

Department of Media and Information

**Tech savvy or tech oriented? Information-seeking
behaviour and the Net Generation**

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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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Date: 10 December, 2012

Abstract

This thesis is an in-depth investigation into the information-seeking behaviour of the so-called Net Generation, Generation Y or Millennials using a target population of young people at the upper age limits of this group (students aged 18 to 22 at the time of this study). Very early in the history of the Internet, young people were observed to be using new technologies associated with the Internet and the World Wide Web with ease, and terms such as ‘digital native’ and digital immigrant’ became very popular in social commentary and the popular press. As a result, a growing body of educational practitioner and academic literature, as well as social commentary in the popular media emerged, and for the first time, attributed a set of technical and information-seeking skills to young people born after a particular date. This idea of a Net Generation that is tech-savvy, and by default, information-savvy, has continued to have resonance with educators, politicians and the general public. It has affected political and systemic educational thinking and decision-making despite a growing body of academic research which has produced evidence to the contrary.

This research investigates the Net Generation’s personal perceptions of how they use a range of technologies and their emotional response (confidence levels) to using these technologies according to the Net Generation attributes as outlined in the practitioner literature and the popular press. It then examines closely, how a group of young people were actually using these technologies to find information using the Internet and electronic resources, to determine whether the Net Generation attributes accurately reflect what young people are doing in practice. Any assumptions being made about the information-seeking behaviour of today’s students need to be closely examined to ensure that tomorrow’s citizens are not disenfranchised or disempowered as users in a world in which government, education and economic information; and the provision of essential services is provided wholly online. Hence the overarching premise of this study centres on the belief that a greater understanding of how young adults seek and interact with information and the online environment, is an important first step in developing strategies to prepare them for tertiary education, the workplace and a future that will be characterised by an increasingly complex and constantly evolving information landscape.

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Dedication

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Chapter 1 - Introduction

1.0. Introduction

This thesis is an in-depth investigation into the information-seeking behaviour of young people born after 1984. These young people are now approaching their mid-twenties and have been categorised by social commentators, theorists and the popular press as members of a particular generation. Assigning certain characteristics to younger generations is not something new and can be observed in quotes attributed to Socrates (Quoting Quotes, 2012). Since World War Two social commentators and the popular media have created catchy labels and assigned an associated list of characteristics for each new generation which have typically included social commentary on personal values; attitudes to work, politics, and leisure; and changing fashion in clothes and music (McCrinkle, 2012a). While the labels and characteristics assigned to each generation and the length of time each generation lasts may differ slightly, several defined groups have emerged during the last century. These are the G.I. Generation (1900-1924), the Silent Generation (1925-1945), the Baby Boomers (1946-1964), Generation X (1965-1979), the Millennials or Generation Y or the Net Generation (1980-2000), Generation Z (2001-2010) and Generation Alpha (2010+) (Huntley, 2006; McCrinkle, 2012a, 2012b). The demarcation lines between each generation are closely associated with political and social changes and the characteristics assigned to these groups are a reflection of these changes. For the purpose of this research investigation the group known as the Millennials or Generation Y will be termed the Net Generation, with a start date that aligns with the introduction of the Internet Domain Name System (DNS) in 1984 and an end date (2008 at the time of this study) that includes the members of Generation Z.

This introduction provides some general background information which examines briefly the origin of the idea of a Net Generation; its impact on education, e-governance and the workplace; and issues that have been explored in a growing body of academic literature. It concludes with a summary of this

study outlining the research investigations, key concepts, the research method and limitations, the significance of the research, key findings and an outline of the dissertation.

1.1. Background to research

A major change in society during the last thirty years has been the emergence of computers, the Internet, the World Wide Web (WWW) and global information communications technologies (ICTs). This change is recognised as being so profound that the current historical period is now being referred to as the Technological, Digital or Information Revolution by social commentators and historians, to distinguish it from the pre-Internet Industrial Revolution era (Freeman & Louca, 2001; Duff, 2003; Grazian, 2005). Since its invention, the Internet and the WWW, and the speed with which computers have become an almost ubiquitous part of everyday life has signalled a major social and cultural shift in the way people live, work, and play (Ito, et al., 2009). This shift has been particularly noticeable in the last five years with the advent of affordable mobile technologies which are multifunctional devices designed to give the user access to the wider world through the Internet/Web at anytime and from anywhere (Weldon, 2012). The importance of this shift is reflected in certain attributes assigned to the generations of children born after developments in technology that led to the creation of a publicly available, worldwide global network, the Internet. For the first time social commentators and generation theorists have assigned a range of skill-based attributes to members of the Net Generation, based on the premise that constant exposure to technology from birth automatically means young people must be able to use it efficiently and effectively (Tapscott, 1998, 2009; Strauss & Howe, 2000; Prensky, 2001; Tulgan, & Martin, 2001, Palfrey & Gasser, 2008).

1.1.1. Origins of the idea of a Net Generation

The idea that members of the Net Generation have an in-depth grasp and almost 'intuitive' knowledge of how to use technology simply because they have never known a world without the Internet and technological change, first appeared in 1998 in the popular press in a social commentary by Donald Tapscott titled *Growing up digital: The rise of the Net Generation* (Tapscott,

1998). The Internet has also had a profound effect on the way society publishes and disseminates information. Hence, this title was published in print as well as on a web site, with some parts freely available to the general public. Even though this title was published nearly fifteen years ago the idea of a ‘tech-savvy’ or ‘Internet savvy’ generation has persisted. In 2001 another social commentator, Marc Prensky, first coined the terms ‘digital natives’ to describe members of the Net Generation and ‘digital immigrants’ for anyone born before the Internet and ICTs became such a major part of the information landscape (Prensky, 2001). These labels have since become general descriptors in the popular media. Digital natives are described as tech-savvy, while digital immigrants are constantly trying to acquire the technological skills the natives are pre-programmed with from birth. Terms such as tech-savvy from the French word *savant*, implies that young people are extremely knowledgeable about the technologies they use in all contexts (Merriam-Webster, 2012). Hence, young people are tech-savvy when using the Internet for entertainment and leisure, business and personal transactions, and for education and information-seeking purposes. They are considered to be tech-savvy in all contexts.

The ideas and terminology first coined by social commentators such as Tapscott and Prensky who were observing an emerging technology consumer in action during the very early days of the Web, have been adopted by educational practitioners and some educational academic researchers. Both groups use the Internet as a global advertising forum and as a consequence the idea has been picked up by the popular press and other academics, to such an extent that these labels and the attributes assigned to the members of the Net Generation appear to be commonly accepted as fact. A number of online books such as *Millennials Rising: The Next Great Generation* (Howe & Strauss, 2000) and *Educating the Net Generation* published by Educause (Oblinger & Oblinger, 2005a); academic journals such as the *Innovate Journal of Online Education* (now ceased publication) (Nova Southeastern University, 2009); education websites and projects such as the *Net Generation Education Project* (Lindsay & Davis, 2012), the *Digital Natives Project* through Harvard University (concluded) (Harvard University, 2011), *Project Tomorrow* (Project Tomorrow, 2012); and research conferences such as EDUSummIT (Kennisnet, BECTA & ISTE. 2009;

UNESCO, 2011) and the New England Regional Association for Language Learning Conference (New England Regional Association for Language Learning, 2010) have become part of the academic discourse. New publications, projects and conferences continue to foster the ongoing perception that this new generation are intuitive, tech-savvy users of the Internet and ICTs.

1.1.2. Impact of the Net Generation idea on education

While there is no doubt that technology has affected, and continues to affect the way we live and influences nearly every aspect of our daily lives, the idea of a Net Generation requires closer analysis. Ongoing, rigorous research is needed to determine whether the attributes assigned to young people are based in fact, or are merely observations that describe what young people appear to be doing when using technology, rather than their actual information-seeking skill levels and achievements. Rigorous research is also needed to establish if young people approach information-seeking in a consistent manner, ie. they use the same methods for information-seeking across all contexts. The significance of the labels and the growing body of popular, practitioner and academic literature that supports the idea of a Net Generation cannot be understated. Much of this literature is freely available on the Internet where the nature of the medium ensures that the theory is re-circulated and kept in the forefront of the popular media and society in general. The idea of a tech-savvy generation has also been widely adopted by educators seeking innovative ways to cater for a generation of students who are often socially and intellectually disengaged from school, and where technology is posited as the missing element needed to make school relevant to the current generation of students.

Labels such as tech-savvy, Web-savvy, Internet-savvy and computer-savvy are used to describe how young people use technology in major educational policy documents such as the US Department of Education's national technology plans *Toward a New Golden Age in American Education* and *Transforming American Education: Learning Powered by Technology* (U.S. Department of Education/Office of Educational Technology, 2004, 2010); and *Voices & Views from Today's Tech-Savvy Students*, part of a national report sponsored by the non-profit group NetDay (NetDay, 2004; Murray, 2004). In

these systemic education policy documents students are assumed to have a level of proficiency when using the Internet and electronic resources. This proficiency includes all contexts including information-seeking. Students quoted in the first US national technology plan developed in 2004, insisted they were different. One student summarised this attitude by boasting: ‘we have technology in our blood’ (U.S. Department of Education/Office of Educational Technology, 2004, p. 10). In these major policy documents it is the teachers who are described as the ‘*digital immigrants*’ and who need to play catch-up if they are going to meet the needs of a generation of users who are already proficient.

The Australian Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) ICT in Schools Taskforce reports *Students in a Digital Age: Some implications of ICT for teaching and learning* (Ainley & Searle, 2005) and *Student use of, and engagement with information technology* (Ainley & Enger, 2007), also rely heavily on the idea of a Net Generation as promulgated by social commentators such as Prensky and Tapscott. These reports also use OECD (Organisation for Cooperation and Development) (OECD, 2005) and UNESCO research data (Blurton, 1999) which report heavy use of the Internet and ICTs by young people, particularly in the home environment. Another major publication from MCEETYA in the series Learning in an Online World is the *Pedagogy strategy* document which introduces the context of the report by stating that ‘the current generation of students was born into a highly technological world. They inhabit, navigate and communicate within a society which is both technologically-rich and information-rich’ (MYCEETYA, 2005a). Implied in this document, is the fact that students are already proficient when using technology (Buchanan & Chapman, 2009). MYCEETYA has since evolved into the Australian Information and Communications Technology in Education Committee (AICTEC). The latest publication in the Learning in an Online World series *Digital education – Making it happen*, is described in the document as a framework and ‘a guide for reflection, and strategic planning for the integration of ICT teaching, learning and administration’ (MYCEETYA, 2008). The underlying premise for all these systemic reports and guidelines is based on the

assumption that use and familiarity with technology/ICTs by young people equates with effective and efficient information-seeking skills in all contexts. At no stage during both the early adoption phases beginning in the late 1990s and the current programs to place technology into schools at both the state and the national level in Australia, has the capability of young people when using technology been questioned.

These systemic education policy documents use the early observations of Tapscott and Prensky as benchmarks and foster the perception that young people from the Net Generation already have the necessary skills to use ICTs when seeking information. It is schools and teachers who are lagging behind. As a result, a major implication is that teachers need to integrate use of the technology rather than the teaching of information skills in curriculum programs. Similar attitudes prevail in political systems outside Australia. Hence, one of President Obama's major initiatives to create jobs and prepare the United States of America (USA) economy for recovery and a major role in the twenty-first century, includes the modernisation of schools, access to broadband infrastructure, wireless and 'next generation facilities, technologies and applications' for all students (Prabhu, 2008).

In Australia, the perception by government and the general public that computers and ICTs are essential prerequisites for educational success is exemplified by the Commonwealth Government's Digital Education Revolution (DER) scheme (Commonwealth of Australia, 2011a). New projects include the ICT Innovation Fund which is led by Education Services Australia (*Teaching Teachers for the Future* and *ICT in Everyday Learning: Teacher Online Toolkit*), the NSW Department of Education and Communities (*Anywhere, Anytime Teacher Professional Learning*) and Principals Australia (*Leading ICT in Learning*). Participation by schools is decided via a funding model where schools must apply to be involved. These projects are current and due to run from 2010 till 2012. The latest media releases from the Commonwealth Government Australia report that the *National secondary school computer fund* has exceeded its target to provide computers for students in Years 9 to 12 (Commonwealth of Australia, 2011b). While professional development for

teachers is acknowledged as a pressing need in the DER program, nowhere does the issue of skills development arise for students. As in the past, the main focus of this and many other programs has been about getting the technology into schools, rather than in-servicing teachers and teaching students. These programs, like others being implemented by education systems and governments around the globe, appear to assume that students already have the necessary skills to be able to operate effectively and efficiently in a digital world.

Initiatives by both Government and educational policy makers in Australia have been described as part of the 'digital rhetoric' where ICTs are defined as the main driver for innovative education and training systems (Buchanan, & Chapman, 2009). Buchanan and Chapman argue that this 'imperative to employ technology, the imposition of ICT is taking place within a contentious field containing multiple players with competing agendas, different hierarchical positions and contested power relations' (Buchanan and Chapman, 2009, p.2). Baskin and Williams maintain that 'like Western governments worldwide, in Australia computing technologies are considered a motherhood solution to the needs of a highly skilled and technologically capable workforce' (Baskin & Williams, 2006, p.455). Bennett refers to the continued focus by education systems to get technology into schools and universities as a 'moral panic that restricts critical and rational debate' (Bennett, Maton & Kervin, 2008, p.776). Stoerger (2009) contends that the labels and attributes assigned to young people have resulted in the marginalisation of teachers and anyone else who doesn't exhibit the skills assigned to this generational group. Such labels also 'imply that the immigrant can never become a native, which may have served to excuse individuals without tech skills' (Stoerger, 2009) and consequently, the uptake of technologies in universities and schools by many educators has been relatively slow (Combes, 2005a; Combes & Valli, 2007; Buchanan & Chapman, 2009) due to lack of support, resources and teacher expertise. As a result, educators at all levels of education often seem to make assumptions about students' technology skill levels and fail to embed the teaching of technologies and information skills within the context of the curriculum (Combes, 2009). Thus the impact of the idea of a Net Generation on education at both the state and national level in Australia has been extensive, with major funding being

allocated away from other resources and staffing to technology infrastructure and equipment. This impact is not limited to Australia, but part of a global push to get technology infrastructure, hardware and software into schools. A result of this technology imperative has been the ongoing pressure by Net Generation social commentators, education researchers, systemic decision-makers and politicians on educators to modify their teaching practices to accommodate this new type of tech-savvy learner (Hay, 2000; Billings, 2004; Jukes & Dosaj, 2004; Millea, Green & Putland, 2005; Gaston, 2006; Oliver & Goerke, 2007; Prensky, 2007; Feiertag & Berge, 2008; Rikhye, Cook & Berge, 2009).

1.1.3. The Net Generation and eGovernance

The fact that young people use technology heavily and appear very confident is a major component of the rationale that supports the idea of a Net Generation. It is important that we know exactly what students are doing if we are to prepare them for the workplace and society in general in the twenty-first century. Governments and information agencies worldwide are currently employing digital initiatives which will ultimately make all government information and services transparent and publicly available via e-government Web portals. The Australian *Responsive government: A new service agenda, 2006 e-Government strategy* signalled a new era in service delivery. The strategy supports the move towards online service delivery for all government agencies and states that citizens will ‘prefer the added convenience and functionality of online, electronic and voice-based channels, which they will use frequently’ (Commonwealth Government of Australia, 2006, p. 8.). The latest document from the Australian Commonwealth Government is the *#au 20 national digital economy strategy* (Department of Broadband, Communications and the Digital Economy (DBCDE), 2011). The focus in this strategy is on infrastructure, security and physical access to the Internet and how technology will ‘improve health and aged care, expand online education and improve online government service delivery and engagement’ (DBCDE, 2011). However, there is no mention about training citizens for the acquisition of information-seeking skills which will enable Australians to locate and make use of essential Government information and e-services. Are these omissions due to a

fundamental assumption that future citizens or today's Net Generation already have these skills and do not require additional training?

Digital information repositories are also a feature of the corporate world, as the almost ubiquitous use of computers and ICTs in the workplace produces an ever increasing amount of information. The endorsement of environmentally-friendly solutions to information storage, also make digital solutions very attractive. Supporters of e-government and e-business solutions argue that digital information is more cost effective, easier to store particularly with the advent of cloud computing, easier and faster to produce, easy to manipulate and with search engine technology, easier to locate (Commonwealth Government, 2006). Governments also argue that information accessed by electronic means is catering for the next generation who prefer and already have the skills to access information in this format. For citizens in the twenty-first century, government and public information is increasingly being published only in digital format, as evidenced by the Federal Government Publishing Service and the Western Australian state government job information which are now wholly online (Commonwealth Government of Australia, 2012; Government of Western Australia, 2012). In the current climate of budget cuts the Australian Commonwealth Government is looking to electronic advertising and publishing to save waste in the public service (Brinsden, 2012). Being able to locate, interpret and use information online is going to be an essential skill for citizens in the future. Thus, if assumptions are being made about the capabilities of today's students when searching for information in the online environment, their skill levels need to be closely examined to ensure that tomorrow's citizens are not disenfranchised or disempowered as users in a world where government, education, economic information and the provision of essential services is provided wholly online.

1.2. The problem with the Net Generation idea

Is there really such a being as a '*digital native*' or a '*digital immigrant*'? The speed of technological change has meant that descriptive labels concocted by the media and social commentators observing what young people appeared to be doing with technology during the early days of the Web, pre-date any

rigorous research studies. The original labels coined by Tapscott and Prensky were first published twelve to fifteen years ago. This is a long time in the world of technological change, especially when the World Wide Web and browser technology which made the Internet easily accessible to the average citizen only became popular and widely used at the same time these terms first appeared. Researchers investigating how youth and society in general use technology for entertainment, social communication and information-seeking, have struggled to keep up with the rapid developments and constantly evolving nature of a range of convergent and increasingly mobile technologies. The volatility of this new information landscape has ensured that any negative feature or consequence of one technology is quickly being superseded by a new technology before use of the older technology has been subjected to rigorous research which may have previously resulted in the acquisition of a negative reputation for that technology (Combes, 2009).

A strong body of rigorous academic research since 2004, however, indicates that young people aren't as tech-savvy as suggested by the popular media and the proponents of the Net Generation idea, particularly when seeking information on the Internet. Longitudinal studies such as those funded by the Joint Information Systems Committee (JISC) (JISC, 2012), the *UK Children Go Online* study (London School of Economics, 2006), the PEW Research Center Internet and American Life Project (PEW, 2012), and the *Information Behaviour of the Researcher of the Future* (Nicholas, Rowlands & Huntington, 2008) report that while young people are using the Internet, they do not necessarily exhibit the Net Generation attributes. A range of other research studies, educational and media reports published during the last seven years also support the findings of these longitudinal and meta analysis studies (Kennedy, Krause, Gray, Judd, Bennett, Maton, Dalgarno & Bishop, 2006; Bayne & Ross, 2007; Bennett, Maton & Kervin, 2008; Beinhoff, 2011; Thomas, 2011b). University lecturer Christopher Scanlon's observations in an article published in *The Australian Higher Education Supplement* succinctly summarises what teachers at the coalface have suspected and researchers are now discovering about how our young people use the Internet and ICTs. Scanlon observed that:

... despite the hype about digital natives' technological skills, the reality is that most students don't come to class with technological knowledge pre-installed.

He also says:

Those writing about digital natives confuse the ability to navigate around ready-made online environments or download content from the Net for a general ease with technology. ... Far from helping so-called digital natives, we may be creating large numbers of digital refugees: people who are lost when it comes to using technology simply because nobody sat down and showed them how to use technology, or use it effectively (Scanlon, 2009).

The idea of a Net Generation is based on the premise that familiarity or the length of time one uses technology equates with efficient and effective use, and these achievements are applicable to a specific group of young people because they have grown up surrounded by this technology. If the logic behind the Net Generation theory is correct, then does this also mean that children born into this same era where cars/motor vehicles are the norm, will therefore not only drive, but be good drivers simply because they have never known a transport landscape that is different? In the case of driving ability, such logic is problematic and not supported by research data which indicates that young people under twenty-five are more likely to be in a traffic accident and more likely to be better drivers if they have undertaken extra driving tuition (Commonwealth Government, 2008; National Road Safety Council, 2012). Driving a car requires more than the mechanical skills of operating the machinery. A good driver also needs to know the road rules, be able to scan the road to anticipate problems, have excellent reflexes to avoid problems as they occur and read the road as a total environment that is in a state of constant change and characterised by a moving landscape. As with the driving analogy, using technology efficiently and effectively, particularly for information-seeking, requires a certain amount of knowledge and a range of skills ranging from operational skills through to comprehension, problem-solving and analytical thinking. Making assumptions about how well young people use technology that is based on observation and how long they have been exposed to technology which may be highly variable, is essentially flawed, yet this argument persists in the popular media, educational practitioner literature and sections of the academic discourse.

1.3. Summary of research

1.3.1. Research question and objectives

This thesis seeks to determine how the Internet and the emerging culture of technology use around it influence information-seeking behaviour, specifically in young adult Internet users. To answer this question the research will:

1. investigate young adults' information-seeking behaviour and their perceived and actual skill levels when using Information Communication Technologies (ICTs) to access electronic information resources;
2. explore critically the notion that young people from the so-called Net Generation have a different culture of technology use when seeking information on the Internet.

By using the Net Generation attributes as a baseline, this research will examine how young people think they are using the Internet and technology for a range of activities to establish if they fit the ideal of a Net Generation. The research will also explore how young people feel about themselves when using technology, since the confidence with which young people use technology is one of the tenets of the idea of a Net Generation. The research will:

1. provide further evidence about the information-seeking behaviour of young adult Internet users;
2. add valuable data to the emerging research on the changing culture of information-seeking behaviour and the use of ICTs and electronic resources amongst young adult Internet users;
3. inform diverse areas of scholarship about the information-seeking behaviour and skill levels of young adult Internet users currently attending university; and
4. make recommendations to inform the integration of information-seeking behaviour in educational curriculum development and delivery.

1.3.2. Key concepts

Key concepts and terms used throughout this dissertation and their prescribed meanings are listed below.

Attributes

The term attribute is defined by the Cambridge Dictionary as ‘a quality or characteristic that someone or something has’, while characteristic is defined as ‘a typical or noticeable quality of someone or something’ (Cambridge University Press, 2013). The Collins English Dictionary (2013) defines an attribute as ‘a property, quality or feature belonging to or representative of a person or thing’, while the Merriam-Webster Dictionary describes an attribute as ‘a good quality or feature someone has, an inherent characteristic or accidental quality’ (Merriam-Webster Inc, 2013). The term attributes and characteristics are used interchangeably throughout the Net Generation literature to indicate a quality or inherent ability unique to a particular age group, to use technology, and to find and also use information. According to this hypothesis these abilities are based solely on the fact that young people have been brought up during a time where technology has always been a feature of their information landscape. The proponents of the Net Generation idea maintain that these attributes affect how young people find and use information using online and electronic resources. The relationship between a proposed set of attributes (Net Generation qualities young people have based on the time they were born), and whether these attributes translate into effective information seeking behaviour is at the core of this research. Proponents of the Net Generation idea argue that the Net Generation attributes mean that young people are effective users of technology and effective information seekers. This thesis explores this hypothesis to determine if the postulated attributes of the Net Generation actually mean young people are tech- savvy as well as information-savvy.

Culture of technology use

Culture is defined by the Cambridge dictionary as ‘a way of life, especially the general customs and beliefs of a particular group of people at a particular time’ (Cambridge University Press, 2013). The Oxford dictionary defines culture as ‘the ideas, customs, and social behaviour of a particular people or society’ (Oxford University Press, 2013). In this thesis the term *culture of technology use* is used to describe an emerging set of observable behaviours and beliefs by young people (aged 18-22 years) about how they use technology. The term culture of technology use in this discussion is more than a description of how

young people search for information, and includes feelings of confidence and beliefs about themselves as technology users, and how these beliefs affect their use of technology.

Digital native

First coined by Prensky (2001), this descriptor has now become an acceptable term in the English language and is defined in the Collins Dictionary as ‘a person who has been familiar with information technology since childhood’ (Collins, 2013). Prensky (2001) uses the term to describe young people as ‘native speakers of the digital language of computers, video games and the Internet’ and maintains that young people have a different way of learning and seeking information predicated on their proximity to technology. Prensky’s idea of a digital native used observations and attributes assigned to this group by Donald Tapscott (1998) in an earlier study. The term digital native has significant and ongoing resonance with the public and popular media. In this thesis the term Net Generation refers to all children born after 1984 and is used in preference to the term digital native. The characteristics and attributes of a digital native as defined by Prensky, are examined in detail in Chapter Two of this thesis.

Information-seeking behaviour

In this thesis the term information-seeking behaviour refers an holistic process that is complicated; often social, emotional and interactive; and requires decision-making and interpretive skills to deal with information that may range from simple fact gathering to extremely complex data analysis, problem-solving and the creation of new information. Information-seeking in this context is more than just looking for information. It represents a fundamental set of behaviours and strategies for dealing with the complexities of dealing with information in a landscape that is constantly changing due to developments in technology. This study examines how a specific group of young people aged between 18 and 22 (upper ages of the Net Generation) use a range of technologies and the Internet to locate and interpret information. The focus of this study is on the behaviours, and feelings evidenced by the information seeker rather than the delivery mode or the context.

Net Generation

The Net Generation is a term first used by Donald Tapscott (1998) to describe young people using technology when the Internet first became publically available in the United States of America in 1995-1997. For Tapscott, children born after 1984, the date used in this thesis, is used to define members of the Net Generation. Other popular labels used to distinguish this group include Millennials, Generation Y and Generation Z. The attributes Tapscott assigned to this group include both technical aptitude and a different attitude (confidence) to using technology. Both aptitude and attitude were used as a baseline to develop Phase One of the research, the anonymous Web survey. Tapscott's observations about the Net generation are discussed at length in Chapter Two in this thesis.

1.3.3. Research method

To examine how young people are using the Internet and electronic resources for information-seeking, both quantitative and qualitative research methods were used. A Web questionnaire was used to collect some baseline, empirical data about the types of technologies used by a group of young people and how they feel about their technology use. The anonymous nature of the questionnaire allowed participants to participate without prejudice. The Web questionnaire was followed by two tasks conducted with forty volunteer participants (20 males and 20 females) who exhibited a range of attributes associated with levels of use and confidence as determined by an ING (Index of Net Gen-ness) metric. The ING metric was calculated using the results of the Web questionnaire to describe each participant's levels of use (Effective Domain) and confidence Affective Domain). Using the metric allowed for an holistic description of each participant, rather than basing the description on levels of use as the single determining factor. The tasks were recorded using the usability software *Morae* which allowed for each participant's think alouds to be recorded, video recordings of their body language and facial expressions, and tracking of their information-seeking via the Internet and electronic resources on the screen. Using the *Morae* software enabled a detailed picture of exactly how participants were engaging and interacting with technology for information-seeking. Lastly, the tasks were followed by a semi-structured, in-depth interview as a reflective exercise to explore how this particular group of young

people used the Internet for information-seeking, their levels of confidence and how they felt about technology in their lives.

