning is authentic and reflects the way that working in the industry actually works.

Greg states that sending photos with a text is the most common way that students make contact with the stakeholder. Early on a student asked to take a photo to send to his dad to see what he thought of the project. Now a days it's part of the process. He stated that his only requirement is that students ask permission first. Part of the process for NCEA Level 1 is to show stakeholder discussion has taken place. While the actual pictures (pxt) and text messages are not being gathered as 'evidence' for NCEA at this point, the teacher keeps a note (or has the students keep a note) of all stakeholder consultations and uses this as evidence for NCEA.

One of the most important factors of using mobile phones in this way is that it is authentic; it simulates the processes of the real world where dealing with stakeholders is a reality. Greg stated, “to me it's one of the key things to getting them engaged and actually

learning. If you can get kids to think outside of the basic task that the teacher sets and engage with the work, the quality of the thinking improves."

Anne Robertson, French Language Teacher

Anne has experimented with using mobile phones in lessons to teach languages students. She began talking with her students and was surprised to find such a variance in the capabilities of mobile phones and she noted that most students did not own a device that had bluetooth or internet access.

"I was talking to my Year 11 students about register - how they talk to each other in a different way to adults which is particularly pertinent for French because of the formal and informal "you" form. We got on to styles of writing and then on to texting. They were also interested in how they could increase their exposure to the French language and I suggested turning their phone and MP3 player interface language to French. I also said that on some phones you could change your writing language to French. The next day they came in to the room all excited because they had done just that and had been texting each other in French!"

Greg Carroll – School Principal

This year, the Principal of Outram Primary School in Dunedin, has made use of his students' mobile phones during their mathematics lessons. Students are given mathematics problems to solve and they are given the option of 'texting' the answer back to him. He says that students are keen to send the answer to him and anticipate the reply they will get from him as to whether their answer is right or wrong. He says that specifically in maths, his students have "lost confidence in their ability rather than not having ability". He says that the use of mobile phones in this way is "inherently engaging" and that he has noticed an increase in student engagement. Greg's students are excited to have the principal in their phonebook and even when an event such as an athletics day may have had a cancelation notice on the radio, students often text him to inquire as they just want to make a personal connection.

Greg states that using technology is more like a learning style, some students are "turned on and switched on" through using technology. However, he cautions against against

using technology for the sake of it saying “just because it's digital doesn't mean it's better”. Greg's philosophy is to “use a few things and use them well”. Greg believes that getting “kids engaging with content - working in small groups and pulling apart and analysing” and he states that it is this “potential for personalising” which for him is where mobile and portable technologies become useful.

Mobile phone policy at Outram School, while informal, requires that student's mobile phones are not to be seen “students can't sit around texting they must be playing with others” and that mobile phones are there “for the convenience of parents and teachers”.

Mel Gibb – Science Teacher

Mel regularly encourages her students to use their mobile phones to take photos. Recently students took photos during a dissection of a heart and lungs. Mel stated, “some of those students would have shown those photos to their parents and talked about what they learnt. I think that it is a successful lesson when they go home and share their learning with their parents”. Mel argues that if the lesson is engaging enough the students will not be using their phones for purposes other than what they have been instructed to do. She stated, “28 kids taking photos/movies, do I worry if they were texting their mates and not using them for what was instructed/allowed to do? Not really. If the activity is engaging enough the kids don’t text. They will use their phone for what you intended.” Mel also points out that students are subtly using their phones during classes anyway “so many of our students are able to text 'blind' with their mobile in their pocket and not even look at the keypad. I imagine a lot of teachers do not realise that this is what kids can do because they [the teachers] can’t!”.

Sharon Harper – English and Media Studies Teacher

This year, Sharon has made use of students' mobile phones within her English classes. She stated that text messaging is a particularly good medium for sharing Haiku. At the beginning of the year, she got students to text her an introduction to themselves – if students did not have any credit on their phone, they were able to send their message via bluetooth. Sharon said she has also asked students to use their mobile phones to organise a meeting with their parents. Her main reason for using mobile phones is to try to

create variety within the classroom that increases student engagement. Sharon has also used mobile phones to record voice messages which are then uploaded to a *voicethread.*

Michael Fawcett – Year 4 Teacher

Michael has used his own personal mobile phone to help organise his day and as a way to have contact with the parents of his students. As school policy requires that students hand their mobile phones to the office each day, Michael allows students to use his mobile phone as a class mobile for the camera and recording functions and to contact their parents if necessary.

As an organisational tool, Michael uses *OperaMini* to send appointments to *Google Calendar*. *Google Calendar* is synchronised with *Outlook* and text reminders of appointments are sent directly to his mobile phone. Michael says he also uses the reminders function on his phone with alerts set for duty, meetings and special events.

As a communication tool, Michael uses his mobile phone to send text messages to parents for assemblies, day trips or to remind them that money is due. He also sends text messages to parents to promote new entries on the class blog. Parents are able to send text messages to get a message passed to their child, for example that they are to be picked up by someone else today. Parents also are able to send a text to tell Michael that they will be running late, or that their child will not be at school for whatever reason. Students may also at times use the phone to send a text message or call their parents if they have forgotten their lunch, swimming togs or sunhats.

Michael says that it makes him seem more accessible and less removed and so far he has had no abuse of the system. He also points out that so often parents don't want a deep conversation - they just want to pass on a message. Perhaps using a mobile phone to do so means that communication is made when otherwise people may not have bothered if they had to make a more formal phone call or write an email. During a recent ERO meeting with parents, it was mentioned that they like being able to text the teacher rather than write a note. Although having said that, he only has phone numbers for 20 out of 29 parents. Michael says he and his colleagues also communicate regularly by text message.

As a classroom tool, students may use either the camera or the voice recorder to record themselves reading a piece of their own writing for posting to the class blog or website. The teacher and students can use it also to send photos, video and audio via Bluetooth to the class laptop either for use now or later editing and they can upload photos to *Flickr* (an online photo storage and sharing website) for instant access on the internet. Often the camera on the mobile phone is used to take photos of classroom activities and special events. The video camera is also used to record and share, through projection on the interactive whiteboard, classroom behaviour expectations, Michael gives examples of this is what reading looks like or this is what moving quietly to the mat looks like.

At times when the school network has been unreliable, Michael has connected his mobile phone either via Bluetooth or USB to use it as an internet connection over the 3G network and when computers have been unavailable students have used the phones to search Wikipedia.

Jo Fothergill – Year 3 and 4 Teacher

Like Michael, Jo also uses the camera on her mobile phone extensively throughout the day. She videos students while in action in the classroom, in assembly and when performing in shows. Every time information is written on the whiteboard, she takes a photo of it and uploads it to *Evernote* to be used again later. *Evernote* allows users to capture information on a range of devices to be stored and easily searched again later.

Jo also takes photographs of students doing things she wants to highlight later mostly to reinforce positive behaviour for example, students working collaboratively or for copies of their written work or art work. She stated that while she does have a class camera, “the mobile phone is easier for all the spontaneous photography - because it lives in my pocket - rather than the class camera which lives on a shelf near my desk!”