The empirical data from the Web survey was analysed using descriptive statistics, a cluster analysis and correlation statistics. The interview and task data uses pattern graphs as well as frequency of activity graphs using the *Morae* software to establish any emerging patterns of use. Detailed notes of verbalisations, actions and activity were also recorded during the tasks and the interviews, as well as notes from post interview discussions. Samples of these are provided in the Appendices.

1.3.4. Significance of research

The Net Generation theory contradicts traditional information theory which contends that information-seeking behaviour is a complex activity that is affected by cultural, educational and social contexts (Kuhlthau, 1991, 1993, 1994, 1996; Dervin, 1998; Case, 2002; Godbold, 2006; Shenton, 2004a, 2007). Anecdotal evidence from schools and universities support an emerging body of research which indicates that while young people actively and confidently use technology, they do not use it as described by the proponents of the Net Generation. The idea of a Net Generation is based on the early observations and social commentary of a few highly publicised individuals who relied heavily on observation and used catchy labels to describe how young people were using the Internet and electronic resources across a range of contexts, rather than basing their findings on rigorous academic research. There is a huge gap between the attributes assigned to the Net Generation and emerging research reports which indicate that today's students do not use the Internet and associated technologies either efficiently or effectively when seeking information. Much of the early commentary and research about the Net Generation also tended to concentrate on asking young people to describe their levels of use and what they thought they were doing, rather than examining exactly how they were using the Internet and ICTs for information-seeking. Neither side of the current discourse satisfactorily explains or describes how young adults use the Internet and electronic resources to satisfy their information needs. Therefore, the overarching premise of this study centres on the belief that a greater

understanding of how young adults seek and interact with information; and the attitudes, beliefs and feelings they bring with them when engaging with information in the online environment; is an important first step in developing strategies to prepare them for tertiary education, the workplace and a future where online information will be the norm. As more information is placed online, governments turn to 'virtual' service provision, education systems embrace elearning initiatives and economies use ICTs to conduct business; this investigation provides a timely check-up of this next generation and their actual capabilities to use technology for effective information-seeking.

1.3.5. Limitations of the research

As with all research studies where a small target population is used to collect data, it is not possible to make generalisations about a whole population or in this case, a generation. This is a major flaw in the idea of a Net Generation since proponents do not consider the variables introduced by socioeconomic status, educational opportunities, language, cultural/ethnic and religious differences, all of which may affect an individual's capacity to access and engage with technology. Since this research used the Net Generation attributes as a starting point, the only constant variable for the target group whose behaviours are examined is their age – between 18-22 years or the upper end of the Net Generation group. Limiting the age group was convenient for the researcher since these participants were easier to access, however, this age distribution does not consider younger members of the Net Generation who may be using technology differently to their older counterparts. This factor is explored to some extent in the research.

This research can only provide an in-depth picture of how a specific group of young people in the upper end of the Net Generation age group were using a range of technologies at a specific time in their lives. In this case the data collection occurred during a twelve month period from early 2007 to early 2008. It represents a snapshot in time. While new technologies have since emerged, recent research studies discussed in Chapter Two indicate that the findings of this study are still valid. This study also provides additional, in-depth information about how this group were using and felt about their information-

seeking capabilities using the Internet and electronic resources and as such is a valuable contribution to the overall research in this area.

1.3.6. Key findings

Key findings from the research are summarised below. Findings from the anonymous Web survey were explored further in the tasks and interviews. The Web survey was used as a filter for the selection of participants for Phase Two of the data collection.

- The participant group overall, presented as very homogeneous in nature, both in levels of use and levels of confidence, and how they were using technology in their everyday lives. Findings from the data collected in Phase One (Web survey) was consistent with data collected in Phase Two (tasks and interviews).
- Participants consistently exhibited high frequencies of Internet use. Most of the participants were using technology or the Internet on a daily basis for a variety of purposes. However, twenty percent (20%) maintained they disliked using technology. Gender, length of time using the Internet and frequency of use did not influence significantly how participants used technology or how they felt about themselves as users. This was not the case for confidence which was a major factor that influenced how they used technology, the technologies they used and how they felt about using technology for information seeking and a variety of purposes in their everyday lives.
- Participants exhibited high levels of confidence across all phases of the data collection. However, they were using a limited range of technologies, with specific groups engaging with online services, Web 2.0 utilities and a range of software and hardware. The use of technology appeared to be more closely aligned with meeting a specific need at a specific time in their lives. Most participants were very confident they would be able to use a future technology to meet a need if required and the mobile phone and the printer ranked highest in importance for technologies they used on a regular basis.

- Nearly all of the participants taught themselves how to use the Internet. Participants received little formal instruction on how to use the Internet and electronic resources to find, extract and interpret information to meet their needs. While participants were extremely confident about their ability to find information they were less confident about their ability to re-find, manage and use the information they found (information literacy).
- Most participants had difficulty reading and interpreting information presented on the screen. They preferred to print information that required deep reading and analysis. As a result most participants did not finish the tasks and satisficing (near enough is good enough) was a common behaviour. They also exhibited a new behaviour, termed 'snatching' in this thesis, where they only examined the first four results on a page and downloaded these without examining the title of the page, the URL or the abstract. This behaviour occurred on the public domain Internet and was transferred to databases within closed systems such as the library, suggesting that this was an entrenched behaviour or habit. Trust in search engine technology to provide the right answer was evident across the participant group.
- Only two closely related information-seeking strategies were in evidence and common misconceptions and patterns of behaviour suggest that these participants have a culture of technology use when using the Internet. These findings suggest that how participants used the Internet for information-seeking is predicated on how they first learnt to use it (by themselves and for leisure), which is transferred when they are seeking information in more serious contexts.

1.3.7. Outline of dissertation

To explore the overarching research question a brief examination of the history of the Internet is presented in Chapter Two to place the Net Generation theory into a chronological context, followed by an examination of the origins of the term, an explanation of the Net Generation attributes and an investigation of the academic research literature. The research framework and methods used to investigate young adults' information-seeking behaviour when using ICTs is discussed in Chapter Three. Both qualitative and quantitative methods were

used to provide comprehensive data sets that describe what young people think they are doing, what they say they are doing and what they are actually doing when seeking information using the Internet and electronic resources. Results of the data collection are then presented and analysed in Chapters Four to Seven, followed by a discussion about the findings of the research and what this may mean for the citizen of the future. Finally, this thesis will make recommendations based on the findings and consider how education can ensure the next generation of citizens is well prepared for life in a society in which the majority of information may be available only via electronic means.

Chapter 2 - Literature Review: Who is the Net Generation?

2.0. Introduction

Since the idea of a Net Generation is a relatively new phenomenon historically, it is important to place the concept and term within the broader context of the development of the Internet and Web technologies. Therefore, this chapter includes a brief history of the development of the Internet and Web technologies both globally and in Australia, before examining the origins of the term Net Generation and the attributes assigned to this group by both academics and the popular press. This discussion is followed by an exploration of the academic research literature which incorporates large population studies (global and Australian), long term research projects and smaller studies, and popular media reports about the Net Generation in the workplace. Throughout this discussion the term Net Generation refers to all children born after 1984 and includes other popular terms found in the literature such as Generation Y, the Millennials and Generation Z.

2.1. Background

The Net Generation is a popular term used to describe children born after the development of the Internet, a publicly available, global communications network. It was first used in 1998 by Donald Tapscott, a social commentator observing how young people were using new Internet technologies such as the World Wide Web with apparent ease and confidence. When the term first appeared it was quickly circulated via the Internet and the attributes assigned to the Net Generation were rapidly adopted by the popular media. Tapscott's book *Growing Up Digital: The Rise of the Net Generation* (1998) is written in a conversational style that is easily accessible by the general public. His commentary was timely and occurred as the popularity of the Internet increased seemingly overnight and began to become part of mainstream society in homes and in the workplace. Understanding the background of the Internet, the

technological developments that occurred long before 1998 and the change of pace that took place in the early 1990s, is a fundamental first step in providing a cogent explanation of how the idea of a Net Generation and its associated logic emerged when it did.

2.1.1. Internet development: The early years

The early development of the Internet occurred over a twenty-year period before 1984 and was originally initiated by the Advanced Research Projects Agency (ARPA) within the Department of Defense (DoD) in the United States of America (USA) (Zakon, 2011). ARPANET was the networking group formed in 1968 to develop host level protocols which would enable the transfer of information over a computer network. The first message sent over this network occurred in 1969 between researchers at the University of California Los Angeles (UCLA) and the Stanford Research Institute (SRI) (Kleinrock, 1969). For the next twelve years researchers continued to work on the idea of a computer network that would allow the easy sharing of resources and information, but with the capacity to still function as a communications vehicle even if some of the nodes were eliminated. Thus the original concept of the Internet as a multi-node system of computer networks that could re-direct information according to a standard set of protocols was developed.

By 1984 the Domain Name System (DNS) had been introduced. DNS was a distributed Internet directory service designed to control the delivery of email communications (Salamon, 2008). It opened up the Internet to other universities and made robust and widespread connectivity possible. By 1985 the first registered domain names began appearing and the basic structure and nomenclature we associate with the Internet today were in place. William Gibson's cyberpunk classic *Neuromancer* was also published in 1984 and introduced the idea of a cyberspace or virtual reality of the future by alluding to contemporary developments in technology (Gibson, 1984). As has often happened in the past, terms used in popular science fiction literature were adopted by researchers and users working with these emerging technologies (Technovelgy, 2012). Much later, terms such as cyberspace, virtual reality and virtual worlds would be picked up by the media and become part of popular

language used to describe technology, associated concepts and the online environment.

By 1984 the first microcomputers were also appearing in schools. While initial forays into the use of technology in education occurred in the early 1970s; cost, poorly designed software; a lack of support by the teaching profession and the fact that complicated systems were required to manage these projects; plus a lack of recognition for innovators; meant that computers in classrooms were the exception (Charp, 1997; Combes, 2005a). This changed in the mid-1980s and by the end of this decade computers in the workplace and education were becoming more commonplace. The convergence of these developments perhaps explains the 1984 cut-off date between the X Generation and the Net Generation often used by social commentators. Tapscott's original work was also based on observations of how teenagers who were born around this period were using the Internet. By the end of the 1980s and during the early 1990s members of the academic community were developing online communities using Telnet and Usenet, early adopters were conducting collaborative email projects in schools, while tertiary institutions were experimenting with student-led discussions, bulletin boards and the first virtual campuses appeared (Ring, & Watson, 1995; Anderson, Clayden, Combes, Ring & Williams, 2005; Combes & Valli, 2007). However, use of the Internet by non-specialists was still in its infancy. The cost of the technology and connection fees were still prohibitive for most people and using the Internet required a certain level of technical knowledge and skill. Up until the end of the 1980s development and use of the Internet occurred mainly behind the closed doors of the military and in universities. It was not readily available to the general public.

2.1.2. World Wide Web: A global network for everyone

A series of major developments in technology occurred in the early 1990s which would have far-reaching effects on the global information, political, social and economic landscapes. These events also exacerbated the perception by the general public that the rate of technological development was and continues to outstrip the ordinary person's capacity to cope with it. In the early 1990s the development of user-friendly graphical user interfaces (GUIs) first pioneered by

Apple, became part of the Microsoft operating system (Windows) and through clever marketing during the 1980s, Microsoft became the standard operating system for IBM computers in business organisations (The Linux Information Project, 2006). During 1990–1993 Tim Berners-Lee developed and refined the concept and technologies that would become the World Wide Web (WWW). Berners-Lee was motivated to produce a single information space that would be universal and consistent. It would be a system that would ‘not constrain the user’ but one that would lead to an ‘enormous, unbounded world’ (Berners-Lee & Fischetti, 1999, p.36-37). The early Internet was closely aligned with academic research institutions, required some technical knowledge and worked on a complex arrangement of protocols, trust and a sense of shared community (Coyne, 2001). This philosophy was carried over to the Web by its developers and sharing and collaboration have remained two of the principal values that underpin both the core technologies and the philosophy of Internet usage (Stalder & Hirsh, 2002). The Web, with its easily accessible graphical interface, however, would be an equaliser and provide access to information for everyone, a perception that still has resonance with the general public, politicians and educators.

By 1994 the first commercial browsers appeared (Living Internet, 2012) alongside a global computer network that utilised the existing telephone network to provide worldwide connectivity and graphics-based interfaces that were more user-friendly. The cost of computer hardware and software had also been falling steadily, making personal computing at home a real possibility for the average citizen for the first time.

1995 was the breakout year for the Internet, when the connection of the large, online service populations to the Web made it known throughout the world. After a lot of technical and popular press covered use of the Web in university and corporate environments, millions of new home users obtained access to the web when CompuServe, American Online, and Prodigy provided gateways to the Internet (Living Internet, 2012).

2.1.3. Internet in Australia

Similarly, in Australia access to the Internet was controlled by the Australian Academic Research Network (AARNet) and access was limited to universities, the Commonwealth Scientific and Industrial Research (CSIRO)

divisions and affiliated members. The network was largely restricted to researchers and early adopters in the tertiary sector (Clarke, 2009). There was limited public access to the Internet in Australia before 1995, notably through the not-for-profit Australian Public Access Network Association (APANA). However, it wasn't until the universities transferred their commercial customers, assets and international links to the Australian telecommunications company Telstra, which subsequently meant control of the whole infrastructure that represented the Internet in Australia, that the network became available to the general public. By the end of 1997 an estimated 1.6 million users were connected in Australia, with only a third coming from the general public (Clarke, 2009).

Towards the end of the 1990s the WWW and hypertext made information more readily and easily available and Internet users no longer needed to have specialist skills or knowledge to be participants in the new 'global village'. Assembling computer hardware and installing software to connect to the Internet became simpler and more standardised with 'plug and play' technology, while easy-to-use graphics-based programs and hypertext introduced a point and click culture of use. 'Web surfing' or 'surfing the Net' became the latest craze. Early adopters of the Web followed the idea of a gift economy and shared resources and information, so terms such as shareware, freeware, open source and public domain rapidly led to a public perception that anything available on the Internet is free (Combes, 2005b). By the end of 1995 there were an estimated 16 million Internet users worldwide (Miniwatts Marketing Group, 2012) and government and education systems were quick to recognise the potential of this new information source as a tool for supplementing expensive, print-based resources. State government initiatives similar to the *Technology 2000* strategy in Western Australia (MCEETYA, 2005) and Commonwealth projects such as the *Education Network Australia* (EdNA) (Mason, Dellit, Adcock & Ip 1999) were designed to support the Australian Government's strategic goals that would ensure Australians had opportunities to become active participants and beneficiaries of the emerging global economy (National Board of Employment, Education and Training, 1995). However, these policy documents and initiatives to place technology into

schools concentrated on the provision of hardware, software and connectivity infrastructure. Rarely was money set aside for training and education programs for teachers or students.

Towards the end of the 1990s it seemed computers and the Internet were appearing everywhere; in the home, public libraries, schools and the workplace. As technology became more affordable and easily accessible to the general public, competition for users shifted the focus of major companies such as Microsoft and Apple Macintosh. The production of multifunctional operating systems and software that requires little or no technical knowledge or understanding by the user, shifted computer use away from the original tight-knit communities of mainly academic users who needed a certain skill set to be able to participate in what was essentially a technical and unfriendly environment. Society was experiencing a new age where instantaneous global communication was possible for everyone, not just an educated and tech-savvy elite¹.

2.2. The Net Generation Idea

It was during this first flourish of connectivity and rapid expansion of the Internet into the public domain that Tapscott first observed an interesting phenomenon. Young people were using these new technologies with apparent ease and confidence. What is surprising is that the idea of a tech-savvy generation of users who have an innate skill set when using technology simply because they were born when that technology was being developed, appeared in the USA barely two years after the WWW and easy access to the Internet became readily available to the general public. There was limited access to these technologies especially for young people before 1995. There was also limited access to computers in schools prior to 1995 as education systems struggled to introduce such expensive infrastructure, hardware and software directly into classrooms, and teachers were relatively slow to embed new technologies into curriculum (Combes, 2005a). This situation has changed little in the last fifteen

¹ While the WWW is a subset of the Internet, for the purposes of this thesis the term Internet will be used synonymously to mean the Internet and WWW, since most people use the WWW to access the Internet, but do not distinguish between the two terms.

years, with innovative educators still trying to embed technology into curriculum programs in schools worldwide (Kennisnet, BECTA & ISTE, 2009; UNESCO, 2011). So where and how did the idea of a tech-savvy Net Generation arise?

The Net Generation theory and the attributes used to describe how young people use the Internet can be traced back to the social commentary of two individuals, Donald Tapscott and Marc Prensky. All subsequent discourse, both academic and social commentary, major systemic education reports and government policy documents that support the idea of a Net Generation refer back to publications by these two authors. Tapscott first originated the idea of a Net Generation, while Marc Prensky took it further and introduced terms such as digital native and digital immigrant that have now become part of common public language and perception. It is important, therefore, to examine the work of these two social commentators before discussing the attributes assigned to the Net Generation.

The term Net Generation was first coined in 1998 by Donald Tapscott, in his book *Growing up digital: The rise of the Net Generation*. Tapscott is a social commentator (Bullen, Morgan & Qayyum, 2011) who recognised the importance and potential of emerging technologies. In the early 1990s he founded and co-founded several companies which provided e-logistics services, research and new business models for the twenty-first century (Tapscott, 2008). In 1997, he conducted a twelve month investigation using a series of online *Growing up digital* forums on a network hosted by the New Paradigm Learning Corporation, York University and FreeZone. These networks claimed to be the 'cyber home' of 30,000 'N-Geners'. FreeZone, based in Seattle Washington, was a monitored website that provided services such as online chat, bulletin boards and epals. Available across the USA, the site catered for N-Geners between the ages of eight and fourteen, with approximately 55 percent female (Tapscott, 1998, p.57-58). Tapscott based the ideas and commentary for his original book on the responses of 300 *Digital forum* users, as well as information from parents, business, educators and a marketing research think tank of which he was the chair person (Tapscott, 1998, p.5).

While this sample sounds comprehensive and Tapscott maintains the forum respondents represented both genders from a wide range of different geographies, ages, socioeconomic and cultural backgrounds; there is no indication as to how this information was collected and verified, a major issue when working in an open, online environment (Tapscott, 1998, p.6). While Tapscott's book appears to have become a seminal work and is quoted by other social commentators and in much of the academic literature which supports the notion of a Net generation, it is really an example of non-scholarly literature (Bennett, Maton & Kervin, 2008; Rikhye, Cook & Berge, 2009; Bullen, Morgan & Qayyum, 2011). Detailed information about the sample group and the criteria used to select the 300 individuals who collaborated to provide their insights are not clearly stated in the book. The fact that Tapscott then uses the responses of this relatively small population to make generalisations about a whole generation is problematic. Although he maintains the forum respondents represented a range of socioeconomic and cultural groups, it is more likely that the sample used actually represented wealthy individuals from middle to upper class, white American backgrounds. These were the early adopters of technology, since at the time Tapscott was making his observations (1997), public adoption and use of the Internet were very much in their infancy in the USA and home computers were still expensive. What the researchers were actually looking for is also not clearly stated. Were they examining a set of clearly defined behaviour patterns or was this purely an exploratory study based on participants' conversations? There are also few instances in the book where excerpts from the participants are negative or indicative of an alternative viewpoint. The lack of rigorous research method used to collect the data upon which Tapscott based his ideas and his tendency to make sweeping statements and generalisations laced with assurances such as 'everybody relax, the kids are all right' (Tapscott, 1998, p.6), make the veracity of this study and subsequent conclusions highly suspect (Bennett, Maton & Kervin, 2008; Bullen, Morgan & Qayyum, 2011). This is especially so when the evidence has been gathered online from young people who are enthralled by a new and exciting environment.

In spite of the non-academic nature of this title, it has become quoted as a seminal work (Bennett, Maton & Kervin, 2008; Beinhoff, 2011) and the

attributes Tapscott originally assigned to the participants of his original study have been used to create a widespread belief that young people of this generation are tech-savvy and in control when using the Internet, and by default, other electronic resources (the assumption being that these are the same as the Internet and require the same skills). The original title received a number of recommendations and awards and excerpts were available on a website dedicated to the book. Excerpts from the print version of the book are still freely available on the Internet and it is also available as an ebook on the author's website. Using the Internet as a publishing and advertising medium has ensured that the original publication remains in circulation within a global forum. Tapscott's latest publication *Grown up digital: How the Net Generation is changing the world* is based on his earlier work (Bullen Morgan & Qayyum, 2011). Chris Jones, in his review of this newest publication, says of Tapscott's scholarship:

Tapscott has reported a \$4 million dollar research project, but in his writing he draws on no strong theoretical account to explain how an entire generation has developed a distinct and novel set of ideas and approaches to new technology and life more generally (Jones, 2011, p.31).

Tapscott's follow-on publication utilises the power of Web 2.0 social networking technologies to advertise the title on YouTube, a blog and FaceBook, as well as a dedicated website (Tapscott, 2009). Advertising via social networking technologies ensures significantly increased exposure, accessibility and longevity in a medium (print) that Stephen Downes considers the direct antithesis of everything the Net Generation allegedly represents. According to Downes an online book is 'static and changeless, [and] enshrined in uneditable PDFs' (Downes, 2007). However, utilising the Internet as a publishing and advertising medium in this fashion for a print publication ensures that Tapscott's books and ideas continue to have resonance for a wide and varied audience. They also remain in the media spotlight even though the research method is neither academically rigorous nor representative of a significant body of emerging research that strongly indicates the idea of a Net Generation is not an accurate picture of how young people are actually using technology (Bennett, Maton & Kervin, 2008; Beinhoff, 2011; Bullen, Morgan & Qayyum, 2011; Thomas, 2011a). The way the online environment has changed the status and behaviour of information and how we interact with it, is discussed later in this

chapter, but suffice to say here, that the media and the delivery mode (Internet/WWW) have had a profound effect on the longevity and access to both Tapscott's original observations and ideas, and follow-up publication.

The second author quoted almost exclusively by proponents of the Net Generation idea is Marc Prensky. Prensky is an ex-teacher, speaker and businessman who runs a company that specialises in the development of electronic educational games and simulations. He has written several books and claims to have reinvented 'the learning process, combining the motivation of video games and other highly engaging activities with the driest content of education and business' (Prensky, 2011b). He publishes regularly in a number of freely available online journals, including his own, and has all his writing available on his website.

Prensky used Tapscott's work as a basis for his own conclusions and was the first person to coin the phrase 'digital natives' when describing members of the Net Generation and 'digital immigrants' for everyone else (Prensky, 2001). He maintains this current generation have been so affected by technology, their brain development and how they process information has radically changed. His recent publications include the notion that this generation should be called 'Homo sapiens digital' (Prensky, 2009; Prensky, 2011a). While these statements use catchy labels which appeal to the public and popular press, they are not supported by serious researchers (Jones, 2011). Prensky is advocating a physiological change in brain development that on an evolutionary scale has occurred in just over fifteen years, since the Internet was not available to large numbers of the general public before 1995. He rarely backs up his claims with references to serious research data, makes sweeping statements and reaches some startling conclusions (Rikhye, Cook & Berge, 2009) in the papers published in his online journal *On the Horizon*.

Today norms and behaviors are changing *much* faster than in the past, because the technology changes rapidly and the Digital Natives are programmed to – and *want* to – keep up with it (Prensky, 2004, p.13).

What should we call this emerging digitally enhanced person? Homo sapiens digital, or digital human, perhaps. The key to understanding this development is to recognize that it includes both the digital and the wise.

As digital enhancements develop, so too will the concept and practice of wisdom (Prensky, 2009).

It is unusual to find two social commentators who have had such a profound influence upon public opinion, serious researchers, educationalists and politicians alike. In the early years their conclusions were challenged rarely, particularly by educators and politicians seeking to be part of the 'digital rhetoric' where ICTs are defined as the main driver for innovative education and training systems (Buchanan, & Chapman, 2009). Baskin and Williams maintain that 'like Western governments worldwide, in Australia computing technologies are considered a motherhood solution to the needs of a highly skilled and technologically capable workforce' (Baskin & Williams, 2006, p.455). One exception is educator and public speaker Jamie MacKenzie who also runs his own website and publishes his opinions in his own online journal, *From Now On*. MacKenzie is scathing in his rebuttle of Prensky's work and the idea of a Net Generation.

Being born into a culture saturated with things digital is not a complete blessing despite the eager claims of digital drum majors and pied pipers. Neither is such immersion an automatic state of grace. ... Their stance is unsubstantiated by evidence and is little more than digital delusion. They are guilty of "arcade scholarship" - analysis that is superficial and cartoonish (MacKenzie, 2007).

Of Prensky's claims and scholarship, MacKenzie says:

In a rather shallow piece lacking in evidence or data, Prensky offers the terms "digital natives" and "digital immigrants" to set up a generational divide. His proposition is simple-minded. ... His stereotypes and sweeping comments seem fabricated through personal observations, strong bias and wishful thinking.

Even though his analysis is weak and his message insulting, many technology cheerleaders have adopted Prensky's language to describe the relationship between various generations and things digital. His view is intellectually bankrupt, but simple-minded thinking is often attractive. ... Prensky's labels are crude, inaccurate and based on no data. His gross generalizations lump complex segments together as if identical (MacKenzie, 2007).

In a recent study by Bullen, Morgan & Qayyum, the authors maintain:

The key claims in the Net Generation discourse emerge from non-scholarly literature. Some appear in the popular or lay press, while others are found in proprietary research funded by and conducted for private business. Still others can be found in quasi-academic publications that have the appearance of academic or scholarly quality but turn out not to be informed by empirical research. ... in our view, the educational community has not adequately

discriminated between the different types of publications nor subjected them to the appropriate level of critical scrutiny. ... Our research found that there is no empirically-sound basis for most of the claims that have been made about the Net Generation (Bullen, Morgan & Qayyum, 2011, p.2).

Bennett, Maton and Kervin maintain that how young people use technology is far more complex and requires greater empirical and theoretical research of a rigorous nature (Bennett & Maton, 2010).

In the seminal literature on digital natives, these assertions are put forward with limited empirical evidence (eg, Tapscott, 1998), or supported by anecdotes and appeals to common-sense beliefs (eg, Prensky, 2001a). Furthermore, this literature has been referenced, often uncritically, in a host of later publications (Gaston, 2006; Gros, 2003; Long, 2005; McHale, 2005; Skiba, 2005) (Bennett, Maton & Kervin, 2008, p.777).

Another significant early work that also used Tapscott's ideas and is widely cited in the Net Generation literature is the title *Millennials rising: The next great generation* (Howe & Strauss, 2000). According to Howe and Strauss 'over the next decade, the Millennial Generation will entirely recast the image of youth from downbeat and alienated to upbeat and engaged – with potentially seismic consequences for America' (Howe & Strauss, 2000, p.4). The authors have been criticised for using a limited population for the data collection and for relying solely on a student survey to make claims about a whole generation (Bullen, Morgan & Qayyum, 2011). Howe and Strauss claim that members of the Net Generation exhibit different attitudes and behaviours, focus on teamwork and achievement and that 'the evidence is overwhelming – and just starting to attract notice' (Howe & Strauss, 2000, p.4). This title also appeared during the very early years of public access to the Internet, referred to and supported Tapscott's original theory, and added resonance to the idea of a Net Generation.

In 2005 EDUCAUSE published the free online title *Educating the Net Generation* (Oblinger & Oblinger, 2005a). Again, making the publication freely available on the Internet ensured it reached a wide audience and retained longevity as an information source, since Web publications do not go out of print and accessibility is assured. This title focused on the unique attributes of the Net Generation and drew on the work of Tapscott, Prensky, and Howe and Strauss. This title contains chapters from a range of authors that include personal accounts (Roberts, 2005; McNeely, 2005; Windham, 2005b); student surveys and a study of how well the academy has responded to the different

generations at a tertiary level (Dziuban & Hartman, 2005); concept papers on how universities need to cater for Net Generation learners both in curriculum development (Clayton-Pedersen & O'Neill, 2005; Ramaley & Zia, 2005) and delivery (Brown, 2005; Dede, 2005); student services delivery (Wager, 2005), including the library (Lippincott, 2005); and change, new expectations and professional development for academics (Barone, 2005; Moore, Moore & Fowler, 2005). These chapters are prefaced by an introduction by Oblinger and Oblinger that sets the tone of the title, in this case the differences inherent in a new type of learner from the Net Generation who has expectations and the skills to use a wide range of technologies for learning (Oblinger & Oblinger, 2005b).

The only chapter in this title where the Net Generation rhetoric is questioned and some rigorous research findings are presented is by Kvavik. Kvavik conducted empirical research and his findings contradict the idea of a Net Generation and a digital native.

Kvavik (2005) presents results from a major survey of undergraduate students in the United States (4,374 students from 13 institutions in five states). The results suggest that the students have basic office suite skills and can use email and the Internet with ease but are not able to use the more advanced features and may not be aware of these features. He found that students only have a moderate preference for the use of technology in their classes and he concludes that there is a need for further training in the use of information technology for educational purposes (Bullen, Morgan & Qayyum, 2011)..

This title continues to be cited by other educational researchers and is used alongside Tapscott's original work by Palfrey and Gasser in their book *Born digital: Understanding the first generation of digital natives* (2008). The research method used by these authors is also obscure and limited. The authors say they:

conducted original research... spoke in detail to young people from around the world ... [and] held about 100 conversations with young people in these formal settings. [The] research is also grounded in conversations that we held with about 150 additional informants, including other young people, their teachers, librarians, psychologists, and those who study them. (Palfrey & Gasser, 2008, p.13).

The authors also maintain the Net Generation culture is global in scope and nature. Bullen, Morgan & Qayyum (2011) point out that it is unclear how the data provided by both Tapscott and Palfrey and Gasser actually supports the

notion that the Net Generation have good information skills simply by growing up in close proximity to technology. While Palfrey and Gasser use the same attributes to describe the Net Generation digital natives (a term they use throughout the book), they do acknowledge that not everyone has the opportunities or access to technology to become a digital native (Palfrey & Gasser, 2008, p.14). The title focuses on how educators can 'prepare our Digital Natives and other young people to lead the way themselves toward a bright future in the digital age' (Palfrey & Gasser, 2008, p.15). Topic areas in the book cover issues such as information overload, safety, online identity, quality of information, privacy and learning as a digital native. This title explores the difficulties of navigating an emerging and constantly changing information landscape. The authors assume that the digital natives who have a demonstrably different, prescribed set of attributes are the only ones grappling with this new landscape. 'They all have access to networked digital technologies. And they all have the skills to use those technologies. (Except for the baby - but she'll learn soon enough.)' (Palfrey & Gasser, 2008, p.1). In a comparative review of Tapscott and Palfrey and Gasser's books, Martin comments:

Such generalizations do not sit comfortably with many researchers however, who note world- and community-wide variations in connectivity, school and home backgrounds, domestic affluence, and cultural and social contexts - all factors which undermine the assumption of a comparatively universal and tech-savvy digital generation. ... So, the question must be asked, 'on what basis do Palfrey and Tapscott determine their conclusions?' Both commentators appear to have conducted some empirical work, though apparently more conversational than according to common qualitative or quantitative research practices. ... While the publications of Tapscott and Palfrey make for entertaining reading, and include many common sense recommendations in places, neither should be considered as an authoritative discourse based on sound research findings (Martin, 2010).

Bullen, Morgan and Qayyum agree with this statement.

Claims about the impact of the use of digital technology are more contentious both because the claims are more bold and because the evidence to support them is often absent or of dubious quality. Prensky (2001a, 2001b, 2005), Tapscott (1998, 2009) and, to a lesser extent, Palfrey and Gasser (2008) have all claimed that the ubiquity of digital technologies and the net generation's intensive use of these technologies is affecting how the net generation thinks, interacts, and makes sense of the world (Bullen, Morgan & Qayyum, 2011, p.3).

The idea of a Net Generation continues to have resonance with politicians, educators and the general public, because it is based largely on observation and

appears to present an accurate picture of how young people are using the Internet and technology. These observations paint a picture that is a 'shared' public experience which perhaps explains the resonance of this idea as it describes the phenomenon first observed by Tapscott – young people use technology with apparent ease and confidence. A major issue with this picture is that it includes a set of characteristics or attributes that have become a defining feature of both public belief and educational academic discourse. However, such a picture is simplistic and deterministic and has little relevance to reality or the complexities inherent in society's use of ICT and an information landscape that is constantly evolving (Selwyn in Jones, 2011). In spite of a considerable body of evidence to the contrary, it is assumed that young people today are 'pre-programmed' or 'wired' to cope with an increasingly complex information landscape that utilises multiple formats and technologies, and where traditional distinctions that previously provided structure for the information seeker are now blurred or largely irrelevant.

2.2.1. Net Generation attributes

Tapscott calls the generation from 1984 onwards the Net Generation, a term he prefers over Generation Y. He recognises the power of language and maintains that:

Terms acquire meaning and they shape our thinking. ... N-Generation is a better term in that it codifies in a unified term the power of demographics with the power of a new media analysis. ... The N-Gen is ... breaking free from the one-way, centralised media of the past and are beginning to shape their own destiny. And evidence is mounting that the world will be a better place as a result (Tapscott, 1998, p.33)

Tapscott's observations of children and young adults using technology led him to conclude that continuous exposure to technology from an early age results in an increase in child development. He believes the development of cognition, intelligence, reasoning, personality and autonomy are enhanced as a result of being part of an interactive world. 'When children control their media, rather than passively observe, they develop faster' (Tapscott, 1998, p.7). Tapscott does allude briefly to problems that require 'management', but dismisses issues such as cyber safety, online bullying, and ethical and appropriate use, maintaining that 'the kids are doing most of the managing themselves' (Tapscott, 1998, p.9). This assertion that children are capable of higher-order thinking, advanced

decision-making and autonomy; are more 'comfortable, knowledgeable, and literate than their parents/adults' (Tapscott, 1998, p.2) when using technology because they are more used to it, is a core element of the Net Generation idea. Young people are more adept simply because they have grown up using technology. According to Tapscott they are confident users and therefore, we (adults) don't need to teach them how to use it. Tapscott even maintains that young people who do not have access to technology will be developmentally disadvantaged.

Confidence is another attribute of this generation. Tapscott maintains that members of the Net Generation are not intimidated by new technology and since they are growing up in this new information landscape, 'they are a force for social transformation' (Tapscott, 1998, p.2). They are '*generational learners*' and '*navigators*' who are more knowledgeable than any other generation and socially inclusive due to their ability to network globally with people from other cultures which exposes them to a wide range of ideas (Tapscott, 1998, Dorman, 2000). The Net Generation have a greater knowledge base, a result of being exposed to a lot of information on the Internet. They are preoccupied with free expression, have strong views and are independent learners who exhibit the ability to question and confront information. Connectivity and social engagement using technologies is very important to this generation of users (Tapscott, 1998). According to Tapscott, connectivity and interaction online helps young people to grow, forces them to acquire values, and enables them to develop skills such as making judgements, analysing, evaluating and critical thinking. It also makes them more self-reliant (Tapscott, 1998, p.56).

Prensky elaborates these ideas and says 'digital natives' communicate differently using email, IM (Instant Messaging), chat, blogs and other social networking technologies. They share emotional as well as intellectual information. The Net Generation buy and sell on the Internet, and exchange and share goods and information differently (peer-to-peer technologies). They even create differently (virtual worlds, avatars and websites). As a consequence of their ubiquitous use of a wide range of technologies, members of the Net

Generation evaluate themselves and acquire peer status differently. Above all they learn differently 'about stuff that interests them' (Prensky, 2004). Prensky also maintains that:

... the natives are very much aware that if they actually *want* to learn something (usually for their own purposes) the tools online are available for them to do it on their own. ... They go far beyond their teachers' ability and knowledge, and far beyond what even adults could have done in the past (Prensky, 2004, p.9).

As a result of their immersion in everything digital, the Net Generation are adept at filtering, programming, searching and analysing the information they find by using a range of sophisticated tools readily available on the Internet. Prensky also believes that this generation are changing the social landscape (Prensky, 2004, p.10-12).

Other early commentary about the Net Generation emphasises the idea that proximity to and the use of technology, especially computers and the Internet, are responsible for behaviours which appear to be innate (Alch, 2000; Merrick, 2001). Frand discussed the information-age learner and reported that 'young people naturally gravitate to these kinds of interactive, input/output devices. They make the devices work without a manual, without the instruction set, as if the device is hardwired into their psyche' (Frand, 2000, p.16). Hay told school administrators as early as 2000 that most students will arrive at schools already knowing how to use the computer to communicate and access information. Their active searching for information on the Internet predisposes them to active problem-solving which automatically lead to the development of higher-level thinking skills and learning (Hay, 2000). In *Millennials rising: The next great generation*, Howe and Strauss maintain the Net Generation have a distinctly different world view due to their use of technology and the Internet. They are confident, believe anything is possible, have an altered view of time and space, and think of themselves as global (Howe & Strauss, 2000). These early commentators all use Tapscott's original ideas and generalisations about the Net Generation. An early review of the title *Millennials Rising* provides a succinct summary of how publications by social commentators such as Tapscott, Howe and Strauss, Prensky and even Palfrey and Gasser should perhaps be viewed by educators and researchers.

This is not a good book, if by good you mean the kind of book in which the authors have rigorously sifted the evidence and carefully supported their assertions with data. But it is a very good bad book. It's stuffed with interesting nuggets. It's brightly written. And if you get away from the generational mumbo jumbo, it illuminates changes that really do seem to be taking place (Brooks, 2000).

When discussing the veracity of the Net Generation discourse, Bennett and Maton describe Tapscott, Presky and Palfrey and Gasser's works as popular nonfiction.

In discussing the findings of this body of research, it is important to note that we shall focus here on the results of empirical studies that are publicly reported in ways that allow scrutiny of the basis of their claims; that is, the authors provide details of the selection or recruitment of participants, data collected, instruments used, means of analysing data and how these relate to the conclusions made. For this reason, we do not include some popular non-fiction books on the topic (eg. Palfrey & Gasser, 2008; Tapscott, 2008) because, though they may describe their claims as based on empirical research, they offer insufficient detail of that research to evaluate the veracity of those claims (Bennett & Maton, 2011).

Although an increasing number of researchers are critical of the scholarship underpinning the works of Tapscott, Prensky, Howe and Strauss and Palfrey and Gasser, the idea of a Net Generation which has a set of attributes and skills because members were born at a certain time has been expanded further by educators at all levels. These authors include practitioners and academics who use Tapscott and Prensky's writings as a baseline to include traditional learning theory and pedagogy to describe what they see as a new generation of learners. Educators have been very quick to adopt the notion of a Net Generation and use it to explain why so many students are disengaged from learning and traditional school environments (Oblinger & Oblinger, 2005; Jones, 2011). Practitioners and education researchers have created a Net Generation discourse that continues to expand on the idea that this generation of students has different attributes, skills and ways of learning (BECTA, 2008; Feiertag & Berge, 2008; Skiba, 2003, 2010; Ainley, (2010). Net Generation commentary from this section of the discourse includes statements claiming that young people are 'acculturated to the use of technology, they are saturated with it' (Barnes, Marateo & Ferris, 2007). 'Members of Gen Y cut their teeth on computer keyboards, and to them, computer technology and the Internet are as natural as breathing' (Coates, 2007). The Net Generation 'have always experienced digital media and Internet access; use mobile devices; prefer to work in groups and

teams, want augmented reality and use hyper learning models as opposed to linear acquisition of information' (Billings, 2004, p.104). 'Many students are entering their school or college with multiple literacies that go beyond text, and this trend will strengthen over the coming years' (Millea, Green & Putland, 2005, p.2).

Net Generation students in much of the educational discourse are characterised by their ability to learn independently by discovery, investigation and experience. As a result of this experiential learning method, they retain information and use it in innovative ways and they are comfortable multi-tasking using a range of technologies (Hempel, & Lehman, 2005; Barnes, Marateo & Ferris, 2007). Now, with incredible amounts of information available through the Web, proponents of the Net Generation maintain we are witnessing a new kind of learning that is 'discovery based' (Brown, 2000; Ito, et al, 2008; Worley, 2011). Other authors from education maintain the Net Generation know what they want and have greater digital literacy skills. They are intuitive visual communicators, have strong visual-spatial skills and readily integrate the virtual with the physical world (network/Internet literacy) (Brown, 2000; Dorman, 2000; Skiba, 2003; Oblinger & Oblinger, 2005a). The Net Generation's 'mastery of and reliance on technology has altered the way it views time and space' (Huntley, 2006, p.17) and as a result, is 'the world's first generation to grow up thinking of itself as global' (Howe & Strauss, 2000, p.17). 'For the Millennium generation, there's never been a time where these digital wonders haven't existed. Consequently they haven't just adopted digital media – increasingly they've internalized them' (Jukes & Dosaj, 2004).

Proponents also claim the Net Generation work and play in an environment where trust, authentication and the authority of information is fluid, and as a result they have developed sophisticated information skills which enable them to evaluate and authenticate information (Dorman, 2000). 'Digital natives are multi-taskers, enjoy working in groups and teams, are savvy with social networks' (Palfrey in Lynch, 2008) and capable of absorbing information rapidly (Murray, 2007). They view the Internet as an essential component of their lives, and are *ultra-communicators*, using many forms of media simultaneously

(Murray, 2004; Hempel, & Lehman, 2005; Windham, 2005a, 2005b). Other commentators, education practitioners and researchers maintain this generation have grown up understanding electronic media and have a strong work ethic, because they are informed and media-savvy (Huntley, 2006). They learn differently, in a multi-dimensional world, and as a result are more fluent in the ways information is handled in electronic formats (Long, 2005). Today's young people are active information creators as well as consumers (Lorenzo, Dziuban & Oblinger, 2006) and want to investigate practical applications of their studies (Windham, 2005a). Members of the Net Generation expect to be engaged, they prefer experiential learning, value the convenience provided by technology and want 24/7 access, fast (Oblinger, 2008). They want their problems to be solved quickly and easily and often turn to technology to provide solutions (Wager, 2005). Some authors have also suggested that this generation are more skilled, creative and socially adept due to their early exposure to the Internet which leads them to develop and experiment with personal identity (Rice, 2001). Roberts' summary of the common characteristics attributed to members of the Net Generation by educators includes the following: the fact that they are tech-savvy; demonstrate new literacy skills and are comfortable with screen-based learning; they are multi-taskers; want to be in control of their learning and are used to an information rich environment; consume a range of digital content and use a wide range of devices which are portable and essential to their lives; and like to be connected so they prefer to work in groups and teams (Roberts, 2010, p.94).

Net Generation supporters and educators have mistakenly assumed that familiarity with the technology is the same as acquiring skills in how to use information effectively, ie. information literacy skills development. Buchanan and Chapman argue that this 'imperative to employ technology, the imposition of ICT is taking place within a contentious field containing multiple players with competing agendas, different hierarchical positions and contested power relations' (Buchanan and Chapman, 2009, p.2). Bennett refers to the continued focus by education systems to get technology into schools and universities as a 'moral panic that restricts critical and rational debate' (Bennett, Maton & Kervin, 2008, p.775). The DER program discussed in the introduction is an

example of the imperative to get technology into Australian schools, while most universities are grappling with the development and delivery of quality online courses, the viability of Massive Open Online Courses (MOOCs) (Palmer, 2012) and the integration of Web 2.0 technologies into curriculum (Franklin & van Harmelen, 2007). These concerns are not new. In an early article Werry (2002) discusses what he calls the ‘rhetoric of commercial online education’, and urges further discussion, critical analysis and the evaluation of online courses. This imperative to embed technology is testament to the appeal and strength of the idea of a Net Generation which has led to a global move by education systems to get technology into classrooms (Kennisnet, BECTA & ISTE, 2009; UNESCO, 2011) and a situation where assumptions have been made about the skill levels of students.

Attributing Net Generation characteristics and generalising about this new generation of learners is not limited to the field of education. A growing number of articles originating from the workplace also stress the need for employers and industry stakeholders to prepare for a generation of workers who are tech-savvy, have refined skills when working with technology, different expectations and different ways of working (Feiertag & Berge, 2008). As early as the year 2000, Song maintained the Net Generation were ‘creating a whole new culture that has profound implications for business and politics in Korea’ (Song, 2000, p.46). Although little is revealed in this early article, the author maintains this next generation of workers want a ‘free work environment’. Employees from the Net Generation are expected to reshape the organisational cultures built by ‘Baby Boomers’, which are largely command-and-control centred, hierarchical and bureaucratic (Boddie, Contardo, & Childs, 2007, p.26). They will expect organisations to use the technologies which increasingly match their personal lifestyles and which facilitate productivity and effective communication including Web 2.0 technologies (King, 2011). As a result, organisations will need to adapt their operating strategies, practise innovative leadership, employ flexible human resource management, and provide opportunities for the adoption of new technologies, and increased education and training (Boddie, Contardo, & Childs, 2007; DeFelice, 2008; Tapscott, 2009; Chief Information Officers Council, 2012). Increased mobility, a lack of geographic boundaries and

opportunities for collaboration and flexible work arrangements will characterize the Net Generation workplace (Patterson, 2012). New technologies also mean new ways of training. Due to their superior skills, Net Generation workers will expect ongoing training that utilises elearning and interactive, simulation technology using virtual worlds such as Second Life (Murray, 2007). Net Generation attributes such as the preference to work in groups/teams, flexibility, being connected and task focused, and having a global, optimistic outlook (Cole, Smith, & Lucas, 2002; Sujansky, 2009) also feature in discussions about workplace change. Since this generation know more about the Internet (Gogoi, 2005) and are the first generation to:

... truly internalize the Internet, as opposed to other generations that have adopted it ... they will thrive in an environment where they can have a direct say in how work is to be done and be given the ability [to] innovate improvements (Cole, Smith, & Lucas, 2002).

‘Technology is like air to them’ (Bingham, 2009, p.57; Tapscott, 2009), as they are the first ‘true children of technology’ (Sujansky, 2009, p.8). As a result they also have a preference for informal learning using the Internet as a personal educational tool (Bingham, 2009). Due to their familiarity with the Internet the Net Generation has a global and inclusive outlook which also means that ‘this generation expects work to have deeper personal meaning’ (Gogoi, 2005). Connectivity has also been identified as an essential component of their personal lives, so this generation wants more frequent feedback on their performance (Brown, 2008; Sujansky, 2009). Net Generation workers will want workplaces that offer engagement, flexibility and interactivity, where their social and work lives are blended (Gargiulo, 2012) and work is associated with activity and not place. Their fluency with technology also makes them highly efficient and natural mentors for older employees (Sujansky, 2009). Since technology has drastically altered the way we communicate and consequently conduct business, change to current workplace environments is inevitable. If the idea of a Net Generation is correct, then this group will approach the workplace with different attitudes, ways of working and a tech-savvy, skill set that will change human resource management and how organisations are structured. However, whether the potency of this impact will be due to a Net Generation mind and skill set or the fact that this group will be the youngest and most numerous in the workforce since the ‘Baby Boomers’ (Bingham, 2009), is still open for debate.

The overarching themes of confidence and being 'wired' or 'pre-programmed' to use technology for effective information-seeking permeates the Net Generation academic discourse and public commentary. These themes appear in social commentary, systemic education reports and policy documents, academic literature, and in articles dealing with human relations and resources in the workplace. Based on this theory young people are described as capable multi-taskers who use a wide range of technologies effectively and with confidence, are very good communicators and prefer to use technology. As a result of their engagement with a wide range of technologies and information, they are higher order thinkers and good problem-solvers. They understand and know where they are in virtual space at all times, prefer experiential and discovery learning and can find, use and create information easily (information literacy). They also have a strong work ethic, prefer being connected and working in teams, are innovative and inclusive (have a global outlook). They have sophisticated information skills and are often described as tech-savvy, ICT-savvy and Internet-savvy; terms which imply high levels of knowledge and skill.

The idea of a Net Generation assumes that information-seeking behaviour and the associated skills required to navigate this new and rapidly evolving information landscape are somehow predicated by the fact that this generation of users have never known a world without instantaneous access to information and are not afraid to use the technology. Proponents of the theory fail to question what is really happening and base their beliefs on observation, catchy labels and a simplistic understanding of an information landscape that is very complex and constantly evolving as a result of technological change. Rarely do supporters of the Net Generation construct question what young people are actually doing online; how they seek information in this new environment; and whether the technologies they use and the different contexts in which they use them require the same skills. The issues of confidence, the perceptions of youth about themselves and their culture of technology use are not considered. Instead, supporters of the Net Generation idea assume that confidence and familiarity with technology equate to competence and effective and efficient use of the technology, which is transferred to online information-seeking contexts and the acquisition of highly developed information skills.

2.2.2. The Net Generation and information-seeking behaviour

Is the Net Generation a ‘real’ phenomenon, or are the behaviours reported by the Net Generation proponents a reflection of a generation of users who are simply used to a different information landscape? A landscape moreover, that is heavily influenced by developments in technology which are increasingly driven by a user-friendly, one-size-fits-all ethos. Does the Net Generation construct explain what is actually happening or is it a gross oversimplification of a complex process (information-seeking) that has been traditionally associated with multi-faceted skills, higher order thinking and deep conceptual understandings? Information-seeking is something we do every day. The process is complicated; often social, emotional and interactive; and requires decision-making and interpretive skills to deal with information that may range from simple fact gathering to extremely complex data analysis, problem-solving and the creation of new information (Kuhlthau, 1991, 1993, 1994, 1996; Dervin, 1998; Case, 2002). The importance of information seeking for individuals and society as a whole is succinctly summarised below.

Information seeking must be one of our most fundamental methods for coping with our environment. The strategies we learn to use in gathering information may turn out to be far more important in the long run than specific pieces of knowledge we may pick up in our formal education and then soon forget as we go about wrestling with our day-to-day problems. (Donohew, Tipton & Harvey, 1978, cited in Case, 2002, p.17).

Although written some time ago, the above quote is perhaps even more pertinent today where the Internet and the range of information resources now available continue to introduce new levels of complexity, information overload and the decontextualisation of information across a range of convergent, rapidly evolving delivery modes and formats. As a result of this shift from a mainly print environment to a more complex information landscape, information-seeking behaviour (ISB) studies have shifted in focus from the delivery mode and context to concentrate more on the information seeker (Case, 2002). The influence and ubiquitous use of technology at every level of society have affected the way we find information that meets our needs (relevant) and how we use it. This influence has been particularly profound on the children of the Net Generation who have never known a world without instantaneous communication and easy access to vast quantities of information. As a result,

Case feels that ‘our view of information behaviour has become more integrated and less dictated by sources and institutions’ (Case, 2002, p.4). He maintains that the Web has put all the information in one place, made obscure bits of information easier to find and changed the workplace, education and how we find information (Case, 2002). Does this also mean that a different information context, the Internet and electronic delivery modes, changes the way individuals search for information? Does the information-seeking behaviour of an individual change, or are different skills required to find information in this new environment which is constantly changing? Do the young adults of the Net Generation exhibit different information-seeking behaviour and do they demonstrate different skills to access information using ICTs and electronic resources? To answer these questions the next section will examine the academic research literature about the Net Generation’s information-seeking behaviour and whether findings support the idea of a set of Net Generation attributes discussed in Section 3.1.

2.3. The Net Generation – Academic research

During the last eight years a large body of research evidence has emerged that contradicts the idea of a tech-savvy, Net Generation. These studies range from population studies across a range of age groups and duration to small qualitative research projects examining specific aspects of young people’s behaviour when using the Internet or electronic resources to find information. A number of ongoing population studies indicate clearly that the Internet is available in the home and the workplace and used daily by a large proportion of the population.² In the early days of the WWW, much emphasis was placed on population studies and the speed with which the Internet was appearing in households and young people were going online. This argument seemed to support the idea of a Net Generation. While Internet use appears to have stabilized in most countries, use by young people is still very high. The number of young people going online as reported in these population statistics may also be higher due to the educational imperative discussed earlier, where access is

² Note these figures are variable according to country, geographic location and economic development, although high density pockets of Internet access now occur around the world in all countries. Access by individuals to technology is also influenced by socioeconomic status.

available via their educational institution. A brief examination of some major population studies is warranted to explore any emerging trends.

2.3.1. The Net Generation - Population studies

Recent statistics from the European Union (EU) indicate that almost 75% of households had access to the Internet in 2011. However, this figure was not evenly distributed across countries in the Eurozone, with 54% of households having the Internet in less developed countries, for example Bulgaria, and up to 94% in countries such as the Netherlands. Conversely, almost 25% of people between the ages of 16-74 had never used the Internet, although this figure is also spread across the twenty-seven different countries that make up the Eurozone (Eurostat, 2011). While Internet access is still variable, access increased across all member nations during 2006-2011. The *Digital Agenda for Europe3* aims to reduce non-users to 15% by the year 2015. Almost half of users aged 16-74 in the Eurozone used the Internet to obtain e-government information, while 28% used it to submit forms to public authorities. In this age grouping, 58% used the Internet to buy and sell or conduct business (Eurostat, 2011). These population statistics indicate that using the Internet for business and shopping, recreation and information seeking is not just limited to the Net Generation.