David Woodcock – Teacher of Year 7 Gifted and Talented

David has worked with his students on an inquiry unit based on finding out why Hamilton had an image as being a 'boring city' when in fact the students really enjoyed it. They set

about inquiring as to why the stereotype existed and how they could go about changing it.

Students went on a class trip to the Hamilton City Council “your City” expo and used mobile phones to visually record their findings regarding why hamiltON (the current Hamilton city logo) really is "ON". Students used mobile blogging technology through their class blog hosted at *blogger* to report the day's events ahead of the local press - capturing and displaying online action live as it happened. David stated, “the children were empowered and engaged and felt their voices were being heard, as well as engaging in meaningful learning with real outcomes using 21st century tools”. As a result the Hamilton City Council wrote the class (Room 5 at Peachgrove Intermediate) into their strategic plan and asked the students to teach them how to use the same technology. As a result, David and his students are now partners in their planning and are involved in think tanks with both the city libraries and the art museum. The class intend to develop digital story telling strategies to help promote their city. David says, “this is real learning and empowerment of our young people."

General Mobile Phone Use in Schools

When talking with a number of teachers at the high school in which this research project was conducted, many commented that while they found student's surreptitious texting frustrating, that they had on occasion allowed students to contact another student in order to pass a message on or to conduct group work. The teachers all talked about using the phones 'illegally' and acknowledged that they were working outside of the school rules.

One teacher acknowledged that there had been a couple of occasions on which she has had to tell students to use a phone for things such as when a student was absent from class and their absence was holding up progress in group work. Rather than wasting a period not being able to move beyond a point because one student had information that the others needed, the teacher allowed the students to send a text message to the absent student to request information so the others could move on.

Another teacher stated that when dealing with the school's assessment policies surrounding NCEA, she ensured students who were absent on the due date of an assessment were reminded by text message to either get their assignment handed in or to

ensure they followed due process and obtained a medical certificate so as they did not miss their assessment opportunity.

The ability to contact students instantly to remind them of meetings while on campus was also noted as being valuable for both teachers but also student leaders trying to organise school events. While most teachers had only used the phones as a communication device, one teacher said that she had let students use their mobile phones to take photos in class for something and which they send to the teacher via bluetooth who then put them up on to powerpoint presentation they were working on together.

A number of intermediate schools spoken with have begun to develop policies that are more mobile phone friendly as the logistics of banning mobile phones became too difficult to manage. They had the problem that parents who had bought their children mobile phones did so for safety reasons and required the students to carry the phones to and from school. However, school policy banned the mobile phones at school and therefore had to set up a way of securely storing mobile phones until the end of the day. The number of students needing to store their mobile phones overwhelmed the system and the schools must now come up with new ways of dealing with student mobile phone use.

SMS and Absentees

A number of schools spoken to have begun to implement an electronic absentee system. If students are marked absent for the first class of the day, a text message is sent to a parent's phone to advise them their child is not at school and advising them of the process for absentee students.

Information Literacy in the Case Study Schools

There was no specific information literacy programme in place at either the primary or secondary school in which this study took place. The following information was gathered by asking teachers from each school to complete a short survey. Most teachers were able to give a definition of information literacy with most answers focusing heavily on the role that technology plays in information literacy rather than the processes or set of skills involved. Teachers stated that they had received very little in the way of professional development in this area and identified a large number of perceived barriers to implementing information literacy into their teaching programmes.

Teacher Definitions for Information Literacy

Not all teachers were able to provide an accurate definition for the term information literacy with some responses focusing on the ability to use technology to communicate effectively; “being able to use technology to communicate with others, I guess - 'communicate' in the broadest sense!” (Secondary Teacher 9).

Similar responses also given were, “being au fait with what is out there in the way of technology, namely computer based” (Secondary Teacher 13) and the “use and application of computer technology in in the world today” (Primary Teacher 5).

Other definitions also emphasised the role the technology plays in information literacy, but showed understanding that having access to technology was what enabled information access; “being able to access and use a wide range of technological appliances in oder to gain information to utilize within a learning context” (Secondary Teacher 7).

Other teachers stated; “it is being literate about finding information - using the various technologies available these days” and “I think it means using computers to be able to access information that can then be used to prepare information in context and to display the information in an appropriate format so that the information is clearly communicated” (Secondary Teachers 8 and 11).

Similar definitions came from primary school teachers with two responses focusing on technology use as being key to information literacy skills the “ability to use different technologies to find meaningful information” and “technology, systems, equipment, models that assist us in finding information” (Primary Teachers 1 and 5).

Another definition focused on accessing information from the internet, “knowing how and when to access information from the world wide web...” (Secondary Teacher 10)

Two definitions incorporated the use of information from any source – not just electronic. Primary Teacher 6 stated that information literacy was having an “understanding of how to gain information from a variety of sources and being able to do this.” Another teacher stated that information literacy was “the ability to access, understand and utilise an increasing variety of electronic devices for an increasing range of learning, information gathering and sharing activities” (Primary Teacher 4). Only one other response focused on the concept of information literacy being skill based, “essentially being able to locate and sift through lots of information quickly to and sift out the relevant and reliable stuff” (Secondary Teacher 14).

Current Methods of Teaching Information Literacy

Across all subject areas within the secondary school, teachers identified research based projects as those which taught students how to use information projects in which students use the library are, “encouraged to use both books and the internet” (Secondary Teacher 8) to access information.

Teachers of English identified a number of ways that they felt they taught information literacy and generally saw it as a skill integrated in to their curriculum; using data displays in the classroom, bringing up websites to look at different aspects of classroom study such as Shakespeare and other written texts, teaching language and using dictionaries, writing response essays where they are encouraged to make judgements and infer based on critical reading of texts, viewing websites and assessing them from a critical literacy viewpoint.

However, most teachers saw information literacy skills as being interchangeable with general technology skills and cited teaching the use of specific technologies or programmes as teaching information literacy skills, “back to basics computer skills” (Secondary Teacher 7), using the software that comes with the interactive whiteboard, keyboarding so that the computer can be used efficiently, learning of the different software applications - *Word*, *Excel*, *Access*, *PowerPoint*, *Internet Explorer*, email. While these skills are valuable in their own right, they are not on their own information literacy skills.

Within the primary school, teachers identified a number of ways that they teach information literacy skills. Most involved using a variety of technology programmes and applications; digital storymaking, emailing, *Google* and *Moodle*, homework and examinations online, giving multimedia presentations and the internet in general. However, a number of activities not necessarily computer based were also given; books, library time, writing and publishing creatively and reading for information or follow up work. As with the secondary teachers, generic research projects were also cited as teaching information literacy skills.

Professional Development

Within the secondary school, a small number of teachers identified that they had received professional development in the area of information literacy, all of whom belonged to the English department. No teachers outside of the English department identified as having received development specifically in the field of information literacy, except for teachers in a Head of Department role, who had been to information sessions dealing with information literacy

The staff are currently involved in a professional development model which sees teachers from within the school presenting ideas and information to the staff. Some survey respondents acknowledged this as at times relating to information literacy. Teachers who had access to new technology were more likely to have had professional development in information literacy, for example those using an *Interwrite* board or tablet. The ESOL department is currently involved in Ministry of Education funded project involving technology use in the language learning classroom.

Within the primary school, teachers had been involved in a wide range of professional development opportunities which they felt related to information literacy. Most of these were tied to professional development offered through the ICT PD cluster initiative. Primary Teacher 2 had been involved in two ICT clusters and had also undertaken an ICT paper at Canterbury University. Some teachers had attended an mLearning presentation as part of their cluster development day earlier in the year and Primary Teacher 3 had attended a SAUCE information skills programme as well as initiating their own professional development around implementing laptops in the classroom.

All secondary teachers involved in the survey saw a need for more professional development in the area of information literacy. However, the majority of the primary teachers stated that they had very good access to professional development and felt that they were “kept up to play with recent developments very well” (Primary Teacher 4).

Within the secondary school, one teacher pointed out that, “IT access has improved significantly over the last two years in our school but our own learning has not kept up with it. Some of us are 'tecnophobes' from years ago and are slow at getting up to speed, although I have improved heaps. We need some IT lessons on what/ how we should present work ourselves to be good role models eg. power points” (Secondary Teacher 13).

Another teacher commented that “there are so many different ways to teach now and tools to use that it has become difficult to decide which might be suitable for you and your subject and there just isn't the time for implementing ideas fully and to give it a chance and then evaluating what has worked and what hasn't. It's almost like there is too much now and it's moving so quickly” (Secondary Teacher 14). As Primary Teacher 3 states on the topic of professional development, “the more things that are available that we know about the more tools we have at our disposal.”

Perceived Barriers to Teaching Information Literacy

Teachers responded to a number of identified areas as impacting their ability to teach information literacy skills. In both schools, access to ICT resources and in particular access to the internet was highlighted as the key barrier to teaching information literacy. Other influences such as time and timetabling all came back to issues of access.

Within the secondary school, teachers found difficulty with accessing the designated ICT suites as they were often fully booked, or during one research period one teacher pointed out that they had to share the library (which has about 10-12 computers) with another class as there was nowhere else to go. Issues of timetabling contributed to conflicting use of resources.

The constraints of a 50 minute period were also highlighted as being not enough time to conduct a sustained period of work, but also if teachers had to shift between classrooms, that a good deal of this time could end up wasted due to having to pack up, move and then set up again.

Some teachers felt that in an already crowded curriculum they did not have time to teach information literacy, or could not afford to potentially 'waste' a period of time due to relying on technology that may not work, or may have problems that they cannot troubleshoot. Therefore, it is better for them not to rely on this technology so as they do not waste the short amount of time they have with their students.

Within the primary school, teachers were split as to whether time was a barrier for them. Some commented that they found it was easy to integrate information literacy throughout the curriculum. However, another teacher said that they found they had “no time to actually physically teach the skills . One expects students to be familiar and be able to use and apply it” (Primary Teacher 6).

Student Perception of the Use of Mobile Phones in Classrooms in the Case Study Schools

Students initially perceived the opportunity to use mobile phones during school time as something fun and acknowledged that there would be much novelty factor surrounding their use. However, students had concerns with the cost that may be associated with their mobile phone use and also factors such as bullying and distraction from learning. Students struggled to identify potential uses of mobile phones without resorting to reasons why these approaches might not work and how teachers might have to enforce them.

The Primary students were focused on using technology in many different ways in order to improve their learning, and had a much better grasp on the ways that particularly accessing the internet might be beneficial to their learning – in particular the ability to personalise their own learning. Within the secondary system, students were much more concerned about teacher control and maintaining the more traditional elements of education. Most of these fit within a very teacher directed environment that takes place within the walls of the classroom.

Secondary Student Perceptions

Initially when the Secondary students were asked how they felt about being able to use mobile phones during school time, most expressed excitement at the idea. Students involved in the study said that their friends were most envious of their ability to use phones during their class time and thought that this was 'flash'. However, after the initial few comments, students were extremely quick to point out all of the negative behaviours that they could see being associated with the use of mobile phones during class time.

“Yeah I agree to begin with. I think just the excitement of having cellphones in school just because we're not used to it would be quite exciting for everyone and I don't think much work would get done but once the novelty wore off it might be alright” (Secondary Student A).

Students all seemed to imagine that the school allowing them to have and use their mobile phones during school hours would result in periods of class time being spent sending text messages with little regard for the learning opportunity taking place. Most students did not seem to trust themselves enough to be able to control their mobile phone use independently, feeling that allowing them to freely access their phones would result in a lack of focus and attention in class. Secondary Student E said, “it would be good but a lot of people wouldn't pay attention in class so I don't think it would be very good for a lot of people. But I wouldn't have anything to do with my phone so I would just keep it away anyway, like a lot of people would just get it and start texting people.”

To which Secondary Student C added, “yeah and they would just be not doing any work at all. It would be cool if we could use them at lunchtimes and breaks and stuff because you are not working and not trying to finish your work but if we are doing something in class we need our full attention and it will take our attention away from that.”

However, students admitted to this occurring anyway, with students surreptitiously sending text messages during class or making excuses to leave the classroom in order to use their phone; “and it's that hiding it away and secretive and you're kind of naughty if you are texting in class” (Secondary Student A). Secondary Student E added that reason for this is because “you are trying to be all rebellious.”

Students were concerned with the teachers' ability to control their classes should mobile phone use during class be permissible - even if the phones were being used for classroom based activities, “how are they are going to tell whether you are on something you're not supposed to be? Because you can just hide it” (Secondary Student D).

It was interesting to note that when the idea of lifting the current ban on mobile phone use at this particular school was first proposed, the students all agreed that it would never happen. In fact when asked what they would think if the current ban on mobile phones was lifted by the deputy principal one student responded, “I would be kind of shocked if she (the deputy principal) said we could use them” (Secondary Student B). However, school policy for 2009 has now been changed to allow mobile phone use during the school day, and as a classroom tool if approved by individual classroom teachers.

Before they considered any potential uses, students instantly began to critique the use of mobile phones during class. Initially students could not see any use for their phones apart from sending text messages to their friends and this dominated their responses to all discussions. Students were extremely quick to highlight their concerns. Younger secondary school students in particular were very concerned about text bullying that they perceive would become more of a problem should mobile phones be allowed. Secondary Student F said this was because “so many people would be texting you wouldn't know who it was....”

Students talked about how allowing students to both send and receive text messages during class could fuel the text bullying situation. “Because they have more time to actually send the text instead of after school they can actually do it during the time that you might be more vulnerable” (Secondary Student D). Another Student felt that text bullying would become more satisfying for the bullies because bullies “can see their [the victim's] reaction as well, so it would encourage it more you can see how they feel when they get the text” (Secondary Student C). Students felt that this would be highlighted even more because “there is [are] a lot of people in the class and if they are all texting at the same time and then the person wouldn't, not that they would know who it was sometimes, but it would be more anonymous but they would also be able to watch them. They'd be able to get that bully thrill or something out of it - like see what their reaction is to it ... and accomplish something ... Instead of just thinking that they don't care or they might just be ignoring it” (Secondary Student A).