The Oxford Internet Survey 2011 (OxIS) reports that ‘44.4% of Britons (16+ years) can be classed as next generation users (NGU) (someone who uses at least two Internet applications (out of four applications queried) on their mobile or who fits two or more of the following criteria: they own a tablet, own a reader, own three or more computers)’ (Dutton, & Blank, 2011, p.4-5). While more than a quarter of the British population still do not have access to the Internet, the number of NGUs is rising, although these users are not evenly distributed across the population, but fall in the higher income brackets. What the report doesn’t include is data about the age groupings for NGUs. If they fall in the higher income brackets, then most NGUs may well be outside the Net Generation age group since it is older people in the workplace who have the disposable income to purchase new technologies which tend to be expensive when first released. Indeed other research studies have found that the Net

Generation do not own the more expensive, specialised devices due to cost (Salaway, Caruso, & Nelson, 2008; Bennett & Maton, 2010). NGUs also appear to have integrated the Internet more extensively into their entertainment and leisure activities (Dutton, & Blank, 2011, p.5). However, how people use the Internet for information-seeking is the same, although NGUs are more likely to go to the Internet first and use a mobile device. For the first time since the studies began in 2003, search engine use has dropped (Dutton, & Blank, 2011, p. 21). Researchers suspect this drop is due to the rise in popularity of social networking. If this is the case, it may be due to an innate preference for people to seek information from 'trusted others' rather than an anonymous source. Information-seeking studies using print resources report that people tend to use personal networks and information sources that are easy to access first (friends and colleagues) (Case, 2002; Borgatti & Cross, 2003; Johnson, 2004). Early research studies in how the Net Generation seek information also concluded that young people are heavily reliant on significant others when seeking information and that their use of digital information sources lessened when they used people as their primary source of information (Livingstone & Bober, 2003; Shenton, 2004b). This population study also reports that employed people are the most likely to seek information on the Internet, compared to students or retired respondents (Dutton, & Blank, 2011, p.21). While e-governance strategies in Britain have been a focus since 2005, less than a quarter of the respondents used these services. Political and civic activity is also low and NGUs are no different to the rest of the population in this area (Dutton, & Blank, 2011, p.28).

In this latest Oxford population study, gender is no longer a defining factor that divides users, however age, education, occupation and income continue to be factors that affect use. Younger people tend to use the Internet extensively, with use declining in the older age groups. Use in the older age groups has remained stable since 2005 (Dutton, & Blank, 2011, p.15). This population study is extensive and indicates that access and how people use the Internet at the population level is dependent on a number of factors including age, occupation, education and income. Not surprisingly, Internet use by NGUs is closely related to income levels, which may be a cost factor, since new technologies tend to be expensive and unavailable to most young people who

fall into the Net Generation age bracket. The data of this study also found that students (Net Generation) were less likely to use the Internet for information-seeking than employed people, although they were using it extensively for other activities.

The *Digital Future Report* is an annual study that began in 2001 and focuses on the impact of the Internet on Americans aged over sixteen. The latest report indicates that 82% of Americans use the Internet, which is the same figure for 2009 (Center for the Digital Future, 2011, p.30). Cost and income continued to be cited as factors affecting Internet use which declined for the first time and 18% of Americans are non-users. 25% of non-users did not like using or had no interest in the Internet (p.55). While 96% of young people under 18 said the Internet was important for their study, 84% of parents said their grades had stayed the same or declined since they began using the Internet at home (p.160-161). Email usage was almost universal across all age groups as a form of communication (94%), even though text messaging was increasing, particularly amongst younger users (p.123). Users who said they would miss their print newspaper grew slightly (63%) (p.91). Although eGovernance in the USA has also been a major strategy especially online voting, there was limited use by respondents in the 16 and over age group. Use increased as age decreased and the highest percentage of Internet use was among Americans under the age of eighteen. Americans over the age of 16 used the Internet for browsing (79%), online banking (47%), shopping and social networking (46%), gaming (39%), downloading videos (39%) and music (38%), and paying bills (22%) (p.39). In this study nearly half (48%) of those who participated were concerned about Internet surveillance by large corporations and government (p.84-85), however, 45% of all participants said they trusted information on the Internet (p.84). Clearly, in this population study, activities such as browsing, buying and selling, social networking, gaming and downloading music and videos was not restricted to members of the Net Generation.

In Australia the latest data from the *Household Use of Information Technology* collected from the *Multipurpose Household Survey* from the Australian Bureau of Statistics reports that 79% of households had access to the

Internet in 2010-2011. Access to the Internet was highest in the higher income brackets (95%) and in households which had children under 15 years of age (Australian Bureau of Statistics (ABS), 2011). An estimated 6.7 million households had Internet access during 2010-2011. Use by Australians aged 15 and older increased to 79% with the highest users (96%) in the Net Generation age bracket. Similar to the UK population study, increased educational attainment and Internet access were closely linked as a major factor affecting access. Most people in the survey reported using the Internet at home (95%), followed by work (49%). Of the 13.3 million people surveyed the most common activities were email (91%), browsing and news (87%) and personal business such as online banking (64%) (ABS, 2011). Users aged 15-17 were using the Internet for gaming and social networking instead of email, while the 25-34 age group were using it for paying bills and online banking (64%). 68% of users had used the Internet for shopping, with 16% citing security concerns as a reason for not using the Internet for this purpose. Statistics for older users (sixty years and older) indicated that 54% had access to the Internet in 2009 (ABS, 2011). The most common activities included email and browsing, however, 46% reported accessing government websites, 41% used the Internet for shopping and 65% used it for paying bills (ABS, 2011). The Australian population studies also indicated that using the Internet for a range of activities was not restricted to the Net Generation age group, but spread across the generations.

Use of the Internet in all these studies is widespread across the population and for a range of activities including communication and social networking, buying and selling, personal business transactions such as paying bills and to a smaller extent, engaging with eGovernance sites. While young people are using the Internet extensively, they are likely to have access to ICTs mainly in the home. How they are using it is also similar to other generations, although social networking and texting using mobile phones appear to be more common amongst Net Generation users.

2.3.2. The Net Generation - Long and short term studies

Proponents of the Net Generation idea posit that frequent use of ICTs, particularly the Internet has led to a generation of intuitive, super users or digital

natives, who do not require tuition on how to use these technologies. Population studies such as those discussed in Section 4.1.1., indicate that use of ICTs and the Internet are becoming a ubiquitous part of society and while young people are using technology extensively, older generations are also using it as part of their everyday lives. Whether young people exhibit the assigned attributes of the Net Generation, however, is open to question and has been the subject of a number of large and smaller research studies. Major, ongoing studies have been undertaken in the United Kingdom (UK), the USA and Australia.

In the UK the Joint Information Systems Committee (JISC), has been conducting research in this area for nearly twenty years and ‘encouraging the adoption and usage of digital technologies within UK teaching, learning and research’ (Joint Information Systems Committee (JISC), 2012). An early study, the JUBILEE project (JISC User Behaviour in Information Seeking: Longitudinal Evaluation of Electronic Information Services) was set up ‘to predict, monitor and characterise information-seeking behaviour in relation to electronic information services (EIS)’ across different disciplines in the university environment (Banwell,& Gannon-Leary, 2000, p.189). This and other studies (Armstrong, Fenton, Lonsdale, Stoker, Thomas & and Urquhart, 2001) found that both students and academics used ICTs at a basic level, using mostly email and word processing. While the resource potential of the Internet and specialist electronic information services for academics and students was recognised, variable skill levels in how to use the Internet and electronic resources efficiently and effectively inhibited widespread usage. These studies reported an overwhelming reliance by academics and students on Internet search engines rather than using specialised electronic information services. Search strategies appeared to be ad-hoc in nature, students rarely used electronic resources supplied by the university library and there was little evidence of coherent search strategies used by students (Armstrong, et al., 2001, p.241, 260). Students rarely used even simple Boolean logic to refine their search strategies and seemed to be disinterested or unwilling to alter their current patterns of information-seeking behaviour. Loss of face and admitting to a lack of knowledge and skill were also cited as major difficulties for the researchers when collecting data for the project (Banwell,& Gannon-Leary, 2000, p.191).

This reliance on the Internet, coupled with poor search skills and a lack of critical information evaluation skills compounds the problem of poor information literacy skills. The JUBILEE project also found that the possession of basic IT skills does not necessarily translate into users having comparable information handling skills (Coulson, Ray & Banwell, 2003, p.440).

These early findings were reiterated in the *ICT Literacy Assessment* report from the US Educational Testing Service (ETS), where researchers confirmed that large numbers of college students did not know how to use refined search strategies, did not have information management skills and few test takers could accurately adapt the information they found (Educational Testing Service (ETS), 2006). In more recent studies, Hargittai found that young people's use and skill levels when using technology were diverse and dependent on socioeconomic status, with those from more privileged backgrounds incorporating technology into their everyday lives, using it for a wider range of activities and with a higher skill level (Hargittai, 2010, p.92). Corrin, Bennett and Lockyer (2010) found that usage by first year university students did 'not fit neatly into the stereotype of the digital native' (p.10). Use by students varied from high to non-use and they tended to use it less for academic study, with use depending on purpose. As part of the *Project Information Literacy*, Head and Eisenberg (2010) surveyed students from across 25 campuses about their information-seeking strategies and difficulties when researching a topic. While respondents were confident they had good evaluation skills of Web and library resources for coursework, they were less inclined to evaluate Web content for personal use. They used significant others such as friends and family and instructors when seeking help with evaluating information for personal use and course research respectively. The findings suggested that students use information-seeking strategies that are dependent on efficiency (how fast can I get this done) and being able to manage the amount of information required. They admitted to having difficulties especially when getting started on research assignments and determining what was required to complete the assignment (Head & Eisenberg, 2010, p.1). Research conducted by Jones and Cross concluded:

The Net generation appears if anything to be a collection of minorities with a small number of technophobic students and larger numbers of others making use of new technologies but in ways that did not fully correspond with many of the expectations built into the Net generation and Digital Natives theses (Jones & Cross, 2009, p.10).

Margaryan, Littlejohn & Vojt, (2011) found that undergraduates at two British universities used a limited range of technologies for both academic and personal use, including social networking utilities. They also demonstrated limited use of emergent and collaborative knowledge creation tools and did not appear to exhibit different patterns of learning and sharing to other age groups. In fact their patterns of learning appeared to be defined by the approaches adopted by their lecturers. Students conformed to traditional pedagogies with both students and lecturers using a limited range of technologies for learning (p.438-429.). When examining the use of Web 2.0 technologies by post secondary students' about to enter university, Roberts (2010) found 'that the Digital Generation does not function as a monolithic group, but that the use of Web 2.0 technologies is related to developmental stages and life situation (p.93). The results of these recent investigations of students' engagement with technology at university level, indicate that perhaps little has changed since the early work conducted by the JUBILEE project.

The JUSTEIS project (JISC Usage Survey: Trends in Electronic Information Service) examined trends in electronic information service usage. As with the JUBILEE project, a major finding was the reliance on search engines to access information. Both students and academics used electronic journals and specialist electronic information services infrequently (Griffiths & Brophy, 2002; Griffiths, 2003). Students tended to navigate websites by clicking on links rather than utilising sophisticated or complex search strategies. This finding is also supported by a number of other early studies. A small early research study by Agosto (2002) examining how adolescent females made decisions when searching the Web, found they exhibited satisficing behaviour (near enough is good enough) when selecting websites. However, this behaviour was defined by acceptance (they were satisfied with the result) and a range of other factors such as boredom, poor quality websites, time limits and an uncomfortable workstation. This meant their searching experiences on the Web

were often frustrating and unsatisfactory (Agosto, 2002, p.25). Martzoukou (2004) and Fidel et al (1999) found that students used 'landmarks' or favourite websites as starting points for a search, and regularly used the back button to navigate. Sandvig and Baiwa found that university students 'have a significant preference for using browsing methods (hyperlinks) over search (via search features) and hybrid (combination) methods' (Sandvig & Baiwa, 2004, p.3). Poor searching skills and an inability to know where they are in virtual space (sometimes called Internet or network literacy) was also a finding of the *UK Children Go Online* (UKCGO) studies. Many participants did not demonstrate the cognitive skills necessary to navigate hypertext successfully (Scott, & O'Sullivan, 2005). They browsed or surfed the Internet or used Google to get quick, easy results. In a small research study of 15 children aged between 11 and 16; Madden, Ford, Miller and Levy (2006) found that a child's search capability was dependent on previous exposure to the Internet, the amount of guidance by significant others (adults and peers) and their ability to use the tools available (Madden, Ford, Miller and Levy, 2006, p.744). While older students proved to be more proficient than younger students since previous exposure to Internet searching was a significant factor in success, all participants appeared to have few issues with the technicalities of searching the Web. Confidence and self-efficacy were high as most of the participants felt they were better at searching than their parents, even though they exhibited some unusual search techniques such as making up their own URLs (p.757). While the researchers felt that participants' use of inappropriate search modifiers would improve over time, the issue of poor discrimination and evaluation of the websites they found was felt to be a serious concern (p.744). In a small scale study using eye tracking software Pan and associates examined participants' use of the Google search engine (Pan, Hembrooke, Joachims, Lorigo, Gay & Granka, 2007). They found that participants trusted the Google search results and selected only higher order results even though the abstracts indicated they were not particularly relevant to the original search query. They concluded that participants did not understand how search engines work or the ranking mechanism used by search engines such as Google. This research suggests that the lack of evaluation skills that concerned Madden, Ford, Miller and Levy in the previous study, actually

occurs at the search result page and before young people actually reach a website or information source.

More recently, the two-year ERIAL (Ethnographic Research in Illinois Academic Libraries) project (Kolowich, 2011) examined how students used their campus libraries. In this study researchers found that students at all levels overused Google and misused electronic resources (databases) provided by the library. They preferred simple search options such as keywords or phrases, exhibited poor search strategies and had difficulty finding information using the Internet and electronic resources. However, both lecturers and academic librarians assumed students had the skills necessary to be successful information-seekers (Kolowich, 2011). A major reason why students' failed to seek assistance was due to a belief in their own skills and the fact they did not realise the extent of their own information illiteracy. As one of the librarians participating in the study commented, 'today's college students might have grown up with the language of the information age, but they do not necessarily know the grammar' (Kolowich, 2011).

Dawson examined the levels of computer illiteracy amongst students and lecturers at the Swinburn Institute of Social Research (Dawson, 2012). The findings of this study concluded that students and educators were digitally challenged, although lecturers were more fearful of technology failure in classes than their students. Educators who were enthusiastic about using new technologies were more likely to use them, but were in the minority, while well over half were resistant to the use of Web 2.0. The research also suggested that 'digitally challenged educators are often not using constructivist pedagogy in the classroom and more likely to adopt an educator-centric approach' (Dawson, 2012). Many students enjoyed having a laptop through the school laptop program, but enjoyed using the Internet at home more and felt their digital literacy skills development had developed through home use (67%) (Dawson, 2012).

The results of these recent research studies indicate that little has changed in schools and universities since the results from the early JISC studies were reported ten years ago. Members of the so-called Net Generation do not

necessarily exhibit the attributes assigned to them by proponents such as Tapscott, Prensky, and Palfrey and Gasser. Many young people appear to have difficulty transferring their informal use of the Internet which is primarily based around leisure and social activities, into serious information-seeking contexts such as university and school which require higher levels of information literacy for success. The inability to use the Internet and electronic resources in a sophisticated way does not appear to be limited to young people, however, with poor levels of engagement also apparent amongst teachers and lecturers.

The Researcher of the Future (JISC, 2008), a research project commissioned by the British Library and JISC, and conducted by the University College of London (UCL) Centre for Information Behaviour and the Evaluation of Research (CIBER) Group, is a virtual longitudinal study examining the research literature and emerging patterns of use amongst higher education students through an examination of Web logs, to investigate the following hypothesis.

The untested assumption is that this generation is somehow qualitatively 'different' from what went before: that they have different aptitudes, attitudes, expectations and even different communication and information 'literacies' and that these will somehow transfer to their use of libraries and information services as they enter higher education and research careers (Nicholas, Rowlands & Huntington, 2008, p.5).

In this study researchers found that 89% of university students always begin their information search using Google and 93% are happy with their results.

Several information-seeking behaviours were reported including the following:

- horizontal information seeking (skimming and viewing one or two web pages, before 'bouncing out');
- poor navigation skills ('finding their bearings' and way around sites);
- viewing rather than in-depth reading or 'power browsing' where users look for a quick 'information fix';
- squirreling behaviour (downloading lots of information but rarely using it);
- one-size does not fit all and behaviour may be affected by gender, geographical location, type of university and status; and
- checking behaviour to assess authenticity by relying on favoured search engines such as Google (Nicholas, Rowlands & Huntington, 2008, p.10).

However, the researchers also found that these results were not specific to young people, but were the same for professors, lecturers and other practitioners. 'Everyone exhibits a bouncing/flicking behaviour, which sees them searching horizontally rather than vertically. Power browsing and viewing is the norm for all' (Nicholas, Rowlands & Huntington, 2008, p.8). This result was also confirmed in a previous large-scale population study conducted by the CIBER Group (Nicholas, Huntington, Williams & Dobrowolski, 2004). The main characteristics of digital information-seeking behaviour in these earlier studies indicated that everyone is using the Internet in the same way: 'today's information consumer is a 'flicker' or a 'bouncer' ... even those who penetrate the sites, rarely go beyond the home page or wander very far' (Nicholas, Dobrowolski, Russell & Whitney, 2003, p.26.).

These studies indicate that while young people are very confident information-seekers, they have poor searching skills and unsophisticated understandings and mental maps of how the Internet works. They associate success with primary search engine brands such as Google, because they offer a safe and simple solution to their information needs (Nicholas, Rowlands & Huntington, 2008, p.12). Indeed the sheer simplicity of Google's search page (no clutter) and easy keyword search is a major reason for its popularity amongst all age groups (Payne, 2007; Dudek, Mastora, & Landoni, 2007). Since simple search strategies using electronic resources were observed in research studies that pre-date the advent of the WWW, widespread access to the Internet and electronic resources does not appear to have altered search behaviour (Nicholas, Rowlands & Huntington, 2008, p.15). *The Researcher of the Future* review also found that both recent and older research studies (pre-WWW) indicate that young people in the Net Generation age bracket do not evaluate the information they find. The authors concluded that commentary describing Net Generation users as expert searchers:

... is a dangerous myth. Digital literacies and information literacies do not go hand in hand. A careful look at the literature over the past 25 years finds no improvement (or deterioration) in young people's information skills (Nicholas, Rowlands & Huntington, 2008, p.20).

The JISC and CIBER Group studies indicate that young people do not understand the difference between electronic information sources and the

Internet and as a consequence, use similar and very simple search methods when trying to find information. The *Researcher of the Future* study concluded that 'many of the claims made on behalf of the Google Generation in the popular media fail to stack up fully against the evidence' (Nicholas, Rowlands & Huntington, 2008, p.18).

In a real sense, we are all Google generation now: the demographics of internet and media consumption are rapidly eroding this presumed generational difference. ... In many ways the Google generation label is increasingly unhelpful: recent research finds that it is not even accurate within the cohort of young people that it seeks to stereotype. A 2007 survey by Synovate finds that only 27% of UK teenagers could really be described as having the kind of deep interest and facility in IT that the label implies. The majority ('average Joes', 57%) use relatively low level technology to support their basic communication or entertainment needs and there is a substantial residuum of 20% ('digital dissidents') who actively dislike technology and avoid using it wherever possible (Nicholas, Rowlands & Huntington, 2008, p.21).

Research into the capabilities of Net Generation pre-service teachers by Lei (2009) supports the JISC findings. While the respondents in this study were very positive about technology, they were only moderately confident about using it in the classroom. The majority (80%) spent a lot of time on social networking and communication, but only a small number (10%) spent most of their time on academic related activities (Lei, 2009, p.89-90). While participants were proficient users of basic technologies they did not exhibit the same skill levels with Web 2.0, assistive and emerging technologies and had difficulty transferring their social knowledge and skills to the classroom environment (p.91-92). These results are supported in more recent research by So, Choi, Lim, & Xiong (2012). The results from this study suggest that the teachers and lecturers currently working in schools and universities are no different to the Net Generation teachers now entering the education workforce. Lei concluded:

The results suggest that, growing up with technology, digital natives as preservice teachers are savvy with basic technologies and social-communication technologies. However, their technology proficiency is limited by both the narrow scope and the lack of depth of their technology activities. Systemic technology preparation is needed to help them learn more advanced technologies, classroom technologies, and assistive technologies, and more important, to help them make the connections between technology and teaching and to help them make the transition from digital-native students to digital-native teachers (Lei, 2009, p. 94).

Another large-scale longitudinal research study (2003-2005) is the *UK Children Go Online* (UKCGO) project which investigated the use of the Internet by 9-19 year olds. Findings from this study indicated that Internet access and use were popular, although there were still significant inequalities, especially with home access.

Nearly all children and young people (98%) have used the internet: 75% of 9-19 year olds have accessed the internet from a computer at home, and school access is near universal (92%) ... Access platforms are diversifying, yet socioeconomic differences in the extent and quality of access persist, as do age and gender differences in the extent and quality of internet use. Indeed, the project identified a wide range of ways in which different groups of young people are using the internet (Livingstone, 2006, p.5.).

While this project identified a wide range of reasons for using the Internet by young people, many were not socially acceptable. The authors concluded that young people in the UK were not critical or discerning users of technology, they had poor Internet literacy skills (cannot find their way around the Internet), invariably trusted the information they found and rarely questioned authenticity or authority (Livingstone, Bober & Helsper, 2005, p.3). In fact the more expert the student (used the Internet longer), the less likely they were to question the information they found. Participants found searching for information difficult and did not have good critical evaluation skills of online content, a result of receiving only 'patchy educational support', with a third reporting they had received instruction in how to evaluate the authenticity of online information. This research found that young people communicated mostly with their peers and rarely participated in civic, global or political activities online.

Despite popular expectation, the research did not find that online communication particularly encourages online participation in civic or public spheres. Indeed, an emergent theme of the project was young people's disaffection not only with political participation in general but with the hope the internet could change things (Livingstone, 2006, p.2.).

A general lack of skills and technical knowledge meant that few of the users surveyed were innovative and created web sites (Livingstone, Bober & Helsper, 2004, p.9-10). In this project confidence also emerged as an important factor that appears to affect how young people approach learning new skills and technologies. In a small research study Kolikant (2010) interviewed 25 post-elementary students and found that while the majority used the Internet and ICTs they did not believe they were as good at learning as previous generations. They

felt the Internet over-simplified learning (Kolikant, 2010, p.1384). Kolikant concluded that low self-efficacy in this area would have repercussions on students' application to their school work. While young people used the Internet for a range of purposes in the UKCGO and other studies, they continued to struggle when seeking information.

Results from the UKCGO study offer a contradictory picture of the Net Generation. On the one hand we have a generation of users who appear to be tech-savvy and who although confident in their abilities and ready to claim greater online skills than their parents, also admit they often can't find their way around the Internet. This finding is also supported by research conducted in educational contexts where the information-seeking behaviour of students from a variety of age groups has been studied. Shenton (2007) calls this the third paradox of information behaviour which deals with the actions and opinions of young people when using the Web (p.3-4). He discusses research from a number of studies which show that despite being motivated and confident in their ability to find information on the Internet, young people are often easily discouraged when unsuccessful and highly critical of the medium (Internet). Young people tend to be satisfied with information of dubious quality because it is convenient and readily available. They feel swamped by the volume of information available and are often distracted when using the Internet for information seeking. Shenton's analysis of the literature and his own research study led him to conclude that 'young people are often highly critical of particular information resources, yet continue to use them habitually' (Shenton, 2007, p,4). Shenton's third paradox suggests that young people may have a culture of technology use when using the Internet that is so ingrained that even when they are unsuccessful or critical of the medium and their own ability to find the information they need, they do not change their information-seeking behaviour.

In two small scale studies Branch (2003) discovered that students (aged 11-15) required specific instructional intervention to develop effective information skills. Students were often confused and found the amount of information on the Internet daunting. As a result they often experienced

significant levels of frustration. Another early study by Waldman (2003) found that self-efficacy was a significant factor in how students used library resources. Students with low self perceptions also tended to have poor computer literacy skills, used fewer electronic resources and experienced lower academic success (Waldman, 2003). The UKCGO study concluded that successful information-seeking behaviour and associated expertise is dependent on the experience of the user rather than age (Livingstone & Bober, 2004, Waldman, 2003). More recently Bullen, Mayan and Qayyum (2011) also found that the Net Generation participants (aged 18-24) in their study used a limited technology toolkit that was defined by familiarity and how well a technology matched their particular needs, cost and immediacy (p.2). They found no evidence of a deep understanding of technology, but students did use a variety of tools and online utilities in ways that suited their particular context or met a specific need (p.18). The UKCGO group concluded that:

It seems that 'access' to the internet is not as simple as turning on the computer and clicking on 'Google'. A range of skills, some more complex than others, is required to access the range of online facilities (Livingstone, Bober & Helsper, 2005, p.3).

The *Pew Internet & American Life Project* has conducted a number of research studies on how the Net Generation use the Internet (Rainie & Horrigan, 2002), how they find information using search engines (Fallows, 2005), how teens view technology at school and at home (Arafeh, Levin, Rainie & Lenhart, 2002) and how teens use technology (Lenhart, Madden, & Hitlin, 2005). These studies produced similar findings to the UK studies. While users felt comfortable using search engines and were satisfied with their search results, few users knew much about them or used sophisticated search strategies. They trusted search engines and the information provided (Fallows, 2005, p.13-15). Even though users admitted to knowing little about search engines they were confident in their ability to use search engines to find information. Teens in these studies also stopped searching once they felt they had found an answer (satisficing) and they demonstrated a tendency to rely on single sources of information (Fallows, 2005, p.11). The Pew studies also concluded that teens prefer to spend face-to-face time with their friends and used landline telephones

to keep in touch³ (Lenhart, Madden, & Hitlin, 2005, p.10). Similar to the UKCGO studies, they preferred to communicate with friends and avoided people they didn't know when using the Internet. Teens in this research used the Internet for gaming (81%), entertainment and news (76%), shopping (43%) and information-seeking (31%), with 51% of teens reporting daily use, mostly at home. While email use was high, most teens preferred to use IM (instant messaging) (Lenhart, Madden, & Hitlin, 2005, p.i). The most recent PEW study found that Advanced Placement and National Writing Project teachers felt the Internet and digital search tools created distracting environments where students were developing short attention spans. In this study teachers felt digital tools used by students hindered academic achievement (Purcell, Rainie, Heaps, Buchanan, Friedrich, Jacklin, Chen & Zickuhr, 2012).