Students were also very quick to point out the distraction factor that they believed would become a problem with most students seeming to visualise a classroom setting where students constantly 'text' throughout class. One student questioned the impact that this may have on teachers' management of student behaviour and their ability to 'control' the class.

Students were also concerned by the cost of mobile phone use and that there might be a requirement to have a phone from which students might have to send text messages for school or access the internet. While the students understood that they had to pay for internet access on their mobile phones, they had no idea of the actual cost – and in fact many believed it was much more expensive than it actually is. Secondary Student F said,

“if you go on the internet it costs each click so it would cost you quite a lot of money.”

Also, students acknowledged an aspect of the digital divide – the haves and the have nots and the pressure that using mobile phones in classes may have on students,
“some people if they didn't have phones they'd feel at a disadvantage maybe. It's like uniform where some people in mufti they don't feel comfortable in mufti because they don't have as many cool clothes as all the rest so they might like having uniform and those kind of things so for some people it would probably make them uncomfortable” (Secondary Student E).

It was surprising how reluctant the students seemed to be to adapt their mobile phone use wider than simply as a text messaging device and how quick they were to draw on what are typically adult arguments against mobile phones. They cited screen size, potential repetitive strain injury from text messaging and time as barriers to using mobile phones for learning. Feedback from the students involved in actually using the phones also supported this. Most found the Vodafone 715 phones too small to read a great deal of data from and too slow when accessing the internet. They found this frustrating and in the end gave up.

It was interesting too to note that every time students came up with a potential use for their mobile phone during class time, they critiqued the way that it might be used. For example when one student talked about the way that she could use her mobile phone to video experiments in Science, another student responded,

> “I guess the opposite end of it is that if the teacher does it one year, and it works really well and then the next year they use the same file they don't really do the experiment live any more it's just like here download this file and so it takes the practical element away” (Secondary Student A).

While students could come up with some good ideas for the ways that they could use their phones to support their learning, all ideas fitted within very traditional models of learning – quite often relating to 'writing notes', listening to the teacher and learning only occurring within classroom walls.

Students were overly concerned by rules and the concept of 'not getting work done'. It was interesting that all students were concerned about technology use coming at a cost to some traditional skills such as spelling and handwriting. “Technology is always going to improve your learning to a degree but at the same time you lose things that you had - like handwriting, spelling skills” (Secondary Student C).

Secondary Student F added that “handwriting would probably get really messy as well because if people were always using cellphones they would forget how to write properly.”

Students were also concerned by lack of uniformity of devices and the problems that this might create, “it all kind of depends on the phone, because my phone only gives me 30 seconds of videoing and 5 photos” (Secondary Student E). Secondary Student C responded, “mine has 200 photos but no video”.

When students began to think about possible ways of using their phones and began bouncing ideas off each other, they came up with a number of ideas for use across all subject areas. What was interesting, was the way that students tried to analyse and then trouble shoot the problems that they anticipated teachers might have with their potential applications they came up with. What was also interesting to note was that students could see a great deal of use for the devices to enhance the traditional classroom setting while still working within these confines. The main advantage that they saw was the portability of their device saying “it's small and you can take it wherever you want to go - like you can carry it around” (Secondary Student D).

To begin with, students considered very generic activities that could be undertaken with their mobile phones, for example, using the voice recorder to conduct and interview or to make notes to remind you of something later. Students also saw the calculator as being useful in maths for when they forgot theirs or for in a classroom where they might not normally have their calculator on them. Students talked about the camera function as being useful for more practical subjects,

> “For media, it would be helpful being able to take different photos of different shots that you want to use, and just feeling comfortable without still trying to hide it from the teacher. And if your phone has a video then you can obviously take some shots with that” (Secondary Student A).

> “And also for Drama, because if you wanted to learn something or if someone did a demonstration and you wanted to play it back - you could video it and keep watching it to see how you can improve” (Secondary Student E).

> “Videoing and photos to help you in science and you can take note of experiments through it - like take a photo of reactions as they happen and video the actual experiment as it happens to get the message so that you don't have to go sit down and try to remember what you did” (Secondary Student C).

The ability to capture video and share it via bluetooth to be watched again at a later date was something that students thought would be very beneficial. While senior students saw this as a valuable way to revise for assessment, younger students saw it as an alternative way to delivering course content.

Secondary Student B pointed out that, “lots of people, or I don't like reading lots of things so if you could just listen to it or watch it then it would probably make it easier to write.” Secondary Student F added, “yeah for some people, if they read notes that they made on the day they might not fully remember what they actually did so watching it would bring back more memories to remember what else they did.”

Students also saw the potential for maintaining and accessing class resources via their mobile phone, “you could do a lot of work outside of class and then it's a good way because if you don't have a computer if you were able to get some sort of notes or some communication, that would be helpful” (Secondary Student E).

It was interesting to note that for most potential uses that students came up with, they quite often came up with worst case scenarios that they tried to 'solve' through possible regulation/rules as was the case mentioned earlier with the students concerned that teachers may just use video taken from last year's science experiment in place of having students conduct their own experiments.

Most students saw the only real benefit of mobile phones being used as being during break-times or as a reward during down time when students had finished their 'work'.

Students referred to their mobile phones as devices that had very little value for their education. They were devices for texting or at a stretch taking photos,

> "I think that one way you could use them is as kind of a reward system, like as soon as you have finished your work you get to muck around on your phone while you are waiting for everyone else to finish" (Secondary Student C).

> "I think leisure times but then that sort of breaks - especially tutor times this year with all year levels, so then you are just in your own, like music is quite unsociable if you have got your ear phones in. We did have MP3s banned for a while. so yeah I don't know how that would work. I guess then you would have your phone but all these different parts of it would be banned. So what's the point?" (
> Secondary Student A).

Students were open to the idea of teachers directing them to make use of their mobile phones for specific learning activities – rather than simply as a tool that they could use should they want to. Reinforcing the fact that students felt more comfortable in a highly teacher directed environment and that teachers should easily have the ability to check up on their students. Secondary Student F said,

> "that would make it more interesting because if they do it as like certain activities not as the whole time as being allowed but if they just added certain activities then it would be easier to keep an eye on what everyone is doing then you could check on what everyone is doing."

One of the aspects students most commented on was the ability to access the internet without being confronted by the 'blocking' of websites that occurs when using the school systems. What was more interesting was that students tried to come up with a way that schools could enforce blocking on students' phones!

Secondary Student D said that "it would be a pain if they were blocking sites on your own phone cause then you can't go on to them when you're away from school." As they tried to come up with a solution, Secondary Student A said, "unless, can you do a thing around school I dunno, some wireless thing that blocks..."

This brought in a new conversation around the practicalities of students using their own personal devices for school based activities, and potentially requiring students to have a mobile phone for school. Students agreed that familiarity with their own device and personalisation would be beneficial. However, concern was expressed as to there being a requirement to ensure their own personal tool that they had paid for would now have to conform to acceptable school standards.

While students agreed that they knew their way around their own device, they questioned whether lack of uniformity between devices would become problematic – with the potential requirement for students all to have the same type of phone.

> "I guess it makes people feel more comfortable and more accessible for them because they know how to use it and all that but then it might be too different when there's no sort of uniform with it" (Secondary Student B).

> "Most people have different phones, so the same things might not be accessible to everybody. Like a teacher might ask for something but not all the kids can do that" (Secondary Student C).

They also expressed concern that if this was the case, the technology might become the focus of the learning rather than simply the tool,

> "because of different technologies, because of different phones would you then be focussing too much on how to use the phone, how to use the technology rather than focusing on your actual learning and what you are trying to get out of it?" (Secondary Student F).

One student acknowledged that currently mobile phone use is still at a very infant stage as far as adoption and advancement in technological capabilities goes. Suggesting that the above criticisms were true for today, but that it would not be long before today's highly capable devices became consumer devices for the masses;

> "Maybe where technology is at the moment but future technology is developing all the time and is becoming more accessible to more people so definitely potential in the future for everyone to have the different features" (Secondary Student C).

Students also highlighted loud and clear that their phone was their personal device. It was highly personal and very private. They were concerned that should mobile phones be allowed, and encouraged in schools, then their own highly private, personal device would be subject to conforming to school rules and regulations,

> "[It's the] same idea as with mufti day - when it's mufti day you have to go with the same ideas as are in the rules - you can't go in a bikini or whatever. Like with phones some people decorate them really strangely and it might be inappropriate. Would they [the school] make it so that you are not allowed to decorate your phones? Some people might not like that, they might say no I want to decorate it because it's my personal thing. But it's like turning it in to a school thing so it's not personal any more" (Secondary Student F).

Students clearly highlighted the incredibly personal nature of their mobile phones. They were concerned with teachers potentially requiring them to share their phones with each other. Secondary Student B said that "if you share your phone, other people can see what is on it and sometimes you might not want them to see."

It is interesting to note that for most students, the ability to use technology frequently and easily was not the social norm. With every group of students spoken to, all spoke about students who use a lot of technology or who were seen as technologically capable as being different or alternative and certainly not mainstream.

Students talked about teachers who might choose to use mobile phones in their classes as benefitting those who use a lot of technology. Secondary Student D said, "having them [mobile phones] in [classroom] activities would make some people who are technology addicts make them pay more attention, because there is something technological/electronic involved with it so it makes it more interesting to them."

Technology is seen as fun. Students can easily find their way around a device but do not have overly developed uses for the technology. When talking about bluetooth, most students knew of it and had limited experience with it. They saw it as a fun novelty activity but at this point had no real purpose for using it.

When students gave their final thoughts on mobile phone use in classrooms, many

students felt that the phones were of very little use to their education and that in order for them to become more useful they may as well use a laptop.

> “Phones have to be more easier to use they have to be bigger, like those [the vodafone 715s used in the study] wouldn't benefit us” (Secondary Student D).

> “...the phone would get so big it would turn in to a laptop...” (Secondary Student F).

> “I think if you wanted a replacement for a laptop which is like a cellphone you would probably want to go to a *Blackberry* or something, because cellphones don't always have a lot of things to write down. That's probably the main thing which you do in school, write down notes, and there's not much memory space and there's not many phones have tools where you can write down a lot of things, like there is memos and stuff but that has a limit on how many characters you can use” (Secondary Student A).

> “As an in between step between laptops you would need PDAs and there would just be too many problems with it would probably be easier just to wait a couple of years and go straight to the laptop” (Secondary Student D).

Students continue to cling to traditional methods of teaching and cannot see a role for mobile phones in this.

> “...but if we haven't needed to use them in the past - like there's never ever been a time where I've though oh I'll use my cellphone for this” (Secondary Student B).

> “The *Smartboard* is good I reckon... I don't think we need to go as far as phones yet...” (Secondary Student A).

> “I don't know if there is really a need for it at this stage. Maybe in the future but there is really nothing wrong with a white board sometimes or just a basic pen” (Secondary Student E).

> “I think it would be good for in your own time to just use your phone, like if you need it on your own maybe. But you don't really need it, it's one of those things that you just don't have to have” (Secondary Student C).

“People have survived all these years without them so why would they need them now I mean Albert Einstein didn't have a cellphone” (Secondary Student D).

“If you look back at our parents' results they were really high, higher than what they are now, we're slipping now even though we have all this access to information now, all the time. It's because we get distracted so easily because we have so much to do on the internet or Yeah it's like I will do my homework on the computer but instead of doing your homework, you go on Bebo” (Secondary Student A).

Primary Student Perceptions

Students from primary school however, could see the potential for making use of the technology and were able to think about the way in which they could use the mobile phones to personalise their own learning. The students were not as concerned about regulating mobile phone use should the school policy change. However, they were concerned about the cost of using their mobile phone for school.

Of the 7 students involved in the focus group, two did not have mobile phones although when asked whether or not they wanted a phone, one student replied, “sometimes I do, but sometimes I don't because they, you can get all the forward messages and sometimes you can get phone bullying and I don't want that to happen (inaudible) but I really want one - like right now!” (Primary Student 1).

All students who had phones used them mostly for sending text messages to their friends because it was cheaper than calling. One student pointed out that they preferred to text their friends as “you can think for a while and then they won't hear you going oh, yeah, um and they won't get bored” (Primary Student 6).

Students however, did admit to finding text messaging frustrating at times especially when communicating with adults, “sometimes it does get annoying because when you are trying to say something important to your parents or something you don't want to ring them because you've got no money or something then when you are texting them you can't say what you want to say quickly” (Primary Student 3). Students talked about using different conventions for sending text messages depending on who the message was being sent to – friends or parents. Two students commented on slipping text language in to their school work saying “I hate it when you are writing a story or something and you start to use text language in your writing” (Primary Student 7). While other students nodded in agreement, all students acknowledged that they could recognise that they had made and error and go back and correct it.

When asked if students were interested in using more technology in their classes the students were divided. “We do have one class in Yr 7 and they are doing computers and

stuff and they are allowed their cellphones and their PSPs hooked up to the internet" (Primary Student 4). Students could see both advantages and disadvantages to the system. On one hand students said that "it would be real cool because instead of maybe walking around reading books you could just go on to the internet, PSP and stuff - straight away and you can get there in 2 seconds" (Primary Student 2). However, another student replied that "a bad thing would be if you had a malfunction or something and you can't do your work cause it's all on the computer or something" (Primary Student 6).

Students talked about the potential for being able to access the internet during class. One student said, "I reckon it would be good because while you're teachers up there teaching you stuff you can go on the internet and find out more" (Primary Student 2). Another student questioned this saying, "well but then you wouldn't be listening to the teacher" (Primary Student 4). To which the first student replied "but some of the time they say stuff like a word or something that you don't know and you go on to it (the internet) and you'd be like oh right (you found out for yourself)."