Critics of the Pew studies point to significant flaws in the research method, including the omission of significant population groups and a very narrow definition of technology (Bernier, 2005). The *Digital Disconnect* study by Arafeh et al (2002) only included students who were considered to be Internet-savvy, thus equating time spent using technology with a degree of expertise. In this study students were not asked to describe how they located, evaluated or critically analysed information. 'In fact, their [the students] expectation was that the Internet should do [the] work for them' (Everhart, & Valenza, 2004, p.51.). While students' perceptions of their skill levels was high, as with the UK studies, finding the right information was frustrating and time consuming. Students used unsophisticated search strategies and tended to browse or use commercial search engines like Google. They also demonstrated 'a serious lack of understanding of the limits of the free Web' (Everhart, & Valenza, 2004, p.51.). The 2005 PEW population study of public awareness of Internet terms revealed that only small numbers of Net Generation respondents (18-29) understood the terms podcasting and RSS Feeds (12%), while 55% understood the terms Adware and Internet phishing (Rainie, 2005, p. 2). A criticism of this

³ This report was published in 2005. Landline phone calls are free in the US which may explain this finding. These results may now have changed due to social networking and Web 2.0 technologies, although cost may still be a major contributing factor, especially if teens are paying their own phone bills.

report is that results are only available for the whole group surveyed and those aged between 18-29 and 65+. The survey also did not ask respondents what they understood the terms to mean, only if they thought they understood them.

Another recent report from the PEW project notes that the Net Generation or Millennials (18-33) were more likely to use wireless laptops or a mobile phone to access the Internet. The older cohort (34-45) or Generation X were more likely to use government websites and conduct a range of activities online. However, the distinctions between the two groups when using the Internet to find health information, buy and sell online, organizing travel and downloading podcasts was no longer significant (Zickhur, 2010, p.1-3). The Center also released a report on the Millennials (Taylor & Keeter, 2010). A real problem with this study, especially the website, is the misuse of statistics to compare and contrast different generations. This difficulty is acknowledged by the authors (Taylor & Keeter, 2010, p.4) in the actual report. There is also no clear indication of the primary sources or methods used to collect and analyse the statistics provided in the Millennials report, the results of which occasionally appear to contradict the findings in the *Generations 2010* report. The PEW studies rely on telephone surveys and the findings are often supplemented from other, earlier surveys. This is the case with the Millennials report. Even though this report purports to examine generational differences the participants in this survey were not spread evenly, with 830 of a total 2,020 respondents falling in the 18-29 age group (Taylor & Keeter, 2010, p.i). Although the method used to collect this data does not appear to be particularly rigorous, the findings for the Millennial generation include how young people perceive and differentiate themselves from older groups, with 24% saying that technology sets them apart (p.13). Since the demographics and methods used to collect data for the PEW reports have been questioned, these findings need to be considered within the bigger picture of more rigorous academic research. However, The PEW Research Center projects are widely circulated and used extensively by educators in the USA and are disseminated to a global audience.

The Centre for Research and Innovation (CERI) has published a number of reports on the new millennium learner which focus on the integration of

technology into learning programs rather than making assumptions about the Net Generation (OECD, 2012). In their study *Are the new millennium learners making the grade?* (OECD, 2010) a major finding is the digital disconnect between access to technology and the capability of the learner to use it efficiently and effectively for information-seeking and learning. Commenting on his blog *Net Gen Skeptic* while attending the *New Millennium Learners' Conference*, Mark Bullen maintains it is 'a refreshing change to be at a conference focused on the impact of digital technologies on education that is grounded in evidence rather than hype and speculation' (Bullen, 2009). His comments indicate just how influential the Net Generation theory has become on education in the USA.

... there are two related but quite distinct discourses around the digital learner. The one that takes centre stage in North America and which I have been most critical of because there no solid research to back it up, is the Net Generation discourse. It suggests, among other things, that the Net Generation has learned a new set of sophisticated technology skills by merely being exposed to the technologies since birth. The implication is that we don't need to teach this generation how to use the technology to make sense of the overwhelming and increasing amount of information available to us (Bullen, 2009).

And:

Work is increasingly knowledge-based, and the technologies are making increasing and vast amounts of information instantly available to us. To cope with these fundamental changes ... we need new skills of information and knowledge management using ICTs. It is not enough to know how to send text messages, use word processing tools, post to blogs, use Facebook etc. We all need to be able to use these technologies to locate, analyze, evaluate and synthesize information that is relevant to our lives and work. (Bullen, 2009).

Other studies have found that users do not have good information skills when using websites. They tend to rely on text clues and/or images when searching a website. Search engines on sites are rarely used effectively or efficiently. Authors of these studies conclude that the design of a website is crucial to effective use (Davenport, 1997, Levine, 2002; Madden et al, 2006), and perhaps this is true. However, there is a growing body of evidence to suggest that young people's attitudes, how they seek information and use the Internet and electronic resources is based on a common set of behaviours that appear in studies worldwide. *Thwarted Innovation: What happened to elearning and why?* (Zemsky, & Massy, 2004), examined elearning initiatives across sixteen universities. Major findings from this study reported that students did

not view or use technology and electronic resources as learning tools. While students wanted to be connected to each other, they viewed elearning as a convenience at best and a distraction at its worst. Their primary use for the Internet was for communication and entertainment (Zemsky, & Massy, 2004, p.iii). It may be that attitudes and primary use of the Internet also affect how young people search for information, and the transference of these skills to more serious information-seeking such as learning environments is not something that happens as a result of exposure to technology (Lei, 2009). Certainly, results from the research literature indicate that young people do not demonstrate the characteristics of a tech-savvy Net Generation.

Kvavik's research, discussed in an earlier section of this chapter, was published in the ebook *Educating the Net Generation* and began with the premise that this generation is different, 'possess[es] unprecedented levels of skill with information technology; [and] think[s] about and use[s] technology very differently from earlier student cohorts' (Kvavik, 2005, p.7.1). Findings from his study however, revealed that students were using technology for word processing, email and communications, entertainment and 'surfing' (the Net) for leisure. How students used technology for educational purposes was determined by their course. While they demonstrated skills with basic office suite applications, they tended 'to know just enough technology functionality to accomplish their work; they have less in-depth application knowledge or problem-solving skills' (Kvavik, 2005, p. 7.6). The quantitative data in this study where students reported good skill levels with technology, differed from the qualitative data which indicated that students had real difficulties moving beyond basic activities. They did not demonstrate advanced skill levels or appear to recognise the enhanced functionality of the technologies they were using. Kvavik also found that a quarter of the students (25.6%) preferred no or limited technology as part of their study experience (Kvavik, 2005, p. 7.8). This percentage closely mimics the 'digital dissidents' figure (20%) found in the *Researcher of the Future* research (Nicholas, Rowlands & Huntington, 2008, p,21) and supports Shenton's idea of a paradox, where young people are confident they have Net Generation attributes, while still having considerable difficulty using the technology for information-seeking (Shenton, 2007). Since

Kvavik's findings contradicted the Net Generation attributes that provided a baseline for this book, he appears to temporise somewhat and concludes:

Some complacency may have occurred because of the belief that Net Gen students require less training with technology. Student and faculty use of instructional technology is more limited than is often portrayed. Students appear to be slower developing adequate skills in using information technology in support of their academic activities, which limits technology's current value to the institution (Kvavik, 2005, p. 7.18).

Lohnes and Kinzer (2007) interviewed a small group of liberal arts students who were already competent users of editing and Web publishing software. They examined students' use of technology in and out of the classroom and found that the liberal arts students were resistant to using even laptops in the classroom, citing auditory distraction and the laptop being a barrier and antithetic to creating a classroom community. In this case how the students perceived their learning environment (collaborative and community focused), affected how they used technology in the classroom, even though they were all using a range of technologies and social networking tools outside the learning environment. The authors concluded that how Net Generation students use technology is far more complex than the simple dichotomy of digital native versus digital immigrants and 'there is a need for more ethnographic and mixed-method studies to begin to fill in the gaps around the "why" and the "how" of college students' technology practices' (Lohnes & Kinzer, 2007).

In Australia, an early study by Edwards observed a small number of university students studying a single subject dealing with information retrieval and different types of information resources. The study was conducted over a three year period and sought to understand the student experience when Web searching. The intent behind the research was to improve the curriculum design of the subject, while also encouraging students to 'pan for gold rather than junk when they search' (Edwards and Bruce, 2006). Findings from this study indicated that confidence was a negative factor influencing effective search. Perceptions of students' search experience also appeared to fall into four categories. The categories likened the search experience to looking for a needle in a haystack, finding a way through a maze, using tools as a filter and panning for gold (Edwards and Bruce, 2006, p. 357-538). The four categories appeared to be associated with different levels of awareness, different learning styles and

different search outcomes (Edwards and Bruce, 2006, p. 358-539). Participants also felt their search strategies had improved due to reflective time to think about their searching and the involvement of the teachers during the unit of study. This small, in-depth study correlates with findings from the early JISC studies in the UK and indicate that students in the Net Generation age group at this time did not exhibit the attributes assigned to digital natives.

Another major Australian study supported by the Carrick Institute and conducted by researchers from the University of Melbourne, the University of Wollongong and Charles Sturt University set out to investigate the idea of a Net Generation and the subsequent gap posited to exist between learners' and teachers' use of technologies in the higher education context. In this study the authors note the following:

... there is an inherent assumption that because students are using particular technologies in their everyday lives this warrants their use in teaching and learning; and ... moreover, it is not clear that emerging technologies and students' everyday skills with them will easily translate into beneficial technology-based learning (Kennedy, et al., 2006, p.414)

This study surveyed over two thousand first year students across three university campuses about their frequency of use for 41 different applications of new technologies in their study and personal lives. The study found that while students frequently searched for information on the Internet, used email, mobile telephony and SMS messaging; they were infrequent users of Web 2.0 technologies and only a small group were regularly using social networking and digital file sharing (Chang, Kennedy, & Petrovic, 2008). Some students even admitted to having no knowledge or experience with these technologies. The study concluded that we need 'to be wary of overgeneralising the distinctive features of this generation, as individuals or as a group, their lifestyles or their learning styles based on assumptions about technology use or preferences' (Kennedy et al. 2007, p.522). When comparing differences between the digital natives (first year students) and the digital immigrants (staff), the study found that there were small differences for technologies related to mobile phone use and gaming.

However, there were no role, gender or age effects for technology-based activities associated with Web 2.0 technologies, and the overall use of these technologies was low. These findings support a growing evidence

base that, while some differences exist, the 'digital divide' between students and staff is not nearly as large as some commentators would have us believe (Kennedy, et al., 2008, p. 165.).

In their latest study, this group have examined whether the digital natives are a homogeneous group (Kennedy, Judd, Dalgarno & Waycott, 2010). They found that Net Generation users show a diverse range of technology skills and preferences (p.332). Using a cluster analysis of 2000+ students aged between 17-26, they found four distinct types of technology users which they identified as power users, ordinary users, irregular users and basic users (p.332). Power users (14%) typically utilised a wide range of technologies and used them more often. Ordinary users (27%) regularly used the Internet and mobile technologies (mobile phones), but were not using emerging technologies or Web 2.0. Irregular users (14%) were engaging far less frequently with the Internet and mobile technologies than ordinary users, with the exception of Web 2.0 publishing. Basic users (45%) rarely used emerging technologies and the Internet, but used mobile technologies (p.339).

In this study there were clear differences amongst the four groups identified according to university, gender, age and residency, but no differences based on discipline, socioeconomic status or rurality (p.340). The authors concluded:

...the overall diversity in the technological backgrounds of Net Generation students, coupled with the fact that the experiences of different student 'types' can vary with regard to specific technologies, has important implications for university educators, those who support them and policy-makers (p.340).

While the evidence suggests therefore that there is a clear subset of students who might fit with Prensky's idea of 'Digital Natives', these students are the exception rather than the rule (p.341).

Major findings for this study:

Net Generation students are far from homogeneous. The individual technologies that any given student uses or has experience with are difficult to predict. In particular, experience with one technology cannot be reliably used to predict experience with another. There are a number of demographic variables other than age that may predict a student's technology experience; these include gender, university and cultural background (p.431).

A major attribute assigned to the Net Generation is the ability to multi-task. However, the term multi-tasking is rarely defined in the Net Generation commentary, other than to note that young people appear to have many technologies operating at once (Hempel, & Lehman, 2005; Barnes, Marateo & Ferris, 2007) or many programs open simultaneously on a computer. While acknowledging that much of the research indicates that children learn better when focused, Palfrey & Gasser (2009, p.190-191) cite one study that showed the use of laptops in the classroom made no difference to the traditional memory tests used to evaluate their performance. Other studies, however, indicate that few of us can conduct effectively several tasks at any one time. Dzubak (2008) defines multi-tasking as activities that occur at the same time. Multi-tasking behaviour needs to be considered in the context of the user, the purpose and the goals of the activity and the term is often confused with sequential processing, sometimes called task switching, which is the performance of many tasks sequentially and in quick succession (p.1-2). Research studies show that task switching requires extra attention and as a result the secondary task does not receive the same amount of focus (p. 2). Dzubak concludes:

Does multitasking interfere with learning? It all depends on the difficulty of a task, its meaningfulness, and our ability to maintain attention. Thinking and learning require focus and sustained attention. The more interruptions that occur during this process, the greater the negative impact on encoding and storage of information. We know what is required for deep and effective learning. We also know that multitasking is not compatible with it (Dzubak, 2008, p.6).

Ellis, Daniels & Jauregui (2010) conducted a comparative study with Business Education students in the Net Generation age bracket and found that texting during class by half of the participants resulted in lower test scores (conducted at the end of the lesson). Junco (2012) used a large sample (1000+ participants) to examine the relationship between multi-tasking and students' overall semester grade point average. Students in this study were texting during class, but using other ICTs to a lesser extent. Findings in this study reported that only use of ICTs such as Facebook and texting resulted in lower grade point average scores. Kraushaar & Novak (2010) used spyware to track laptop use in an information systems management class. They found that students had 'disruptive windows' open for 42% of the time, although the researchers felt the amount of use was not accurately reported by the students. They also found that

students who used only 'productive windows' (course related) achieved at a higher level across all assessment activities including in-class quizzes, projects and exams (Kraushaar & Novak, 2010, p.249). In a recent study of 774 university students, Barak (2012) observed that the majority of students engaged in multi-tasking and found this activity was unfavourably linked to lower grade point averages and a greater likelihood of participating in risk behaviours.

According to these research studies multi-tasking is not conducive to learning, especially deep learning, critical analysis and effective memory retrieval. Descriptions of the Net Generation that include the term multi-tasking are more likely to be examples of sequential processing or task switching. Having several programs running on a computer or a number of technologies in operation at once do not involve either task switching or multi-tasking unless the user engages fully with the technology. The research on multi-tasking by this generation indicates that professing to be a good multi-tasker may not be advantageous to either education or the workplace.

2.3.3. The Net Generation in the workplace

As discussed previously, there have been a number of articles in recent years which support the idea of a Net Generation and describe changes required for the future workplace to cater for this new generation of workers who have different expectations and a superior knowledge of technology. However, there is also evidence that the member of the Net Generation are far from ready to enter the world of work. The US Educational Testing Service (ETS, 2006, 2007) found that Net Generation students had poor ICT literacy, critical thinking and information management skills necessary to succeed at school and in the workforce (Bogan, 2006). Net Generation graduates coming into the workforce have been found to lack professionalism, have inadequate work ethics and poor problem-solving and critical thinking abilities. The USA *Are they really ready for work?* report (The Conference Board, 2006) concluded that:

While "excellence" is infrequently reported, over 60 percent of employer respondents rate the preparation of high school graduate entrants as "adequate" in three applied skills considered "very important" for successful job performance by a majority of employers - *Information Technology (IT) Application, Diversity, and Teamwork/Collaboration* (p.13).

The survey results indicate that far too many young people are inadequately prepared to be successful in the workplace. At the high school level, well over one-half of new entrants are deficiently prepared in the most important skills - *Oral and Written Communications, Professionalism/Work Ethic, and Critical Thinking/Problem Solving*. College graduates are better prepared, with lower levels of deficiency on the most important skills, but too few are excelling (p.7).

The Net Generation need other types of training to be successful in the workplace according to Tyler (2008). She also maintains they lack an understanding of how to behave professionally, have poor literacy skills, struggle with confidentiality, lack critical thinking skills and find it difficult to accept constructive criticism. Increasingly, employers are finding large gaps in the Net Generation's preparation for work and this includes technical and communication skills (Preston, 2007). Certainly, this new generation of employees needs new management strategies as the world of work is being transformed by technology; however, reports from the employer sector indicate that young people don't have the communication, problem-solving and critical thinking, or technology skills that are major components of the Net Generation attributes.

The findings of all the research studies discussed above indicate that the proponents of the Net Generation and social commentators such as Prensky and Tapscott do not have a cogent explanation for how young people use technology. The large population, longitudinal and single research studies conducted during the last ten years in the United Kingdom, Australia and America, are an attempt to define exactly what young adults are doing when they use the Internet and electronic resources and are an indication of a growing concern amongst academics, political leaders and communities about this generation's alleged skill levels. While Tapscott's Net Generation construct appears to describe a new culture of technology use that explains how young adults interact with the Internet, the inferences drawn from these observations do not provide an adequate explanation of young people's skill levels or how they are actually using technology to satisfy their information needs. Reports from employers also indicate that despite the educational imperative to cater for this generation by placing technology in schools, young people may not be adequately prepared for the workplace.

2.4. Conclusion

The Net Generation theory became popular at a time when the first thrall of the Web took hold and Internet access became available to the general public. The original theory and its extrapolations about how young people use technology were established at a time when the information landscape was much simpler than the one we have today. The Internet and especially the introduction of the WWW and user-friendly browsers marked the beginning of a major change in how society generates, uses and perceives information. Fifteen years after Tapscott first observed how young people were using the Internet, the information landscape in which we live, work and play is increasingly complex and constantly evolving. Developments in new technologies not only change the infrastructure and mode of information delivery, but it also changes the way society processes, creates, uses and views information.

Floridi calls this new information domain the 'infosphere', an holistic term which refers to the whole informational environment - its structures, constituents, agents, processes and mutual relations (Floridi, 2007, p.59). This infosphere is not limited to electronic media, and also includes traditional information media such as print, radio, television and video. This new landscape is very dynamic. It includes and is shaped by the humans who inhabit it, intervention activities, developments in technology, ideas, cultures of technology use and attitudes. The technological structures and technologies that drive the components of the new information landscape are also in a constant state of change. Technologies are becoming more affordable, user-friendly and convergent (Combes & Valli, 2007). Thus, the new landscape is increasingly complex and contains old fashioned information artefacts such as books, television and radio that are usually stand alone, alongside newer, converging artefacts such as the Internet, interactive tools and utilities on the WWW (Web 2.0 and Web 3.0); and multifunctional, mobile, hand-held devices that store and retrieve information, provide access to the Internet and a wide range of tools (applications), enable communication using a range of delivery modes and provide multimedia delivery that can be generated across a number of linked platforms.

For the user operating in the new landscape, the information artefacts are also access devices, so the technology being used as the delivery mode is also the information resource, eg. the WWW. For the user, the delivery mode or technology is often confused with the information resource and attributes associated with the technology have become associated with the information it stores and delivers, and vice versa. When information in print dominated, the authority of information was verified to a certain extent by the publishing industry. In this environment the written word was perceived as being solid, having worth or validity and authority, particularly as its publication was usually associated with an evaluation process that could be relied upon by the user. Although we now have Web-based multimedia, interactive Web 2.0 tools and utilities, text is still a major component of information on the Internet and how we communicate, a fact which tends to strengthen the perception that information in this environment is 'solid' and authoritative.

However, in the digital environment information has two major characteristics which are contradictory in nature or what Shenton (2007) calls a paradox. On the one hand, digital information is quite fluid. Information on the Internet can be copied and pasted, altered slightly and be attributed to a number of different authors and disseminated widely, very rapidly via convergent devices to a number of different locations even though there is a single primary source/author. Hence, information delivered via the Internet is often perceived as having more value and authenticity, because it appears in multiple locations and publications. It may also be decontextualised and appear in a condensed or abridged format (RSS Feeds and Twitter) or in a social context (blogs, wikis, Facebook). On the other hand digital information is increasingly solid. It has greater longevity, is available to a wider and more public audience, may be regenerated and re-circulated over a number of years and in some instances such as social networking sites, very difficult to remove. Since text is still a major component of information on the Internet and a major component of how we communicate using ICTs, the traditional perceptions of authority and validity still resonate with most users. So while information in this environment appears to be solid, its origins may be fluid and the way it behaves is fluid.

Hence, the early observations by the proponents of the Net Generation such as Tapscott and Prensky continue to have resonance and influence, even though there is now an enormous amount of rigorous academic research that largely refutes the attributes assigned to the Net Generation. Since most of the academic research remains locked away from the general public and popular media in subscription only journal databases, it is the idea of a Net Generation that continues to have resonance with the general public, politicians and many educators. Thus, how society perceives and uses the new information landscape is directly affected by the technology and vice versa.

Floridi maintains that ICTs and the convergence of technologies are 'reontologizing' (a very radical form of reengineering) the very nature of the infosphere and are responsible for transforming the information landscape at fundamental levels as technology becomes embedded into everyday life (Floridi, 2007, p. 59). Two ways ICTs have and continue to transform the infosphere, are the change from analogue to digital data and the burgeoning nature of digital space (Floridi, 2007, p.60). With developments in cloud computing and the use of convergent platforms/devices and delivery modes, these two facets have become even more evident since Floridi was writing about future developments in 2007. However, Floridi concluded:

One thing seems indubitable though: the digital divide will become a chasm, generating new forms of discrimination between those who can be denizens of the infosphere and those who cannot, between insiders and outsiders, between information rich and information poor (p.62).

Thus, the new information landscape is not only increasingly complex and undergoing continual structural change (new technologies), but our traditional perceptions of what constitutes an information resource or form is being altered. The way we/society interact with information is also being altered as the information forms change and develop. An early observation by Vicker (2003) is still true today and as one set of users moves on from blogs and wikis to newer social media, a new set arrives, thus increasing the complexity of the information landscape and adding to its evolutionary nature. As evidenced in the academic research literature, how young people are dealing with this new landscape does not reflect the Net Generation attributes ascribed to them by early observers. Hence, Shenton notes as his fourth paradox that 'despite the

sophistication of today's information age, youngsters frequently follow a basic formula for action when finding and using information (Shenton 2007). This may be due to a number of factors such as a lack of instruction, a culture of technology use or how intelligent software is now directing the information-seeker when using the Internet to find information. The academic research literature indicates that the Net Generation construct which consists of highly competent digital natives is simplistic and highly contentious. However, it is the idea of a Net Generation and terms such *digital native* and *digital immigrant* that continue to have resonance with the wider public, educators, politicians and government. If Floridi is correct, then rather than a generation of digital natives, young people may be exhibiting behaviours that are more aptly described using Scanlon's term – *digital refugees* (Scanlon, 2009). Successful information-seeking in the digital environment is the result of complex skills that include problem-solving, digital literacies, critical analysis and higher order thinking, in an information landscape that is in constant state of flux. This research provides a snapshot in time of how a group of young people at the upper age group of the Net Generation (at the time of data collection) were using a range of technologies for study and in their daily lives. It will add to the academic research literature and provide an in-depth picture of a particular group of digital natives' perceptions of how they were using technology, and the behaviours they demonstrated when using the Internet for formal and informal information-seeking.

Chapter 3 - Research Method and Design

3.0. Introduction

This chapter details the methods and design of the research used to conduct this study. It includes an examination of the research methods selection process and why the research was conducted using the chosen methodology. Research methods are established tools designed to provide the researcher with data that will thoroughly examine the research questions/investigations in a rigorous fashion to produce a comprehensive piece of research (Moore, 2000). The research design section includes the context of the research and participants and a detailed description of all data collection techniques. This section is supplemented by Appendices 1 - 6⁴. The aim of this chapter is to establish a sound and logical link between the research investigations and the methods used for data collection and analysis.

3.1. Research method selection process

A number of research methods were considered during the research design process including action research, case studies and ethnography. To justify the methods used in this study, this section discusses these approaches, the reasons they were deemed inappropriate and any elements that were incorporated into the research.

Action research is an iterative method described as consisting of “a family of research methodologies with dual aims of action (that is, change) and research (that is, understanding)” (Dick, 1999). These research methodologies “pursue action and research outcomes at the same time. [Action research] therefore has some components which resemble consultancy or change agency, and some which resemble field research” (Dick, 2000). Action research works through iterative cycles with repetitions of evaluation, implementation and

⁴ Appendix 1: Ethics documentation; Appendix 2: Survey instrument; Appendix 3: Cluster analysis report; Appendix 4: Sample notes of participant activity during task analysis; Appendix 5: Anecdotal field notes post interview; Appendix 6: Interview checklist

review to monitor change in participant behaviour. Constant evaluation and review determine whether behaviours change due to changes in the iteration (Blaxter, Hughes, & Tight, 1998; Pickard, 2007). Action research can be conducted by individuals or teams to improve a process or solve a problem (Avison, Lau, Myers, & Nielsen, 1999; Stringer, 2008). “At its broadest, action research can refer to any process with the dual aim of changing a situation and producing knowledge” (Hughes, 2004).

Action research was deemed inappropriate for this study because it usually involves the active participation of the researcher. Such close involvement poses problems for the researcher who may not be able to present an objective analysis of the behaviour being studied (Moore, 2000; Williamson, 2000, Pickard, 2007). Even though this research is looking at information-seeking behaviour, action research method was not considered useful since a primary aim of the research investigations was to obtain some objective, empirical and observational data about the behaviours of young people when using the Internet for information-seeking. The issue of involvement by the researcher when conducting action research and the possibility of influencing participant behaviour precluded the use of this method. Action research was also deemed inappropriate because this research does not change or implement any actions to alter the information-seeking behaviours of the participants.

Using case studies was also considered as a possible method for this research. Case studies are in-depth investigations of particular contexts. This method focuses on and examines in detail what is happening in a specific context or within a specific location. Information acquired through the case study can enhance understandings of a particular topic and advance current knowledge.

Qualitative cases study is characterised by researchers spending extended time, on site, personally in contact with activities and operations of the case, reflecting, and revising meanings of what is going on (Stake, 2003, p. 203).

The tight focus of a case study cannot yield data about an entire population (Yin, 2002, 2003; Eisenhardt, 1989). Instead, it is a deep examination of a contained population that may include observing participants’ actions and responses

(Grasiano & Raulin, 2004; Pickard, 2007). Data collection may employ several techniques such as questionnaires, interviews and observations (Eisenhardt, 1989; Pickard 2007).