One student liked the idea that having access to the internet on a mobile could personalise his learning, "you could make it more personal ... you would just go and do it you wouldn't have to go and ask to go on the computer and everyone would have it" (Primary Student 3).

Students did feel that it might take them some time to get used to using the mobile phones to access the internet. When speaking about previous experiences with using a mobile phone to access the internet one student pointed out that, "sometimes it takes, well for me it sometimes takes ages to load up, I don't know why and it doesn't seem that convenient to me" (Primary Student 6). Another student felt that the screen size and the user interface on a mobile phone might prove to be difficult, "on a computer you can use your mouse and everything to go but with that you've got to push buttons and one and two..." (Primary Student 3).

Students were also concerned about the cost of using the mobile phones, "another disadvantage would be if everyone got it and stuff and they had to pay for it themselves that could get kids in trouble because they won't have the money to pay" (Primary Student 3).

However, the students were all very excited about using the mobile phones for the purposes of this study, “I reckon it's good to try it out because you never know what it's going to be like because you haven't tried it before” (Primary Student 6). Another student reaffirmed this by saying “it's good to try something new that we haven't done before” (Primary Student 4).

Teacher Perception of the Use of Mobile Phones in Classrooms in the Case Study Schools

Secondary Perceptions

Teachers from the secondary school in which this research was conducted were generally supportive of this project and the technology involved. The small group of teachers involved in a focus group, were cautiously optimistic about the role that mobile phones could play in their classrooms.

Of the teachers involved in the focus group, all agreed that they would like to make the decision themselves as to whether or not mobile phone use is appropriate in their classroom. All teachers were confident that the new school policy to be introduced at the beginning of next year would allow them this freedom by removing the current total ban on mobile phone use. Secondary Teacher 1 said, “I would like them to have the option to use them if we need to.” To which Secondary Teacher 2 replied, “I agree I think (having) the option there to use them - I wouldn't like to say whole slather have them on your desks permanently but I think it's more of a case of OK now you may get out your phone and do this with it.”

Under the current mobile phone ban at this school, mobile phones seem to be taking up a large amount of time, particularly in regard to discipline. As Secondary Teacher 1 pointed out, “We've got to stop making it hard for ourselves.” Teachers commented on the 'policing' aspect of the current ban on mobile phones which involves confiscating phones which are used during class. They also commented on the lengths that students would go to in order to use their mobile phones, including leaving class to send text messages in the toilets. Like students, teachers also felt that lifting the current ban on mobile phone use would reduce the 'novelty factor' surrounding the phones and may well result in students using their phones very infrequently.

Teachers were adamant that they did not want mobile phone use to detract from the classroom learning. They could see the use of students' mobile phones in class as being something that they as the teacher would both initiate and control; “I don't want to have to

stand up in every lesson and say we're not using cellphones today. I would rather it was a blanket expectation" (Secondary Teacher 6).

The same teacher reinforced this statement again, saying;

> "I don't want to have to stand there at the beginning of every lesson and say that we're not having a cellphone in this class or we're not using cellphones today and I want them in the bags. But then again that's really easy - just saying at the beginning of the lesson - ok if you've got your cellphones out - whatever you've been doing in between class I'd like them in your bags now, I don't want to see them this lesson - I mean that's pretty simple. To me it's a bit like a calculator. I'm happy to use calculators in the classroom when I think they are appropriate and when I tell them they can use them. It's about the kind of control."

Teachers felt that the students needed to be taught about acceptable use and mobile phone etiquette and that this would be imperative to making the system work. Secondary Teacher 1 pointed out that "they [the students] need to know when it's appropriate and when it's not." Adding that, "as long as you teach kids how to - the rights and wrongs of using them - and the educational use of it."

Teachers shared similar ideas to that of the students involved in the study in relation to the concept of a 'digital divide' or the 'haves and the have nots' and the pressure that adopting mobile phone use in schools might put on students and their families. Secondary Teacher 6 pointed out that "technology works if you've got the money to buy the technology - and I think that in our school that that's one of the really big issues. If we said 'oh yes you can use your phone in class' we're putting pressure on kids to get a phone." Secondary Teacher 4 added that "some of the kids who don't have a cellphone really do feel quite out of it and maybe that will go away but I actually don't think in NZ that that will go away - I think that we have got this really big - not digital divide - it's an economic divide" .

However, teachers also shared their surprise at the number of students who already had a phone and the quality of their phones. As one teacher acknowledged, "yes, there's an economic divide but they have cellphones more than they have computers" (Secondary Teacher 3).

Secondary Teacher 1 commented on the amount of technology students have access to;

> I'm surprised at the number of kids that have iPods too. My kids have been doing something in the last week and I said this is the first time you can take your iPods out as long as I can't hear them then it's fine and I couldn't believe how many kids had iPods." Saying also that she "couldn't believe it - I had the cruddiest old phone that had just broken and I was going around and I was saying now girls you've got to tell me a bit about cellphones I don't know enough about them - what is a good one to buy? And they were showing me theirs - and they all had cameras on them - some of them had really good pixel cameras on them too - not just the little ones.

Secondary Teacher 4 pointed out that, "even the kids in my Yr 9 class - the kids who have no computer or internet at home they all have a cellphone with a camera on it".

Teachers also acknowledged that they had a sense of where the future of this technology was going and the role that it could play in the future even though at this point they may not feel entirely comfortable with the technology themselves.

> I think in the days when they all have got really good cellphones and web access is much better I think it will be brilliant when they have all got decent sized screens and they're all on - what's that thing that will make it go fast? - wireless. I think then I could do some really neat things (Secondary Teacher 2)

While teachers could see the potential for mobile phone use, they cautioned the use of technology for technology's sake. Particularly in regard to students being put in a position where a mobile phone became a required tool for learning, Secondary Teacher 6 questioned "how much of it do they need - I mean it's an interesting little nice tool but is it absolutely essential?" Secondary Teacher 3 supported this by asking, "is it actually enhancing their learning or is it just something to play with?"

Secondary Teacher 6 further questioned the worth of the mobile phone as enhancing education and considered the possible alternatives, "I just think at the moment, even with a cellphone like this which does whip on to the internet and everything - the actual teaching thing in my class is novelty value - if it was a bigger screen and it had a bit more function - if it was an iPhone - a big iPhone with a good camera in it."

This prompted a response from other teachers arguing that while some aspects of current mobile phone use are limited, the limitations teachers are already faced with are so great therefore what do they stand to lose?

Secondary Teacher 5 expressed her frustration in accessing technology with her classes, “when your class cannot get in to a single computer room anywhere in the school - then is it enhancing their learning?”

“If it was using the calculator - then it would be cause they wouldn't be able to do it otherwise - enhancing their learning – maybe.” (Secondary Teacher 4)

To which it was pointed out by Secondary Teacher 6 that,

> “the really big issue for us is the money issue and if we are struggling with getting enough computers for our kids and enough internet access and good internet access - I think cellphones - I mean I know that they fill in another kind of hole - but you know realistically speaking we can't actually do it”. Meaning that yes, mobile phones can potentially meet a need, but right now, our students don't have phones that are fast enough to access the web and we cannot expect them to pay for it.”