Although using a case study method would provide in-depth data about participants' information-seeking behaviour, this would apply to a small population from a specific context. For this reason, case study method was considered inappropriate for investigating the information-seeking behaviour of a large segment of the Net Generation, which required a broader sample population to acquire some general data about how a range of young people use the Internet. Although participants in this research were limited to two universities, no other factors such as courses being studied, nationality/ethnicity, gender and socioeconomic status limited participation. The only specific factor connecting participants was their age: between 18 and 22 years (at the time of data collection), or the upper end of the Net Generation.

While the research method used here exhibits some facets normally associated with ethnography, it is not a true ethnographic study. "The term ethnography refers to the research method and the research output" and "is the process of engagement and the written account of that engagement" (Pickard, 2007, p.111). Ethnographic research deals with culture and investigates how a particular group understand and organise their lives (Buchanan, 2004).

The goal of ethnography is to combine the view of an insider with that of an outsider to describe a social setting. The resulting description is expected to be deeper and fuller than that of the ordinary outsider, and broader and less culture-bound than that of the ordinary insider (Wilcox, 1982, p. 462).

When we talk about studying culture in this way, we are not referring to an ethnic or high culture or popular culture. Instead, culture is defined as 'the ensemble of social processes by which meanings are produced, circulated and exchanged (Thwaites, Davis & Mules, 1994 in Bow, 2000, p. 248).

Ethnography often includes multiple methods that require the researcher to participate over a period of time in the daily lives of the population being studied (Hammersley and Atkinson, 1995). The notion of the researcher becoming so closely aligned with the participants and subsequently influencing their information-seeking behaviour also precluded this method/approach. Although

participant observation and interviews are techniques used in this research, steps were taken to minimise the influence of the researcher.

The primary aim of this research was to understand how young people use the Internet to find information, what methods they use, and how their actual information-seeking behaviours differ from perceived behaviours and beliefs. The investigation was framed by the attributes assigned to young people as posited by the proponents of the Net Generation idea and discussed in Chapter 2 (Section 2.2.1). This research sets out to test these attributes and to thoroughly investigate how young people perceive their information-seeking behaviour versus what they are actually doing when using the Internet and electronic resources to find information. While, the research method employed seeks to describe patterns of behaviour, these behaviours do not exist or apply to a single context, but rather describe how young people are using the Internet and technology in their daily lives. So while the method used in this research contains some of the features normally associated with an ethnographic study and employs participant observation and interviews, it is not the purpose of this study to “describe and interpret a cultural social group” (Pickard, 2007, p. 111) in its entirety, but only in relation to its information behaviour.

3.2. Research method

Research can be described as a highly conscious, formal process that uses rigour and discipline to examine and interpret our environment and the activities of the human beings who inhabit our world (Williamson, 2000; Pickard, 2007). Definitions from the information field include the following:

Research ... is an organised, systemic, data-based, critical, scientific inquiry or investigation into a specific problem, undertaken with the objective of finding answers or solutions to it (Sekeran, 1992 in Williamson, 2000, p. 6)

For the social scientist or researcher in applied fields, research is a process of trying to gain a better understanding of human interactions. Through systematic means, the researcher gathers information about actions and interactions, reflects on their meaning, arrives at and evaluates conclusions, and eventually puts forward an interpretation (Marshall & Rossman, 1995 in Williamson, 2000, p.6.)

The first of these definitions comes from the *positivist* research tradition in which emphasis has been on the collection of quantitative data, often from surveys and questionnaires. The second definition is from the *interpretivist* tradition which is based on extracting meaning from people. Data collection in this tradition is qualitative and may include interviews and observations (Williamson, 2000). To gain a clear picture of how young people are using technology, this study will use a multi-faceted or mixed methods approach and use both quantitative and qualitative methods. Thus, the research will employ both positivist and interpretivist approaches, to provide a more holistic picture of how young people seek information in the online environment, since many of the studies discussed in Chapter Two (Literature Review) are quantitative and positivist in nature. Using both quantitative and qualitative methods in a single piece of research is strongly supported in the literature (Jick, 1979; Kaplan & Duchon, 1988; Steckler, McLeroy, Goodman, Bird, & McCormick, 1992; Williamson, 2000; Bryman, 2007; Creswell & Tashakkori, 2007; Pickard, 2007;). This type of study is sometimes referred to as exploratory research, in which the researcher seeks new insights to find out what is actually happening by examining behaviours, asking questions and assessing phenomena in a new light (Robson, 1997). According to Babbie, exploratory research must “satisfy the researcher’s curiosity and desire for better understanding, test the feasibility of undertaking a more extensive study and develop the methods to be employed in any subsequent study” (Babbie, 2010, p. 92). Since no single method of data collection will provide all perspectives, particularly when examining individuals’ behaviour, using more than one method ensures a more complete description or picture will emerge (Nachmias & Nachmias, 1981; Bryman, 2007)

The incorporation of mixed methods to obtain the most complete, rich, and in-depth data about a singular phenomenon allows for ‘triangulation’ or ‘the combination of methodologies’ so each section of the investigation provides support and enlightenment for other sections (Jick, 1979). The benefits of triangulation include the consistent reinforcement of findings by using a number of methods which produce ‘convergent validation’. Jick maintains that triangulation allows the researcher to reach deeper understandings.

[Triangulation] can also capture a more complete, holistic, and contextual portrayal of the unit(s) under study. That is, beyond the analysis of overlapping variance, the use of multiple measures may also uncover some unique variance which otherwise may have been neglected by single methods. ... Triangulation may be used not only to examine the same phenomenon from multiple perspectives, but also to enrich our understanding by allowing for new or deeper dimensions to emerge. (Jick, 1979, pp. 603-604)

Triangulation has another purpose. The selection of triangulation sources and techniques that have different biases and different strengths can complement each other (Miles & Huberman, 1994 in Pickard, 2007, p. 86). It is important when using a mixed methods approach for research, to integrate the quantitative and qualitative methods and design the research process in a holistic manner at the beginning, to ensure all methods lock together so the focus of the research investigations is being addressed comprehensively (Bryman, 2007; Creswell & Tashakkori, 2007; Kaplan & Duchon, 1988). The use of mixed methods and triangulation is strongly supported in the literature (Jick, 1979; Greene, Caracelli, & Graham, 1989; Sydenstricker-Neto, 1997; Bryman, 2007;) as a means of ensuring a rich, detailed and holistic picture of the area under study and as a method of testing the consistency of any findings. For these reasons, a mixed method approach and triangulation were utilised in this research.

Since this study is examining young people's perceptions about themselves and others of their generation, as well as what they think they are doing as opposed to their actual information-seeking behaviour; a number of different methods were used to satisfy both aspects of triangulation identified above. Survey, interview, participant observation and task analysis techniques were used to provide a range of different data to inform the most accurate explanation of how young people search for information using the Internet and electronic resources. The combination of these methods allowed the researcher to take on the role of outside enquirer and anonymous observer in order to maintain some distance from the participants, thus ensuring greater objectivity. The research was conducted in two phases, with the results of the questionnaire in Phase One providing data for the selection of participants in Phase Two (which used participant observation, task analysis and semi-structured

interviews). An overview of the mixed method approach used for this research study is shown in Figure 3-1 below.

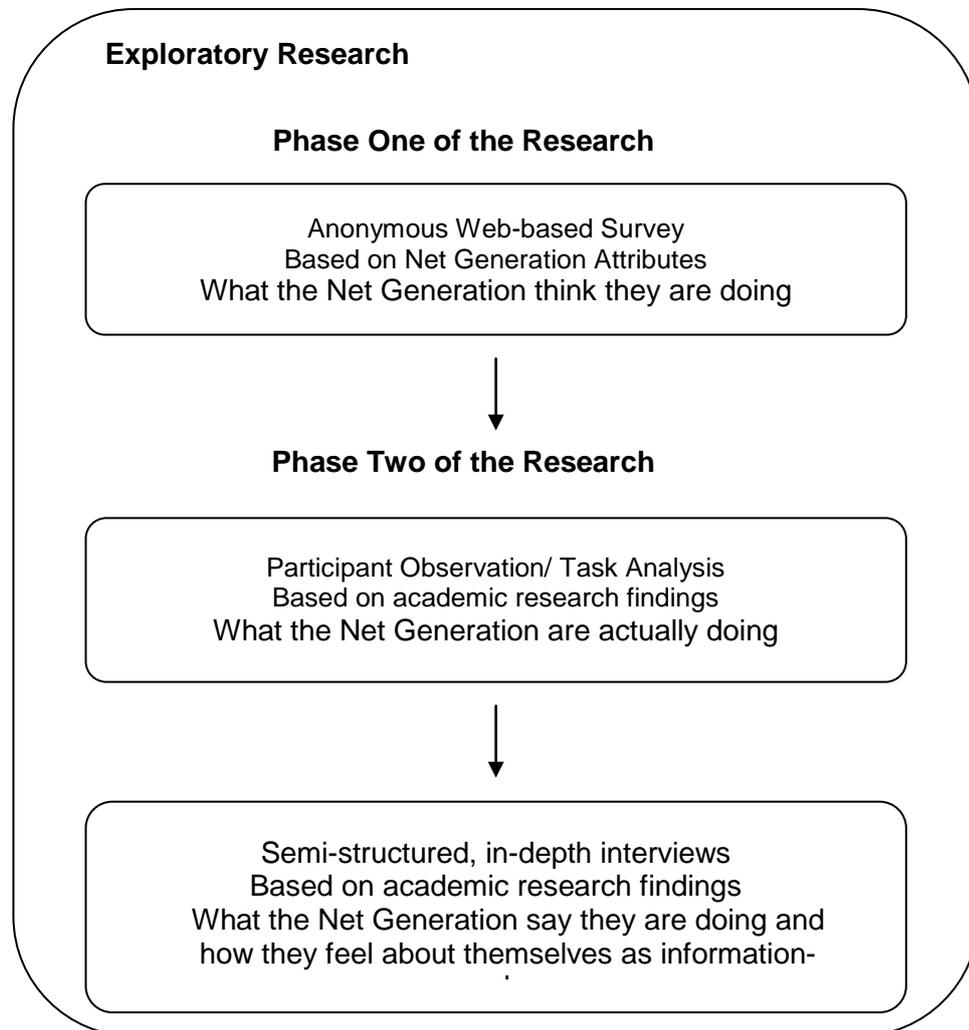


Figure 3-1: Mixed method approach overview

3.2.1. Survey method

Phase One of the research consisted of an anonymous Web-based survey using the Net Generation attributes discussed in Chapter Two (Section 2.2.1.) as the basis for question design. “Surveys and questionnaires are tools that enable the researcher to investigate trends and characteristics that are present within a population” (Pribyl, 1994, p. 195) in a cost effective and time efficient manner. Findings may then be used as a beginning point for more in-depth examination of issues and patterns of behaviour of a particular population. Using the survey method enables the researcher to gain “a snapshot of the current state of affairs

in a given group or population” (Janes, 2001, p. 419). Surveys are effective tools that can be used with other techniques for the purposes of triangulation (Jick, 1979), as they provide an overview of a large number of participants from the target population. A major issue with this method is obtaining a representative sample from the target population (Tanner, 2000). In this research the target population was the oldest members of the Net Generation aged between 18 and 22 years (at the time of data collection, 2007-2008). However, by using the two universities as collection points for participants, the target population has been stratified (Pribyl, 1994) to include only these particular university students aged between 18 and 22. It could be argued that young people at university are more educated and therefore more likely to be tech-savvy users of the Internet and electronic resources, especially since they use these for study purposes. This variable has been counteracted somewhat, due to the fact that both universities are ranked as mid to low-tier universities which cater for a wide range of applied studies and have large numbers of overseas students. One has a rural campus, and students come from a wide range of socioeconomic and cultural backgrounds. While the target population used for this study is not truly representative of the general population, it will still provide a snapshot of what these young people are doing when using technology to search for information on the Internet and electronic resources.

The Web was chosen as a delivery platform for the questionnaire to provide access to the maximum number of students in the target age group (18 – 22 years). Using the Web is cheap, allows for a fast turn-around for data collection (Nancarrow, Pallister, & Brace, 2001), and has been shown to be a reliable alternative to telephone surveys (Braunsberger, Wybenga & Gates, 2007). While the anonymity afforded to participants by conducting the questionnaire online allows them to answer the questions in a non-threatening environment, Web-based surveys do have some drawbacks. ‘It is generally agreed that the major sources of error in surveys include sampling, coverage, non-response, and measurement error’ (Couper, 2000, p. 466). Coverage error in a Web survey is influenced by lack of access to the Web, and is often the result of a ‘mismatch between the target population [Net Generation] and the frame population [students at these universities aged between 18 and 22]’

(Couper, 2000, p. 467). In this case, all prospective participants in the frame population had free access to the Internet and electronic resources through their respective universities as part of their enrolment.

Access may be defined as physical access or cognitive access to the technology. Since all students at both universities had student email accounts, physical access was not an issue for this group. Cognitive access relates to people's skill levels and is one of the elements under investigation in this research. There was, therefore, a risk that low confidence or low skilled users may not have been willing to take part in a Web-based questionnaire, although this method is familiar as both of the universities use web-based surveys to obtain feedback from students. To determine how many in the sample population fell into this category, a question about participation in Web surveys was included in the questionnaire.

Sampling error arises in a Web survey because not all members of the frame population are investigated. As mentioned earlier, the sample used in this research is a stratified sample (Pribyl, 1994; Williamson, 2000) and includes students aged between 18 and 22 who attend two universities in Western Australia rather than the general population. The general population in this case is all young people worldwide, aged between 18 and 22, which represents an impossible target population for investigative purposes. Any conclusions reached during this research will represent the findings for this particular sample of the larger population. However, the sample population is large enough (over 500 respondents) to provide a snapshot of how students in this age group were using technology at a particular time, which when compared to other research studies identified in the literature will provide a strong base to explore the information-seeking behaviour of the Net Generation.

Other issues when using Web-based surveys include non-response errors which may be due to survey fatigue and 'satisficing' (near enough is good enough) (Krosnick, 1999). Non-response errors in a self-administered questionnaire can be the result of 'lack of motivation, comprehension problems, [and] deliberate distortion' (Couper, 2000, p. 475), or difficulties in navigating the questionnaire due to poor layout, poor wording or technical flaws

(Nancarrow, Pallister, & Brace, 2001; Pickard, 2007, p. 183-200; Williamson, 2000, p. 217-223). In this case steps were taken to minimise these issues. The questionnaire was clearly divided into sections that each participant had to complete before moving onto the next section (auto-navigation). It was short, with an approximate completion time of ten minutes to reduce fatigue; questions were clearly worded (Shaeffer, Krosnick, Langer, & Merkle, 2005) and demographic data was collected at the end of the questionnaire to maintain participant interest. There were no open questions, and participants were invited to volunteer for the second phase of the research at the end of the questionnaire.

The issues of non-response and satisficing were also addressed by using a four point Likert scale for most of the questions in the questionnaire. Current research indicates that there is little difference in validity when using Likert scales of four points or greater. Although the seven point scale is suggested as the most reliable, there is still much debate on this point (Krosnick, 1999; Tang, Shaw & Vevea, 1999; Cummins, & Gullone, 2000). Research by Krosnick found that the omission of non-opinion options did not compromise the quality of data obtained from questionnaires assessing attitude (Krosnick, et al., 2002). In this questionnaire participants were invited to rate their use and confidence in terms of how they felt about the technologies they use (importance) rather than trying to quantify their use. Only one question asked participants to quantify their use of the Internet over a given period and there was a choice of eleven time periods. Scale points were also clearly labelled to clarify meaning, since reliability and validity have been shown to be significantly improved when this detail is included as part of the questionnaire design (Krosnick, 1999).

The issues of privacy, confidentiality and security have also been suggested as key factors affecting participation in Web surveys (Couper, 2000). In this case a full declaration and disclosure about the purpose of the study, ethics and how the data would be used and stored were presented to the participants before signing into the questionnaire (see Appendix 1). Direction to the university research faculty dealing with ethics and the researcher's email were also included if participants wanted more information. Security to avoid spamming of the site was included as part of the survey design and student sign-

in process (students had to correctly identify randomly generated letters and numbers in a graphic) (Krosnick, 1999; Couper, 2000).

The questionnaire developed to survey the target population was based on the attributes assigned to the Net Generation as reported in the research literature and social commentary (Chapter Two, Section 2.2.1). It consisted of closed questions only and was designed to collect some empirical data from the target population: young people aged between 18 and 22 years.

3.2.2. Participant observation and tasks

Observation of what students are actually doing when they use technology is one way of collecting evidence about information-seeking behaviour directly from the sample group. Observation of participant behaviour allows the researcher to collect evidence of the “here and now” (Pickard, 2007, p. 201) to describe how, in this case students, search for information in a particular context. ‘As the actions and behaviours of people are a central aspect in virtually any enquiry, a natural and obvious technique is to watch what they do, to record this in some way and then describe, analyse and interpret that we have observed’ (Robson, 1997, p. 190). A major issue with observation is the role of the observer, whose participation may influence how the participant performs (Bow, 2000). Performance may be affected in a number of ways. Participants may behave in a way they feel is expected especially when under close scrutiny by the observer, or they may experience anxiety if the task is not going well or as planned (Pickard, 2007). While the influence of the observer can never be completely eliminated, it can be limited to keep the context as close to ‘normal’ as possible. Organising the setting is also important and taking descriptive field notes immediately after an observation session is recommended in the literature (Mellon, 1990; Patton, 2000).

Reports from the research literature indicate that young people have a preference for learning how to use technology by themselves and are reticent about admitting they may not have the necessary skills to find the information they need (Livingstone, Bober, & Helsper, 2005; Nicholas, Rowlands, & Huntington, 2008). This behaviour suggests that any type of observation

technique that is intrusive and directly involves the researcher as an active participant/observer (taking notes) may act as an inhibitor or influence the behaviour of the research subject. To observe and track participant behaviour in an unobtrusive manner, the usability software program *Morae* (TechSmith, 2007) was employed. This software allowed the researcher to record sound, to video participants and record their movements while working with the computer (screen captures). The software displays the participant's face, and plays a sound recording of their musings alongside his/her movements on the computer as displayed on the screen. Thus, a complete picture of what the participants were actually doing when seeking information on the Internet was captured in an unobtrusive manner. While the researcher was in another section of the room during the session in case the participants had any problems, they were left by themselves to conduct the tasks. They were provided with a task sheet, pen and paper, and full access to other word processing functions on the computer, and they were connected to the Internet via their university interface to make the tasks appear as familiar as possible.

Participants were also asked to think aloud about what they were doing during the tasks to clarify their movements on the Internet. Participants received no training on how to conduct a think aloud (verbal protocol), mainly due to time allocation, but also to minimise any effects this may have had on their information-seeking behaviour during the tasks. The researcher did not want participants analysing their own behaviours before the tasks, but rather to react in a manner as close as possible to a real-life situation. Think alouds provide data about behavioural, cognitive, and affective processes (Branch, 2000). They are used to provide information about how an individual solves problems (Russo, Johnson, & Stephens, 1989) and may include how participants feel during a task. While think alouds do not tell the researcher why an individual may be reacting in a certain way or anything about an individual's ability levels, they may say something about how that individual copes with challenges and problems, how he/she view the world and how he/she respond to various circumstances (Cacioppo, von Hippel, & Ernst, 1997). Think alouds have been used extensively in psychology, education and information-seeking studies and are a useful means of identifying patterns of behaviour amongst users (Morrison,

1999; Wildemuth, 2002). Think alouds, or verbal protocols which reflect on a task, have been shown to provide different data to think alouds (while doing the task) (Branch, 2000; Kuusela, & Pallab, 2000). In this case participants' reflections were addressed in the semi-structured, in-depth interviews which, wherever possible, followed the tasks.

Using think alouds and the software program *Morae* allowed the researcher to compare participants' body language and dialogue as they verbalised their actions, with their information seeking behaviour in real time (as it was happening) by tracking and recording their use of the technology. The need for descriptive field notes was alleviated, as the software provided the opportunity for review of all aspects of the task being 'observed' at any time. Reflective notes were also taken by the researcher immediately after interviews whenever this was possible. Using *Morae* supports a scientific approach to observation as it facilitates the capture of a rich set of data using a number of techniques (Nachmias & Nachmias, 1981; Trochim, 2006). Using technology to provide descriptive, observational data is often perceived to produce results which have greater external validity and reliability (Steckler et al., 1992; Golafshani, 2003; Steckler and McLeroy, 2008). Certainly the opportunity to review a 'captured moment in time' means the data may be verified and analysed by others. Using both audio and video recording is also suggested in the literature as a way of limiting observational bias (Nachmias & Nachmias, 1981; Trochim, 2006). Hence, this part of Phase Two of the study also used mixed methods to capture a complete and rich data set that best describes and explains the information-seeking behaviour of the participants, thus providing the researcher with opportunities for further triangulation which adds rigour and depth to qualitative research.

3.2.3. Semi-structured interviews

The semi-structured interviews were designed to examine students' use of the Internet and electronic resources in more detail and provided valuable data about actual versus perceived skill levels (Pickard, 2007, p. 171-182; Williamson, 2000, p. 246). The research literature supports semi structured interviews as a suitable technique for collecting in-depth data, as the interview

forms a framework in which the interviewees can articulate and reflect upon their experiences. In-depth, semi structured interviewing is primarily an 'interpretive process'. It is a research method which accommodates how people interpret the world around them and assign meaning to events, issues and experiences (Liamputtong & Ezzy, 1999, p.4).

The quality of the information elicited from participants in an interview is heavily dependent on the skill of the interviewer (Patton, 2000; Partington, 2001). A semi-structured interview format and an interview prompt checklist were used to provide consistency and to act as a quality assurance measure to balance the influence of the interviewer as a novice (Woodhouse, 2005a; Partington, 2001). These instruments were used to 'cultivate the participant's narrative activity' (Holstein & Gubrium, 1995, p. 76; Pickard, 2007; Williamson, 2000) and counteract the interviewer's lack of experience and training in interview techniques, which may influence the quality of data collected using this technique (Partington, 2001). While using a checklist may initially inhibit the natural flow of the conversation, it provides consistency and focus for the interviewer, adds rigour and integrity to the interview method and final outcomes, and has been identified as 'a means of facilitating interview technique and skill for the novice' (Woodhouse, 2005b, p. 9). The interview checklist also provided the template for the reporting structure used to analyse the interview findings. Responses from the interview questions provided a wealth of qualitative data which were transcribed and coded thematically using the interview question checklist and probes as a guide to identify and record participant responses so patterns of use and common perceptions were evident (Miles & Huberman, 1994; Creswell & Miller, 2000). Hermeneutic analysis was used to provide an iterative, analytical approach (Lee, 1994) to establish the relationship between understanding the text as a whole and the interpretation of its parts. The Interview Checklist is available in Appendix 6. The checklist also assisted in keeping the time allocation (half an hour) consistent for the interviews and kept to a minimum the influence of individual participants who were prone to provide more extensive answers/conversation.

Volunteer participants signed a privacy and confidentiality disclosure statement before the interviews commenced (available in Appendix 1). The in-depth interviews had a reflective focus (completed after the tasks) and contained questions based on the Net Generation attributes. They were designed to obtain a more detailed picture of how young people use the Internet and technology in their daily lives and for seeking information. Wherever possible, the interviews followed the tasks. This sequence was chosen to provide participants with opportunities to reflect and answer the interview questions based on the activities/tasks they had just completed (verbalise what they think they are doing when seeking information online). Reflection was also included at the end of each task, when participants were required to fill in a brief online questionnaire in *Morae* about the difficulty level and any anxiety or frustration they may have experienced during the tasks. The inclusion of reflective practice in the interviews and tasks was designed to act as a counter balance to reports in the literature that students in other studies were very reticent about admitting a lack of skill in their use of the Internet and technology (Banwell, & Gannon-Leary, 2000; Livingstone, Bober, & Helsper, 2005).

Using a mixed methods approach for this study supports the exploratory nature of the area under investigation and strengthens the validity of the research. The inclusion of survey method allowed the researcher to obtain some empirical data from a reasonably large sample of the target population. The anonymity of the Web-based questionnaire should encourage participants to be honest about their feelings and use of the Internet and technology. Following the survey with participant observation, task analysis and semi-structured, in-depth interviews of a range of participant types allowed the researcher to explore any emerging patterns of use and information-seeking behaviour in a thorough and holistic manner. The use of technology provided an environment that was anonymous (Web survey), unobtrusive (*Morae*) and designed to minimise the influence of the researcher, while enabling data collection that was comprehensive and reviewable long after the data collection had taken place.

3.3. Research design

A major purpose of good research design is to “to help avoid the situation in which the evidence does not address the initial research questions” (Yin, 2002, p. 21). Figure 3-2 outlines how the research method used in this study supports the focus investigations and shows the primary relationship between each investigation and the data collection techniques used.