Teachers were anxious to question the skills that students now need in order to make sense of the information available to them, especially considering the way that access to the mobile web encourages 24/7 access to information. They were also quick to question how teachers must position themselves in order to deal with this.

Secondary Teacher 6 expressed this saying,

> “that [while] the information might be sitting out there - there's a hell of a lot of information they can access now and it depends on their will to access it, their need to access it and their ability but also it's about somehow accessing information and doing fun things on the internet isn't fun when you are doing it at school but if you are doing it at home and you want to find out about some obscure Prussian general because you read about something in somebody's blog - but doing it at school - even if you are on a blog doesn't seem fine at school and I don't know how you get over that.”

As Secondary Teacher 4 pointed out, while there is a lot of information out there, “you've got to have the skills to do it [find, access and make use of information] and my kids do not have the skills.”

Secondary Teacher 6 explained that

> “there are two different things operating - you need to have the kids wanting to do it which assuming they go on *bebo* isn't assuming they want to do anything else on line. The second thing is that it only works if the teachers know what they are doing and to be honest there are a lot of teachers around who do not know.”

On reflection of the role that teachers need to play in moving to adapt to the availability of information and how to deal with it, Secondary Teacher 6 said “I think a lot of teachers are going to hide away for a while because they actually don't realise...” The same teacher also questioned the shift in pedagogical thinking that may have to take place asking “how much inter-connectedness do we need or is feasible in the classroom situation?”

Secondary Teacher 6 expressed her experience with trying to get students co-constructing content and accessing this via the internet;

> “You see doing things like collaborating online and sharing stuff in actual fact it isn't just about the teachers doing it it has to be a shared experience and that shared experience means that the students have to access. When I see my Year 13s I say did you manage to go and get your notes of the school intranet and you know that stuff you did the other day is on there and you can log on and do this and that and several of the kids have said well I tried to go the the library to get on but there wasn't a spare computer and I can't access it at home. Or when I'm at home I can't download your *Powerpoints* because it takes too long. I put them on Google docs but then they say something like I tried to go on to google docs but my browser was doing...”

Teachers pointed out that while they did have time and opportunities for professional development, Secondary Teacher 5 acknowledged that “everybody wants a little piece of that time - whether it be ICT, key competencies...”

Secondary Teacher 6 pointed out that a big hurdle is still going to be getting teachers on board;

> "The other thing is that the teachers have to have a desire and a want and they also have to be involved in using the internet themselves. It's not going to happen over night - but it's giving them the in to it - it's like they don't understand what a blog is until they find a blog on something they are interested in and then it becomes something they want to do not something they have to do and I think that for those of us who do have an internet life it becomes part of what you do - and you might find you say oh I don't want to go near a computer again. But it's like reading."

The teachers involved in this focus group were looking forward to the opportunities that might be afforded to them as a result of the school being part of an ICTPD cluster for next year and felt that this would be good forum in which to develop new concepts of pedagogy, trial the use of new technologies, and question the future of education.

Primary Perceptions

Unfortunately due to time constraints, a focus group was not possible with a group of Primary School teachers working in the school in which this research took place. However, a small number of teachers responded to a survey questioning the way in which they perceived the use of mobile phones in education and ways that they might consider making use of them in their classroom. As with the secondary school teachers, they were cautiously optimistic about the role the mobile phones would play in the future.

All teachers felt that there was definitely a place for mobile phones in the classroom. Teachers' level of acceptance ranged from those who wanted to make use of mobile phones as simple communication devices as with Primary Teacher 2 who says that "we all need to be able to access information and people all the time, anytime in today's society" through to teachers who were looking forward to devices becoming more capable. Primary Teacher 4 said that they would be interested in embracing the technology once "mobile phones are www [internet] capable and have high quality photo and video". Primary Teacher 6 also supported the idea provided that "the professional development to use these [mobile phones] was in place" and that teachers and students were made "aware of potential misuse".

When asked how they might consider using mobile phones in their lessons, the teachers gave a wide range of suggestions. The focus of all activities was on ease of use and the perceived speed at which activities could be completed. For example, Primary Teachers 4, 6, 7 and 8 all highlighted the use of both the video and still camera on the mobile phone with Primary Teacher 4 saying that this was particularly beneficial as it was “quick and easy”.

Teachers also noted that they would be looking to use the mobile phone as a spell checker, calculator. Primary Teacher 8 was looking to set up the mobile phone as an electronic diary reminder as well as a calendar. A number of teachers also commented on the potential for students to have instant access to email and to communicate with others – for example, to find information from say a scientist (Primary Teacher 6). Primary Teacher 2 was interested in using the polling function with phones to create surveys.

Teachers were surprised by the amount of technology students had access to. However, unlike the secondary school teachers who felt that their students made quite limited use of the technology, Primary Teacher 7 expressed surprise at the way in which their students already used technology in sophisticated ways; “when I asked my class for suggestions as to how they might use a cellphone in class the answers amazed me. They are obviously already using them to access a range of technologies.”

A number of teachers highlighted the potential for use of a mobile phone web browser. In response to the concept of students having 'anytime access' to information via their mobile phone, teachers thought it would be beneficial for a number of reasons including, the speed at which students could access information and reducing the need for computer set ups which are costly and take up a lot of space. Primary Teacher 8 said “I think this will be wonderful as it will make information immediately accessible”. Two teachers commented as to how they thought it might impact their teaching except in one instance, Primary Teacher 7 highlighted the need to ensure students were educated in the safety aspect of the use of mobile phones. Primary Teacher 6 said that they would “embrace” a move to easily and quickly access information and adapt lessons to ensure it was used effectively.

As with the secondary teachers, teachers still had caution surrounding the adoption of mobile phone technology. Primary Teacher 6 expressed their frustration at the idea of

integrating a new technology in to their teaching saying that “with everything else we are expected to do it takes time to plan, trial, adapt and get things right, in order to make it work. That time is rarely if ever made available forcing one to stick to tried and tested methods rather than trying something new”. A number of teachers also questioned the cost of accessing the mobile internet.

Discussion

The findings of this research suggest that while students see the opportunity to use mobile technologies as something that could potentially be fun and exciting for them, they do not necessarily want to have their own personal devices appropriated for school use. Generally, the secondary school students involved in this study had concerns about the lack of teacher control and guidance surrounding the use of mobile phones in classrooms and as to the learning that would take place.

Younger students at Year 8 and to a lesser extent, Year 9, thought that having the ability to access the internet at any time would allow them to personalise and self-direct their learning to a certain extent and saw this as being of great benefit to their learning. However, the Year 12 students who were ending their second year of 'high-stakes' assessment, knew that the teacher had the answers and were skeptical about new methods used by the teacher co-construct knowledge as a class which was both stored and accessed online. Students occasionally voiced concern about the lack of 'notes' given by the teacher for this particular unit of work and at times seemed to be nervous as to the quality of their own information for assessment purposes.

The Year 12 students mostly saw the mobile phones as being 'gimmicky' and of very little value for real classroom learning. They wanted the teacher to closely control the use of the phones, both in the sense of guiding them through very specific learning activities which involved the mobile phone use, but also in terms of classroom management, where students wanted teachers to monitor their use of the mobile phones. It would be my analysis of this situation to say that the students at Year 12 were far less willing to take responsibility for their own learning needs than the students in Year 9 and particularly in Year 8, neither of whom faced high-stakes assessment outcomes as a result of the classroom work they were doing.

The teachers of the secondary students (Year 9 and Year 12) both noticed that by the end of each unit of work the students had 'self-selected' to no longer use the mobile phones. However, the teacher of the primary students noted the opposite effect. In fact towards the end of the unit of work, students were more likely to want to use the mobile phones and

were coming up with their own suggestions for how they might use the phones in other learning activities.

A large number of students involved in this study showed a lack of understanding about information literacy and general skills needed to access the web. While as teachers we are led to believe our students are so called 'digital natives' it is my belief that this is potentially an incredibly damaging term. As we teachers who would therefore fall in to the digital immigrants category are led to believe that our students inherently have the skills and a desire to fluently use new technologies and in particular, the world wide web. The findings of this research strongly suggest that this is not the case.

It was interesting to note the way that particularly older students talked about those who used a lot of technology as being the exception rather than the rule and were often referred to as being different or alternative. Generally, students expressed a desire to learn using more traditional teaching methods and seemed concerned by the rate at which technology was developing and becoming integrated in to schools. These findings would appear to be somewhat in contrast with a number of the articles written by Mark Prensky who coined the terms 'digital natives' to refer to our tech savvy younger generation who have grown up with technology and 'digital immigrants' which incorporates the generation of our teachers, who use technology but do not find it as easy as their students.

Students at all levels made mention of finding the small screen of the mobile phone difficult to use, the navigation with only a number key pad awkward and found that using a device unfamiliar to them took some time to get used to. While by enlarge the students were very quick at sending text messages and learning new games found on the mobile phones, particularly the older students found navigating the new phones and the internet difficult. Once again this in contrast with a number of Prensky's articles including, *What can you learn from a cellphone? Almost anything* (2004) and *But the screen is too small* (2003).

One of Prensky's most recent articles states that 'too many teachers see education as preparing students for the past not the future" (2008 p.1). However, my findings suggest that particularly our older students are demanding an older, more traditional style of education in order to feel prepared for the assessment tasks that they will be facing as part of NCEA. This does not mean that NCEA demands traditional teaching and assessment

procedures, in fact as a secondary school teacher myself, I believe quite the contrary to this. However, this is beyond the scope of this project.

What this does mean however, is that as teachers we are being led to believe that our students inherently possess the necessary skills and a desire to use new technologies, and particularly the internet, in order to support their learning. The findings of my research do not support this – particularly at upper-secondary level. However, it would be interesting to see whether or not the Year 8 students involved in this study change their values by the time they near the end of their secondary schooling to match those of the Year 12s involved in this study.

The impact of this that I can see is teachers are being both led to believe that students have skills in accessing particularly the internet that they as teachers do not have, and that therefore the students can be largely left to their own devices (within the confines of a well setup 'net nanny' service of course) to find and access information freely from the internet. This is leading to students being set internet based 'research' activities for homework with very little guidance as to how to go about finding the desired information, or more importantly what to do with it. Secondary teachers from the school which this study took place in had been exposed to very few professional development opportunities in information literacy in comparison to the primary school teachers. Another factor that could also affect the delivery of information literacy skills in the secondary school context is the segmentation of the curriculum in to subject areas where information literacy belongs to no one curriculum.

From the reading I have done throughout the year, information literacy is highlighted as the single most important skill for fostering life long learning. It is also a literacy that must be integrated throughout all levels of schooling and across all curriculum areas. There are a vast number of models for teaching information literacy that schools can adopt, or schools can develop their own model. However, it seems clear that under the mandate of the revised New Zealand Curriculum and with the rise of massive volumes of information now available 'on-demand' that schools do need to be developing a school-wide approach to information literacy, and teachers do need to be given the opportunity to receive professional development in this area. Many teachers feel that information literacy is the domain of the ICT curriculum and this is incorrect. The ICT teachers have their own

curriculum content to deliver. A key place to start with a school-wide information literacy programme would be the school library.

Mobile technologies are becoming mainstream. Children of younger ages are now being given mobile phones by their parents for security reasons. Older teenagers are wasting class time texting in their pockets or leaving class to send text messages. Much research has been done on the way the brain functions when sending text messages via a mobile phone – particularly in regard to doing so whilst driving. The research suggests that functionality of the *ratio communis*, or decision making section of the brain reduces when a person engages in the act of sending a text message.

Therefore, although we have rules which ban mobile phones and often consequences for breaching this ban, anecdotal evidence suggests our students are still spending valuable class time on their mobile phones, completely disengaged from the content that is being covered. Schools need to be addressing this problem and it would seem that simply banning the use of mobile phones during class or school is not solving this problem. A number of schools that I have spoken with are currently in the process of changing school policy to see mobile phones being allowed at school and to be used for classroom activities under the teacher's guidance. While this will not solve the problem of students texting during class, certainly it would seem that removing the stigma from mobile phone use could go some way to improving this.

The potential for mobile phone use in classrooms is exciting. While many of the applications undertaken for this research project are currently costly and therefore impractical, it would seem that we are now at a time where we can begin to implement their use slowly. Many of the older students spoken to seemed to believe that we should wait until for the ultimate device. I disagree. I think we should be beginning to think about ways that we can use the devices already in our students' pockets to enhance their learning so as when new technologies develop and data access becomes more ubiquitous (probably in the form of wifi devices) that teachers and students can seamlessly add these new tools rather than running to catch up.

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Appendix

Information Literacy Survey - Yr 9-13 Teachers

1. Which subject area do you teach in?

2. What Professional Development, if any, have you had in the area of information literacy?

3. What is your understanding of the term information literacy?

4. Give examples of activities you might use or have used to teach information literacy skills in your subject area?

5. What impact do the following factors have on the way information literacy is taught in your

6. What do you see as barriers to the inclusion of information literacy in your lessons?

7. Do you have anything else you would like to add?

Information Literacy and Mobile Phone Survey - Yr 1-8 Teachers

1. At which year level do you teach?

2. What Professional Development, if any, have you had in the area of information literacy?

3. What is your understanding of the term information literacy?

4. Give examples of activities you might use or have used to teach information literacy skills in your subject area?

5. What impact do the following factors have on the way information literacy is taught in your subject area? Please provide detail on the impact of these factors.

6. What do you see as barriers to the inclusion of information literacy in your lessons?

7. Which functions of a mobile phone do you think might be most useful in the classroom and how might you use these?

8. Through using the internet on a mobile phone, students can have "anytime access" to information. What impact do you think that this may have on education and the way you teach?

9. Do you think there is a place for mobile phones in the classroom? Please explain the reasons for your answer.

10. Do you have anything else you would like to add?