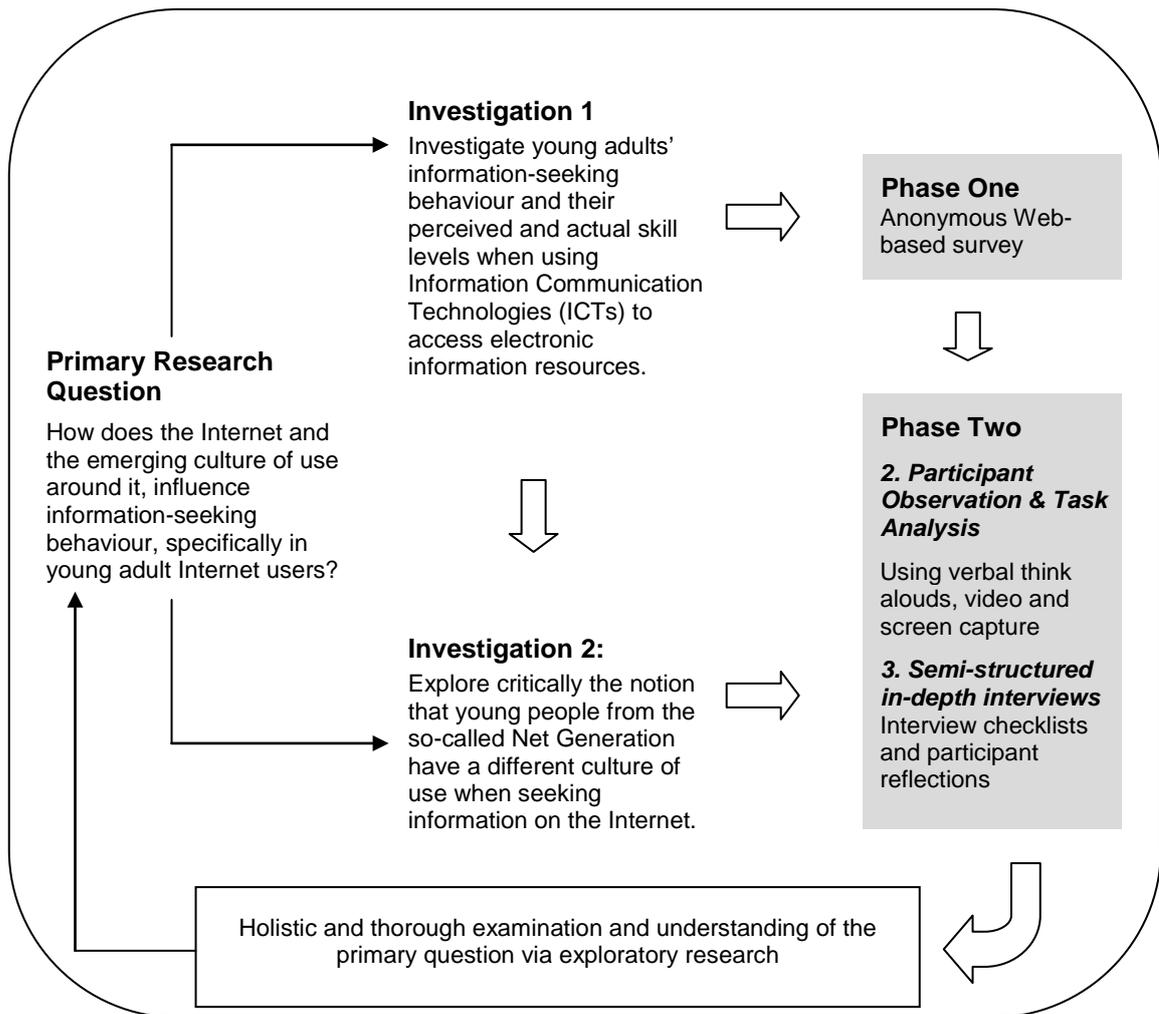


Figure 3-2: Primary relationships between research investigations and data collection techniques

3.3.1. Web-based questionnaire

In this research Phase One of the data collection (Web survey) served two purposes. An anonymous Web questionnaire was used to gather some empirical data about how young people in Australia were using the Internet and

electronic resources to find information and in their daily lives at a particular time. A secondary purpose was to use the questionnaire to extract information that could be used to develop a descriptive metric, the Index of Net Gen-ness (ING), so a range of users could be targeted for the follow-up interviews and tasks (Phase Two). The dual purpose of the questionnaire determined the sequence and content of the questions, as well as the scoring used to create the descriptive metric (ING).

The large studies by Kennedy and colleagues identified in Chapter Two (Section 2.3) (Kennedy, et al., 2006; 2007; 2008; 2010) indicated there is a lack of empirical evidence which documents how members of the Net Generation actually use technology and the implications this lack of research has for education in Australia. The questionnaire for this research was designed to test the Net Generation attributes as defined in the practitioner literature and by social commentators, and to collect some empirical data to add to the current body of knowledge (Web questionnaire available in Appendix 2). As discussed in Chapter Two (Section 2.2.), the proponents of the Net Generation construct include a set of attributes that incorporates two facets when describing how young people use technology. These facets are confidence when using technology (Affective Domain) and high levels of use across a range of devices, online services and utilities (Effective Domain). The questions in the Web survey were designed to collect data regarding these two aspects of the attributes assigned to the members of the Net Generation, while also providing data for the formulation of an ING descriptor for each participant based on the two facets. The questionnaire consisted of closed questions only and covered other areas to add to existing evidence including:

- demographic data;
- historical information about previous use of the Internet in educational and home settings before university;
- Internet usage for personal and study reasons;
- where/from whom participants acquired their online skills;
- what they principally use technology for – information gathering, communication, entertainment, as an organisational tool.

At the end of the questionnaire participants could volunteer for the interview and task analysis – Phase Two of the research. Results from Phase Two should match closely with the results gained from Phase One if participants' perceived skill levels equate with their actual skill levels. Descriptive statistical techniques were used in the preliminary analysis of the results from the Web questionnaire to ascertain what percentages of the sample group were recording similar responses (Dytham, 1999). These were calculated to the third decimal, but rounded to the nearest 0.5% for the Web questionnaire findings chapter (Chapter Four). Such presentation of the data provides a summary that enables easy comparisons across a number of questions and clearly indicates any major similarities that may be present across the whole group (Schild, 1999; Dytham, 2001; Trochim, 2006). A cluster analysis of the original dataset from the questionnaire was also conducted by an outside source to verify the preliminary findings and to execute a finer-grained examination of the dataset (cluster analysis report available in Appendix 3). The results from the cluster analysis indicated there were no significant groups or clusters in this particular dataset. To examine the significance of confidence and level of use as factors which affect how the young people in this sample group were using technology, a bivariate correlation analysis was conducted using *Excel*. 'A correlation is a single number that describes the degree of relationship between two variables' (Dytham, 1999; Trochim, 2006). Since large samples will often produce some degree of significance, only results for the maximum level of significance/probability ($p < 0.0005$) were considered in this research (Dytham, 1999). These results are discussed in Chapter Five.

3.3.2. Index of Net Gen-ness (ING)

As mentioned earlier, a secondary and equally important function of the questionnaire was to provide a filtering mechanism to target participants for the follow-up observation, task analysis and semi-structured, in-depth interviews. The objective was to examine closely the information seeking behaviour of a range of participants as determined by their levels of confidence and levels of use. Questions relating to confidence and levels of use were scored to create a descriptive metric called the Index of Net-Genness (ING) for each participant according to the two facets of the Net Generation attributes that appear in the

Net Generation literature and social commentary. While related questions appeared together, questions dealing with different topics were interspersed amongst the other questions, to avoid participants answering automatically, because there was an obvious sequence.

To introduce the questionnaire, the first three questions in Section 1 asked participants about their previous engagement with technology in educational settings. The fourth question asked them where they mainly used the Internet for study purposes. These questions were designed to collect information about the level of integration of technology experienced by participants before entering university, since high levels of previous engagement may affect their confidence and levels of use. The fourth question was designed to find out where they used the Internet for study/information-seeking.

Section Two of the questionnaire asked participants about their use of the Internet. Question five used a five-point Likert scale (Table 3-2) and asked participants to rate their proficiency level (a measure of confidence) when using the Internet to find information, while question six asked them to quantify their use of the Internet during the previous three months using a similar scale (how much they use it). These questions were scored from zero (Q5 non-user - Q6. no use) to four (Q5. expert – Q6. very frequently) and used with scores from other questions to generate the ING for each participant, with question five falling in the Affective Domain and question six in the Effective domain. Questions seven and eight asked participants to quantify time (hours per week) spent using the Internet for study purposes and for personal use. These two questions were designed to provide data about frequency of use and whether participants used the Internet more for study or leisure activities. These questions were not scored for the ING metric as it was felt that the accuracy of participants' responses could be an issue since quantifying time retrospectively is very difficult. Rather, these questions were designed to obtain an overall picture of how much time participants thought they were spending on the Internet for study and leisure purposes. Question nine asked participants how long they had been using the Internet.

Section three of the questionnaire asked participants to rate the importance of the Internet for a range of activities (question 10) including studying, communication, online services, organisation, leisure and finding information. Questions relating to technology use which were scored for the ING avoided asking participants to quantify how much they used a technology, service or Web-based utility, because it was felt that accuracy could be an issue. Instead participants were asked to rate the importance of a technology, service or Web-based utility in their lives. The rationale underlying this strategy was the reasoning that the greater the level of importance, the higher the level of use. Thus question ten had seven subsections which were scored from zero (not important) to three (essential) and generated a total of twenty-one points for the highest level of use when scored using a four-point Likert scale (Table 3-2) for the formulation of the Effective Domain ING descriptor. Question eleven explored the importance of a range of Web-based utilities and services, while question twelve examined the importance of a range of devices used by participants in their daily lives. Questions eleven and twelve were also scored using a four-point Likert scale from zero to three and generated a combined total of sixty-nine points. When combined, the total number of points for levels of use (Effective Domain) for this participant group equalled ninety-four points (questions 6, 10, 11 and 12).

Section five (question 13) asked participants how they had first learned to use the Internet and to rate the influence of significant others (not important to essential) including teachers at school, siblings and parents/guardians. They were also asked if they had taken short courses at TAFE, experimented by themselves or learnt by reading books and magazines. This question was designed to find out how participants had acquired their skills when using the Internet. It was deemed important to know how young people acquire their skills. This question does not appear in the academic research studies, although the proponents of the Net Generation idea seem to be aware that young people are learning how to use and using the Internet by themselves (Tapscott, 1998; Prensky, 2001).

Section six collected information about the Affective Domain and asked participants how they felt about using the Internet for a range of activities. Questions fourteen and fifteen used the descriptors not confident, gaining confidence, confident and very confident. The questions were also scored from zero to three, the same as for the questions about level of use. Question sixteen asked participants to rate their enjoyment when using the Internet. This question used the descriptors strongly dislike to very enjoyable and were also scored from zero to three. The overall total for these questions (Affective Domain) when question five was added equalled 61.

Section seven dealt with demographic data (age, gender, years at university and whether they were a fulltime or part time student) and included questions about prior use of Web surveys as this issue was identified in the academic literature in the past (Couper 2000). Participants were also asked to provide some additional information about their study mode at university (online, on campus, mixed mode). A second questionnaire, examined participants use if they clicked on *never use the Internet* for question six. This questionnaire was a shorter version that asked about preferences when using the Internet and demographic data. No one clicked on this option. The questionnaire design and scoring mechanism for each section and domain are outlined below in Tables 3-1 and 3-2 below.

Table 3-1: Questionnaire design

Historical data		
Net Gen attributes, previous use of technology,	Questions 1, 2, 3, 4	No scoring
Level of use		
Net Gen attributes, quantitative self-assessment, personal and study	Questions 7, 8, 9	No scoring
Affective Domain		
Net Gen attributes, level of confidence, feelings, information literacy skills	Questions 5, 14, 15, 16	Total score = 61 Mean = 30.5
Effective Domain		
Net Gen attributes, level of use, importance	Questions 6, 10, 11, 12,	Total score = 94 Mean = 47
Skills acquisition		
Major influences in Internet skills acquisition	Question 13	No scoring
Demographic data		
Gender, age, years at university, part time or fulltime, study mode, previous use of Web surveys	Questions 17, 18, 19, 20, 21, 22	No scoring

Table 3-2: Scoring for Effective and Affective Domains

Affective Domain – confidence/feelings using the Internet/technologies (Q 14.15.16)				
Not confident	Gaining confidence	Confident	Very confident	
0	1	2	3	
Strongly dislike	Dislike	Like	Very enjoyable	
0	1	2	3	
Rating of skill level (Q 5)				
Non-user	Beginner	Average	Good	Expert
1	2	3	4	5
Effective Domain – use of the Internet/technologies (Q 10. 11, 12)				
Not important	Minor importance	Major importance	Essential	
0	1	2	3	
Level of use (previous 3 months) (Q 6)				
Never	Occasionally	Sometimes	Often	Very frequently
1	2	3	4	5

Results from the questionnaire were scored for all participants to create an Index of Net Gen-ness (ING). It was originally posited that participants would fall into four major categories. The four ING categories are presented in Figure 3-3 below. The ING categories with sample scores from participants who were a close fit (within one standard deviation of the mean score for that category) are presented in Table 3-3 below with the Affective Domain score (confidence) appearing first and the Effective Domain (use) second.

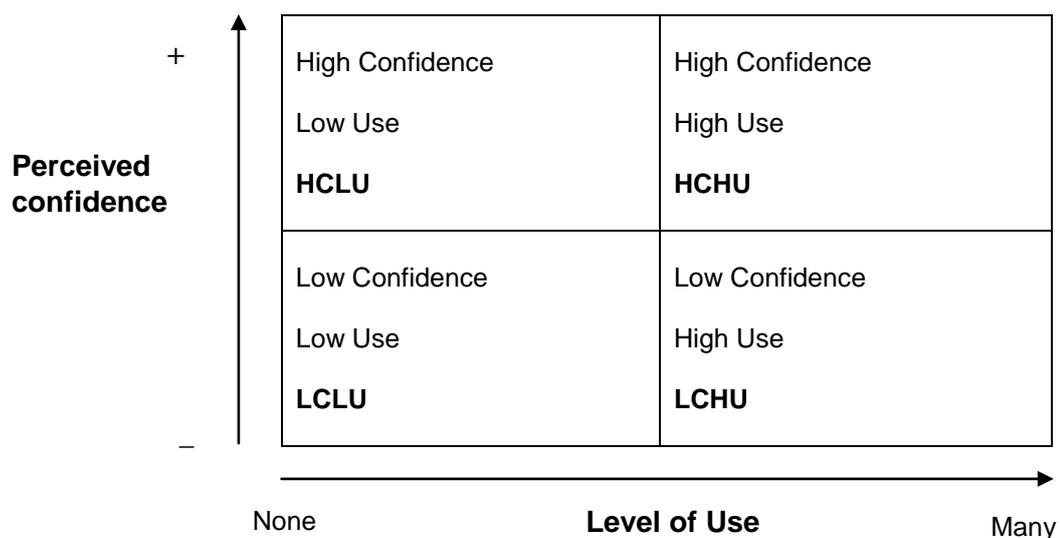


Figure 3-3: Four major ING categories

Table 3-3: Index of Net Gen-ness (ING)

ING Category	Example scoring
LC/LU - Low Confidence/Low Use	participant #59, ING = 28:36
LC/HU - Low Confidence/High Use	participant #54, ING = 25:53
HC/LU - High Confidence/Low Use	participant #547, ING = 47:24
HC/HU - High Confidence/High Use	participant #341, ING = 58:83

A graphical representation of participants' ING scores was also developed using a scattergram in Excel. These graphs included all participant ING scores and indicate the range of scores around the mean ING scores for the Affective and Effective Domains for this particular sample group and those at one standard deviation from the means to indicate significance. An example of the scattergram is presented in Figure 3-4 below. It should be noted that participants in this sample group were almost one standard deviation higher for the Affective Domain (confidence) than the mean calculated for the scoring metric in Table 3.1 above and participants tended to cluster within one standard deviation of each mean, indicating they were a very homogeneous group. This fact was supported by the results from the cluster analysis which reported no significant groups present in this sample.

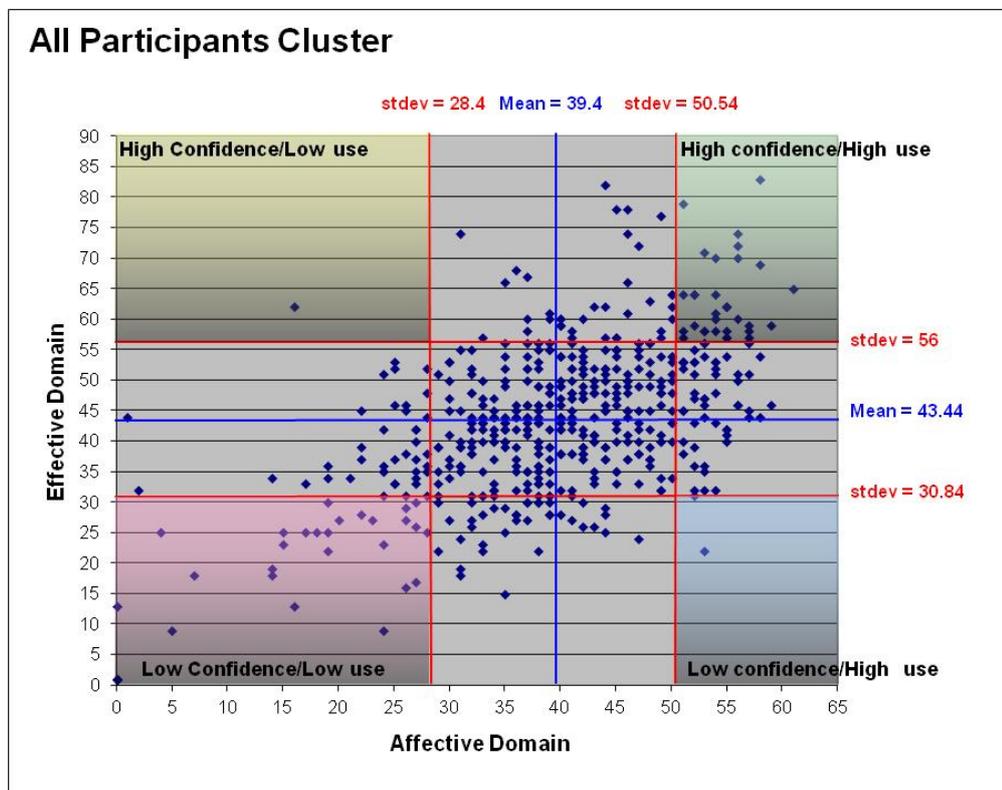


Figure 3-4: Scattergram of all participants' ING scores

It was proposed to select participants who self-nominated for Phase Two of the research by determining their Index of Net Gen-ness (ING), and then randomly choosing within the four ING categories above (Table 3-3). Using the ING metric would allow for the objective identification of a range of user types for participation in Phase Two of the research. This method posed some difficulties as the total participant group tended to be very homogenous in nature, with a higher overall mean for confidence across the sample population (see Table 3.8). Thus, instead of forty participants who represented the original four groups above (Table 3-3), participants from across a range categories as defined by the ING descriptor were selected for participation in Phase Two of the research. The descriptor Av was introduced to indicate participants who fell within 1-3 points of the means for this group (see Table 3-8). Selection of participants for the follow-up group used random sampling (every fifth participant in an ING category that approximated the original four categories was contacted by email): five females and five males from each ING group. A small sub-group emerged during this process, and four students (two males and two females) were identified as belonging to a rural campus.

3.3.3. Participant observation and task analysis

Observation of what students are actually doing when they use technology is one way of collecting evidence about information-seeking behaviour directly from the target population. In this research, the usability tool *Morae* was employed to limit the amount of influence exerted by the researcher on the participants. At the beginning of each task participants were given two questions (in writing) and instructed to search for the answers as they would normally search for information using the Internet or electronic resources. They could record this information any way they wished (online or print). A major aim during the tasks was to promote familiarity and make participants feel comfortable, to counteract the fact that this was not a normal information-seeking situation, but out of context. Both tasks were authentic and set in a real life context or something the participants might be likely to do as an information-seeking task in their everyday lives. Participants were also given a time limit (managed by the software program), which stopped the task after fifteen minutes. Participants were informed that the time limit was imposed only

to limit the amount of time taken for the whole exercise and not to worry if they did not complete the tasks. However, the time limit could have introduced other feelings for the participant such as anxiety. To ascertain whether this factor was involved, at the end of each task participants were asked to complete a brief reflection exercise about their feelings during the tasks using the *Morae* software program. The reflection consisted of four questions at the end of Task 1 and six questions at the end of Task 2 (see Table 3-4) and used a four-point Likert scale ranging from strongly disagree to strongly agree.

Table 3-4: Reflection questions in *Morae* at the end of each task

End of task 1: Options - STRONGLY DISAGREE / DISAGREE / AGREE / STRONGLY AGREE	
1	I understood what was required in the first task.
2	I found the first task easy to complete.
3	Information on the first task was difficult to find.
4	I needed more time to complete the first task.
End of Task 2: Options - STRONGLY DISAGREE / DISAGREE / AGREE / STRONGLY AGREE	
1	I understood what was required in the second task.
2	I found the second task easy to complete.
3	Information on the second task was difficult to find.
4	I needed more time to complete the second task.
5	I felt anxious during the tasks.
6	At times I felt frustrated during the tasks.

Participants were asked to complete two different tasks. Task 1 had a personal or recreational information-seeking focus which involved finding information for a holiday trip. This was a multi-level data gathering exercise, which asked them to search for information from different sources to complete the task. Task 2 was interpretive and had an educational information-seeking focus. While both tasks required participants to use higher-order thinking, the second task included more problem-solving and successful completion depended heavily on how participants initially interpreted the task. Task 2 was also designed to lead participants to use electronic resources from the university library and asked participants to find academic resources using different delivery modes and formats. The tasks are shown in Table 3-5 below followed by a summary in Table 3-6 of the resource formats required for the completion of Task 2.

Table 3-5: Information-seeking tasks used in observation activity

<p>Task 1 (Recreational)</p> <p>You and your partner have decided you would like to go on a famous train journey for your holidays. You need to find 3 famous train journeys. You want to know:</p> <ul style="list-style-type: none"> • the name of the train journey; • the starting point; • the end point; • distance travelled; • approximately how long it will take; and • the approximate cost of a one way trip in Australian dollars. <p>State aloud why you are searching in a particular manner. You may record your findings any way you wish.</p>
<p>Task 2 (Academic)</p> <p>You are leading an oral discussion group in class on how to write a good university assignment. As part of the assessment brief to support your discussion you have to find three (3), quality, academic/scholarly resources on the topic of lifelong learning. The academic resources must be:</p> <ul style="list-style-type: none"> • a recently published, academic journal article; • a website; and • a book. <p>State aloud why you why you are searching in a particular manner and why you think the resources you have found are quality resources. You may record your findings any way you wish.</p>

Table 3-6: Task 2, required resource formats

Format/Resource Type	Delivery	System
Book - print	Online catalogue	Closed – within the university
Academic journal article – text (mostly) on screen	Electronic journal - database	Closed (university) and open (public domain Web)
Web site – text, images, multimedia on screen	Online - Web	Open – public domain Web

Recordings of all forty participants supplied a wealth of data that was then ‘tagged’ in *Morae*. The software program allows the observer to tag specific movements as the participant is working through a problem or information-seeking task. Facial expressions, verbalisations and actions (for example, notemaking, checking task sheet, switching pages) can also be tagged in the recording using coloured markers. The results of the tagging can then be graphed to show the frequency of each action. A maximum number of behaviours were selected (*Morae* uses the twenty-six letters of the alphabet). A marker tag for unexpected was included to account for any unusual behaviour or experiences during the task such as technology failure, the appearance of popup

windows or a sudden change in information-seeking behaviour by the participant. The markers used to describe participants' information-seeking behaviour were based on behaviours identified in the academic research literature (Chap 2, Section 2.3) and are available in Table 3-7. Information-seeking behaviours observed in academic research studies include the exclusive use of Google and simple keyword searches, lack of planning activities, use of landmark sites, satisficing, use of Wikipedia and a range of feelings expressed by participants. The notemaking, attribution and unexpected tags were added after the pilot study when these additional behaviours were noted.

Table 3-7: Marker tags and descriptors used to describe participant recordings

Letter	Marker Tag	Descriptor
A	Plan	Shows evidence of planning research strategy
B	Launch Google	Goes to Google first
C	Launch search	Uses other search engine
D	Basic search	Uses keywords or sentences/questions to search
E	End Task	Completed/not completed
F	Advanced search	Uses Boolean search strategies or advanced tools within the search engine
G	Search within	Uses a search facility within web site
H	New	Begins new search strategy, new window, new webpage
I	Unexpected	Unexpected move/strategy
J	Launch Wikipedia	Goes to Wikipedia
K	Landmark	<ul style="list-style-type: none"> • Uses a landmark site as a search jumping off point • Uses Wikipedia as a landmark site
L	Back	Uses back button for navigation
M	Revisit	Un/intentionally revisits a site more than once
N	Browser	Uses browser functionality to navigate
O	Satisficing	Evidence of satisficing - satisfied with first result
P	eNote basic	Basic - uses electronic media to take notes, types in notes
Q	eNote advanced	Advanced - uses electronic media to take notes, cut & pastes, manipulates information electronically
R	pNote	Uses pen & paper
S	Start task	Open browser
T	Library	Uses university library/library/online data repository/journal site
U	Voices confusion	Participant appears confused
V	Voices anxiety	Participant appears anxious
W	Voices frustration	Indication of difficulty with task, use of media or information seeking results
X	Voices surprise	Evidence of surprise
Y	Voices task fatigue	Tired of task, can't find required information
Z	Voices attribution	<ul style="list-style-type: none"> • Positive - system fault • Negative – my fault

An example of a frequency of activity comparison graph for tasks 1 (left) and 2 (right) produced in *Morae* using the tagged recording for participant #615 is available in Figure 3-5, while Figure 3-6 presents a screen shot of a tagged recording in *Morae*.

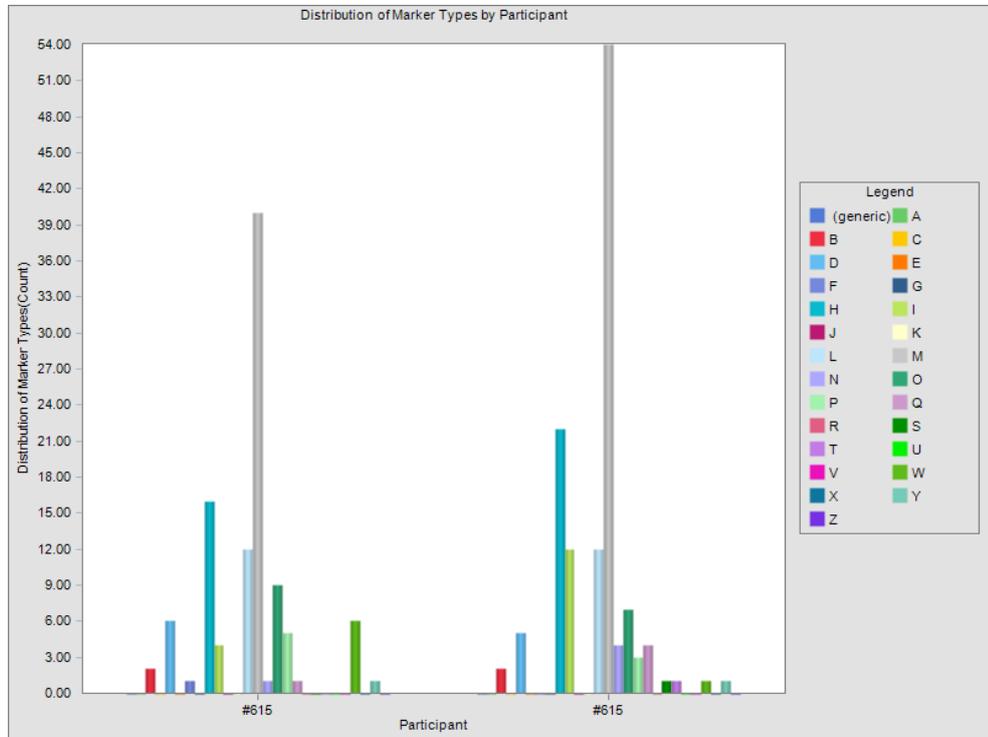


Figure 3-5: Comparison task graph, participant #615 (LC/HU), frequency of activity during Tasks 1 (left) and 2 (right)

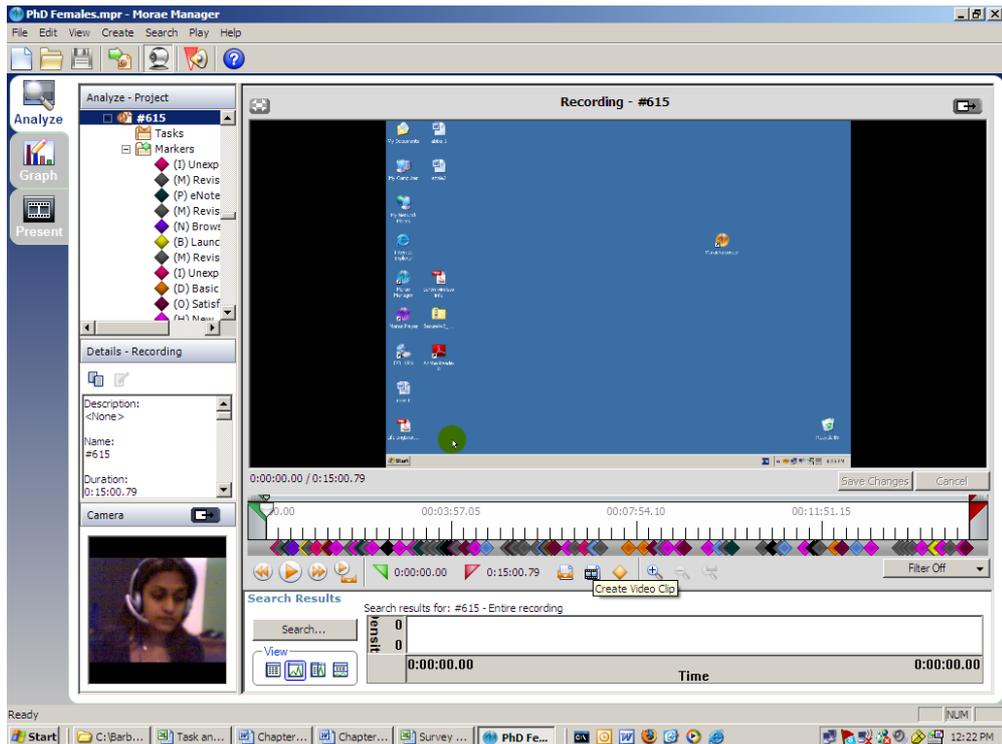


Figure 3-6: Tagged recording in *Morae*, participant #615 (LC/HU), Task 1

Detailed notes were also taken to describe each participant's behaviour during the tagging process. It soon became obvious that the tag *revisit* constituted a number of different behaviours ranging from revisiting pages already visited, revisiting a Google results page, revisiting notes taken, revisiting Wikipedia and revisiting the task sheet. These activities were recorded in the notes and subsequently graphed using *Excel*. An example of this further breakdown of frequency of activity during a task is shown in Figure 3-7 below.

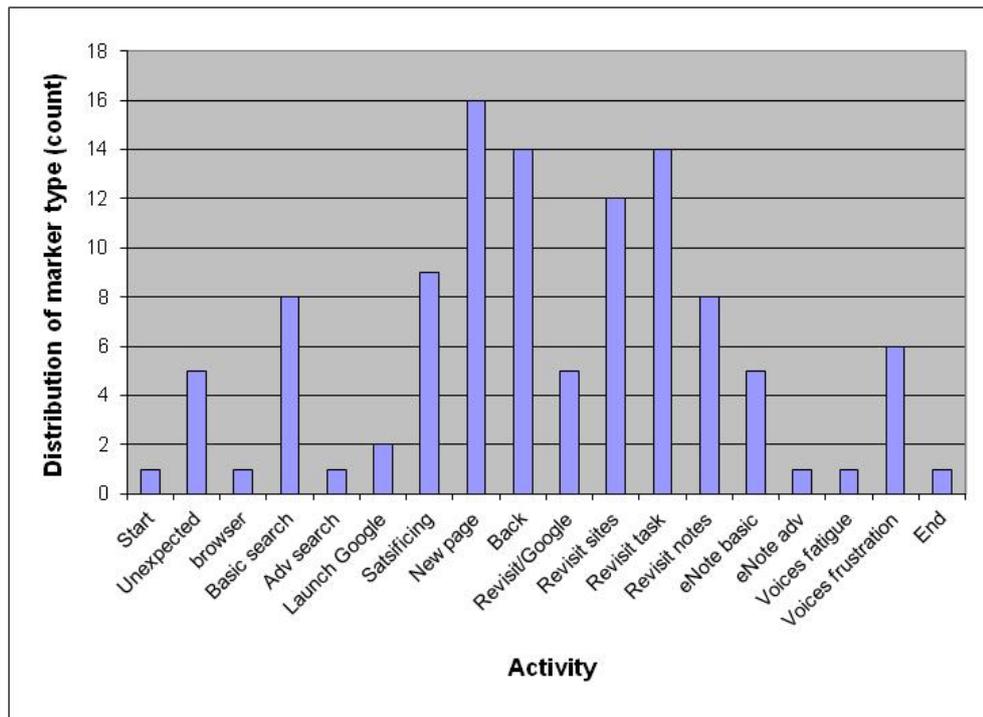


Figure 3-7: Frequency of activity, participant #615 (LC/HU), Task 1

The notes taken during the tagging of each *Morae* recording also recorded any verbalisations uttered by the participant during the recording and any facial expressions that may have indicated anxiety or frustration, since the tags for these were very generic. In this section of Phase Two of the research, each participant produced an individual dataset that included the following elements:

- a tagged recording of both tasks including the reflective questionnaires;
- detailed notes describing participant activity;
- individual frequency of activity graphs using the *Morae* tags;
- individual frequency of activity graphs (*Excel*) using the notes taken during the tagging process; and
- comparative frequency of activity graphs using both *Morae* and *Excel*.

Samples of these notes for participants from across the ING categories are available in Appendix 4. The complete data set, which requires the *Morae* software to run, is available from the researcher upon request.

3.3.4. In-depth, semi-structured interviews

The semi-structured interviews provided an opportunity to investigate how participants from each category said they use the Internet to find information and how they use a range of technologies in their daily lives. This part of Phase Two of the research examined participants' confidence, self-perceptions and beliefs. Much of the Net Generation literature is based on the idea that this generation of users have distinctive and/or defining attributes when using the Internet that set them apart from previous generations. The in-depth interviews had a reflective focus and contained questions that included the following:

- demographic data – age at time of task, area of study, year of study;
- Internet user – frequency of use, main purpose, other uses, use for learning, use of the library and electronic resources;
- information-seeking behaviour – perceived difficulty of the tasks, information-seeking skills (self efficacy, skills acquisition, Internet), difficulties and ease of use, re-finding information, information literacy (self-efficacy and using information);
- Net Generation – self-efficacy and rating against peers, their generation;
- method/s for seeking information using the Internet and electronic resources;
- Internet influence – living with/without it, cost and technology use;
- other technologies – use, influence; and
- multi-tasking (self-perception and behaviour).

Volunteer participants signed a privacy and confidentiality disclosure statement before the interview commenced (Appendix 1). Each interview was recorded using an mp3 player and lasted half an hour. As discussed previously, a checklist and semi-structured format to keep the interviews on track, to maintain consistency, and to counteract the fact that the interviewer was a novice were utilised (Partington, 2001; Woodhouse, 2005a, 2005b). The checklist and semi-structured format were also designed to limit any influence by the interviewer and to conduct the interview process in a manner that was unbiased and used a standardised approach. To ensure that such standardisation did not limit the number of responses or influence the extent to which respondents were willing to talk about their experiences and perceptions when using the Internet, each interview question contained a series of prompts or open-ended probes to

encourage elaboration on each topic (Holstein & Gubrium, 1995; Partington, 2001; Patton, 1990).

Wherever possible the interviews followed the tasks. This sequence was chosen to provide participants with opportunities to reflect and answer the interview questions based on the activities/tasks they had just completed (verbalise and reflect on what they think they are doing when seeking information online) (Branch, 2000; Kuusela, & Pallab, 2000). As mentioned previously, reflection was also included at the end of each task, when participants were required to fill in a brief online questionnaire about the difficulty level and any anxiety or frustration they may have experienced during the tasks. The inclusion of reflective practice in the interviews and tasks was designed to act as a counter balance to reports in the literature that young people in other studies were very reticent about admitting a lack of skill in their use of the Internet and technology (Banwell, & Gannon-Leary, 2000; Livingstone, Bober, & Helsper, 2005). In four instances when multiple interviews and tasks were conducted at the same time, the interview occurred before the task. On these occasions anecdotal notes were also taken by the researcher after the interviews and compared to the responses from the brief questionnaire contained within the tasks to determine if the lack of reflective component made a difference. In this instance the participants' responses appeared to be unaffected by the order of the activity. Anecdotal notes were also taken when the interviewees elected to stay and talk further. These field notes are available in Appendix 5.

Responses from the interviews and were transcribed and coded thematically, with descriptions and assertions (Miles & Huberman, 1994; Creswell & Miller, 2000). The results were then placed in an *Excel* spreadsheet where each participant's ING was recorded and colour-coded to distinguish between different types of users as identified by the ING metric. This technique was used so any patterns or common responses could be presented as either a graph or an image. This allowed for comparative analysis at a glance, ie. you can distinguish easily different user types and their responses. These 'pattern graphs' allowed for the visual presentation of large amounts of qualitative data

and provided a means to distinguish any emerging patterns of use amongst the different user types. Table 3-8 presents the legend for the colour coding used in the pattern graphs, while Figure 3-8 is an example of a pattern graph for male and female participants' personal ability rating for using the Internet to find information. The use of the descriptor Av where the metric did not fall into the four proposed categories outlined in Table 3.3. Hence, there were actually nine descriptors instead of the original four. The final descriptors used for the ING metric were a result of the homogeneous nature of the group as evidenced in the scattergram in Figure 3.4.

Table 3-8: Legend, Index Net Gen-ness (ING), interview pattern graphs

Low confidence/Low use	(LC/LU)	
Low confidence/Average use	(LC/Av)	
Low confidence/High Use	(LC/HU)	
Average confidence/Low use	(Av/LU)	
Average confidence/Average use	(Av/Av)	
Average confidence/High use	(Av/HU)	
High confidence/Low use	(HC/LU)	
High confidence/Average use	(HC/Av)	
High confidence/High use	(HC/HU)	
Audio failed, no clear answer		

Internet use, personal rating (affective domain)

Interview Answers Males	Index Net Gen-ness (ING)																				
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736	
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC
Beginner/non user																					
Gaining confidence																					
Average																					
Good																					
Very good																					
Expert																					

Internet use, personal rating (affective domain)

Interview Answers Females	Index Net Gen-ness (ING)																				
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698	
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Beginner/non user																					
Gaining confidence																					
Average																					
Good																					
Very good																					
Expert																					

Figure 3-8: Sample interview pattern graph

The pattern graphs were used to further explore the notion that the Net Generation has a culture of technology use (Research Investigation 2) when using the Internet to search for information. The pattern graph format allows for similarities and differences to be clearly evident within the sample population across the nine ING categories used in this study.

Pattern graphs were also utilised in the presentation of qualitative data obtained from the verbal utterances of participants during the task analysis using the *Morae* software. The colour coding and presentation of these pattern graphs is consistent with those used to present the qualitative data gathered during the Interviews. Using these pattern graphs to present large amounts of qualitative data in a visual format allows for the easy interpretation of any emerging patterns amongst the participants across the ING categories.

3.3.5. Pilot test study

The design of the Web questionnaire, the semi-structured interviews and the tasks were tested during a pilot study with two students (one male and one female) who met the age requirements of the target population, but did not take part in the main research study. The pilot test was an important step in the design of the data collection instruments and was used to test the usability software (*Morae*) and refine the questionnaire and interview questions so these reflected the two Research Investigations and delivered relevant and accurate data. As a result of the pilot study, the following extra topics were added to the interview checklist:

- the influence of cost and Internet use; and
- how participants rated their skills against their peers at university, peers outside university and their generation.

3.3.6. Research implementation and progression

Figure 3-9 presents a timeline outlining the research progression and implementation. Since the sample population was taken from two universities, one of which included participants from a rural campus, the time frame for data collection took approximately fifteen months due to travel and time constraints for both participants and the researcher.

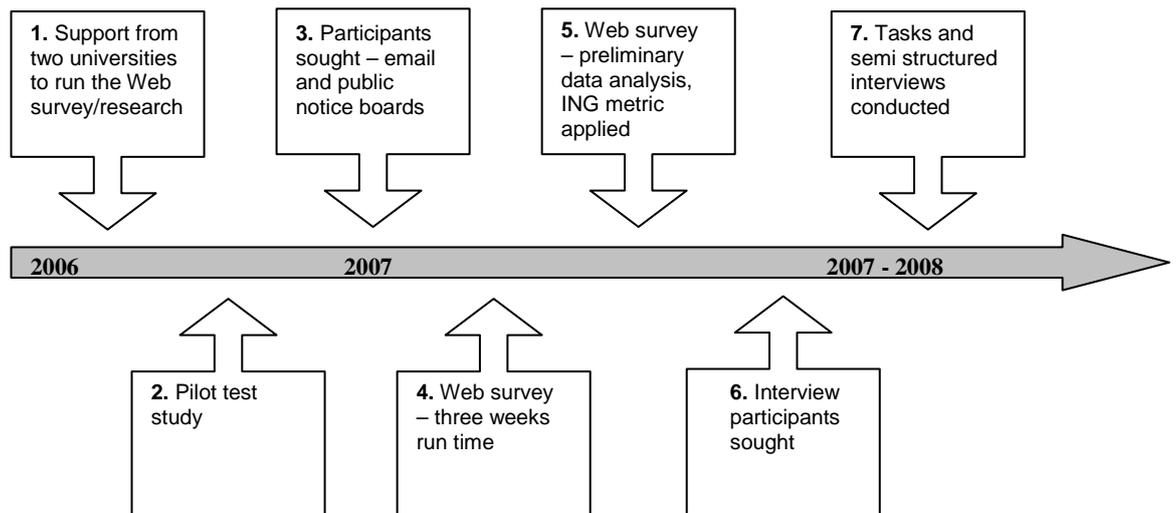


Figure 3-9: Research timeline – implementation and progression

During this period a number of conference papers (refereed) were presented and published including a review of the literature at the time and the results of the Web survey (Combes, 2006; 2007; 2008).

3.4. Participant recruitment

The pilot study was conducted in February 2007, while the Web-based survey was advertised and conducted towards the end of semester one (April/May) 2007 and was open for a period of three weeks across two university campuses. This particular population was chosen because participants represented the oldest members of the Net Generation and were within close proximity to the researcher. While the research sought to target university students within the specified age group (18 – 22 years), gaining access to this group proved to be problematic. Both universities were reluctant to provide access to their students and would allow only a single invitation to participate to be circulated. Avoiding survey fatigue (Krosnick, 1999; Couper, 2000) could explain this reluctance since both universities use this method extensively to collect feedback and information from their students. At one university the invitation to participate was available on the electronic student notice board (intranet, university students only). While the notice was available for the duration of the survey (three weeks), no follow-up message indicating that the survey was due to close was allowed. At the second university, one invitation

email was sent to all first year students, and the invitation was posted on the BlackBoard (Learning Management System) student notice board (intranet, university students only). Since BlackBoard was not used by all students at the university, this message reached only a proportion of students. No follow-up email message was permitted. In both cases the invitation to participate was limited to two sentences. The first sentence included a brief statement of what the research was about. Since the invitation to participate was restricted, students were asked to participate in the form of a challenge. Thus, the second sentence of the invitation read as follows:

Please HAVE YOUR SAY and tell us how you use technology by answering an anonymous, 10 minute Web survey.

When students clicked on the link to the questionnaire, they received a full disclosure statement about the research including the purpose and scope, the follow-up research and contact information (Appendix 1). At the end of the questionnaire, participants were asked to provide their contact details if they wished to participate in the second phase of the research.

3.4.1. The participants, Phase One - Web survey

Despite these restrictions, over one thousand students from across both universities completed the survey during the three week period. After participants were eliminated due to age, null responses (usually the demographic data at the end of the survey) and double-up responses, five hundred and thirty-three (533) students remained in the final survey group. A further five hundred students answered the questionnaire, but did not fall into the specified age group. These older students took the time to answer the questionnaire even though the target age group was clearly stated in the disclosure statement. A number of students also emailed the researcher directly to express a desire to be part of the follow-up research or to complain about the universities' move to the use of wholly online service provision for students. These students were eliminated from the final survey group since it was felt their views may represent an extreme or be the result of personal issues.

Of the final group, two hundred and twenty-nine (229) or 43% of the final survey group indicated a willingness to be part of the follow-up research.

The high response rate from students to the initial invitation even though the advertising profile for the research was severely limited; the unusually high number of older students outside the target group who participated; plus the high number of students willing to participate in the follow-up research indicates that technology and how both young and older students use it may be an issue for them. It may also be due to a belief (especially in the case of university students) that older people who are essentially the providers would benefit from their input, especially when both universities were moving rapidly to wholly online delivery of course materials and all student services and administrative functions such as enrolment.

An examination of the demographic dataset shows that nearly half of the participants (48.5%) were in the younger age bracket of the target group, 44.5% were in their first year of study and the follow-up group was generally representative of the total group. This is hardly surprising since 43% of the final survey group indicated a willingness to participate in the follow-up research. Over a third of the students (37%) of the final survey group recorded an age of eighteen years, a following 44% were aged between eighteen and twenty-one, while 20% were in the oldest age bracket (22 years). The final survey group contained a good spread of the representative age groups at the upper end of the Net Generation demographic. Two hundred and forty students (45%) of the final survey group indicated they were in their first year at university, with a following 25% in second year. Five hundred students (93%) were studying fulltime, four hundred and eighty-two (90%) studied all their units on campus and only one hundred and thirty (24%) indicated they studied some units on campus and some online. Almost 16% (85 participants) of the whole group reported they had never completed a Web survey. The age of the participants in the final survey group is presented in Figure 3-10 below, followed by Figure 3-11 which indicates their year of study at university.

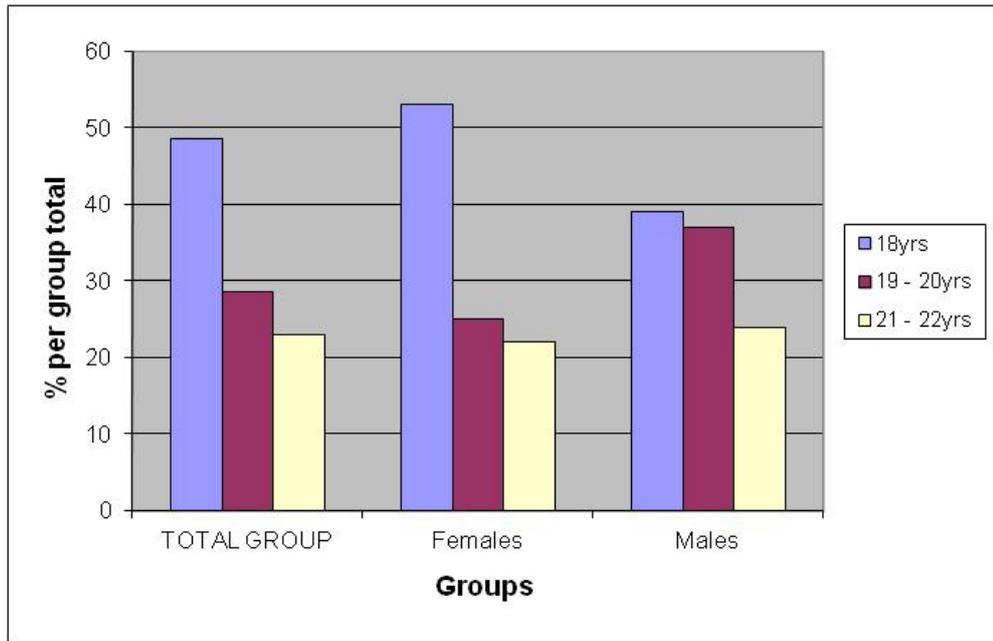


Figure 3-10: Final survey group - age

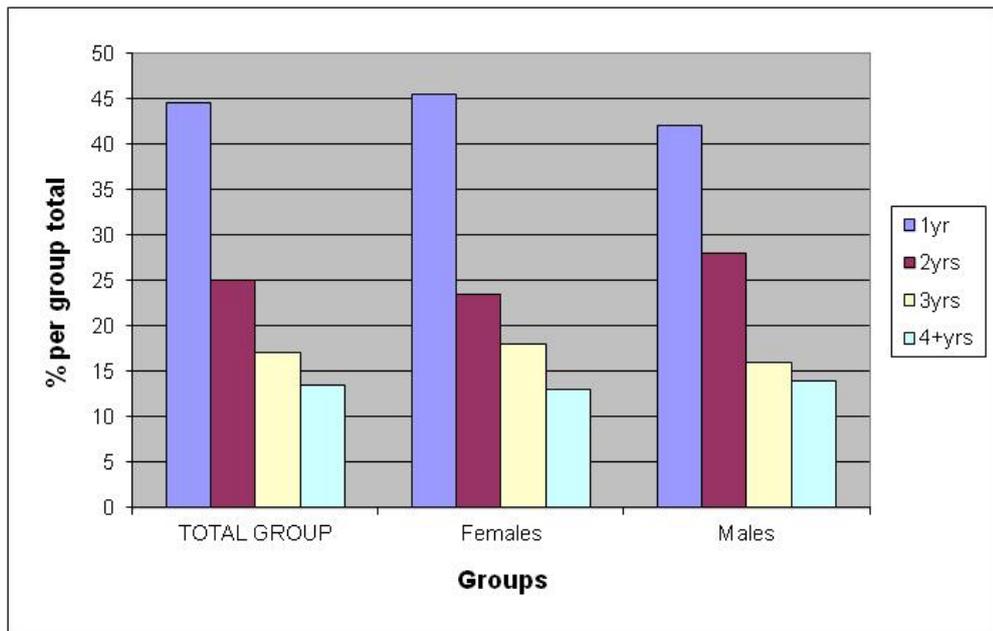


Figure 3-11: Final survey group – year of study at university

3.4.2. The participants, Phase Two – Tasks and interviews

Phase Two of the research occurred over an eight-month period and finished in the first quarter of 2008. Preliminary data analysis of the Web survey was conducted using the scoring method to create the ING metric discussed earlier in this chapter (Section 3.3.2). The ING metric provided a numerical description of both the confidence levels (Affective Domain) and levels of technology use (Effective Domain) of the participants. In the follow-up groups

there were representatives from the nine ING categories described previously in Table 3-8.

The highest possible score for the Affective Domain was 61 with a mean score of 30.5. The highest possible score for the Effective Domain was 94 with a mean score of 47. Participants received an Index of Net Gen-ness (ING) score as a result, consisting of two numbers, for example, participant #41, ING = 50:34. Participants who had indicated they were prepared to participate in Phase Two of the research were placed into the nine ING categories then randomly selected (every fifth participant) and contacted by email to set up a timetable for the hour long session required to complete the two tasks (15 minutes each) and conduct the interview (30 minutes). Table 3-9 below presents the final 40 participants for Phase Two of the research according to their ING categories and scores. As evidenced by the scoring results in Table 3-9, only a few of the participants fell neatly into the four original ING categories (LC/LU, LC/HU, HC/LU and HC/HU). Although participation in the follow-up study was dependent on availability, there was a wide spread of participant types as described by the ING metric in the follow-up group.

Table 3-9: Phase Two participants – ING Index descriptors and scores

Participant ID		Index of Net Gen-ness (ING)		Participant ID		Index of Net Gen-ness (ING)	
ID	Gender	Descriptor	Score	ID	Gender	Descriptor	Score
#572	F	LC/LU	16:13	#699	M	LC/LU	33:30
#87	F	LC/LU	19:30	#688	M	LC/Av	31:44
#32	F	LC/LU	26:27	#53	M	Av/LU	42:26
#615	F	LC/HU	32:52	#689	M	Av/LU	40:32
#336	F	LC-Av/LU	34:31	#817	M	HC-Av/Av-LU	48:36
#423	F	LC-Av/LU	34:32	#231	M	Av/Av	38:48
#99	F	LC-Av/LU	34:29	#322	M	Av/Av	38:38
#200	F	LC-Av/Av	34:44	#41	M	Av/Av	44:38
#142	F	Av/HU	47:56	#377	M	Av/Av	42:47
#17	F	Av/HU	40:59	#629	M	Av/Av-HU	41:52
#861	F	HC-Av/LU	49:32	#753	M	Av/Av-HU	42:49
#687	F	HC/LU	52:31	#946	M	HC-Av/Av	49:43
#319	F	HC-Av/Av-HU	49:50	#638	M	Av/HU	45:57
#443	F	HC-Av/Av	49:40	#519	M	Av/HU	46:64
#312	F	HC/Av	50:45	#845	M	HC/LU	50:32
#559	F	HC/Av	56:46	#922	M	HC-Av/Av	49:40
#313	F	HC/HU	51:57	#92	M	HC/HU	54:54
#872	F	HC/HU	54:64	#639	M	HC/HU	54:58
#141	F	HC/HU	53:58	#402	M	HC/HU	55:59
#698	F	HC-Av/HU	48:63	#736	M	HC-Av/HU	47:57

The mean scores for the whole survey group were calculated using formulas in Excel. The mean score for the whole survey group for the Affective domain was 39.4, almost one standard deviation above the mean of 30.5 for the Affective Domain questions, indicating the participants in this group showed high levels of confidence according to the ING metric. The mean score for the whole survey group for the Effective Domain was 43.44 or three and a half points lower than the mean for the Effective Domain questions (47). This result indicates that this group were not high level users as defined by the ING metric which used both frequency of use and range of technologies used as criteria to determine level of use (Section 3.3.2. Index of Net Gen-ness). Follow-up participants were given an ING metric according to one standard deviation of significance, using the mean for the whole survey group as the mean. The single male participant who fell in the LC/LU category, actually scored an ING of 33:30. His score indicates that his confidence levels are average according to the mean for the Affective domain, but are low when scored against the confidence levels for this group. The ING categories for participants were also colour

coded for easy comparison and to highlight the emergence of patterns. The order of participants and colour coding for the ING metric in Table 3-9 is consistent throughout the data presented in this thesis.

Follow-up participants were studying across a diverse range of courses including Biology, Business, Chemical Engineering, Computer Science, Creative Industries, Economics, Education, Fine Arts, Journalism, Medicine, Molecular Genetics, Psychology and Sports Science. Over thirty-two different areas were represented in the courses being studied, with participants ranging from first year students through to fourth year honours. The demographics of the follow-up group indicate that the group as a whole was very diverse (Appendix 7). The average age of female participants was slightly older (20 years) than their male counterparts (19 years) at the time of the interviews, with follow-up participants ranging from 18 to 22 years of age. Participants also represented a range of cultural and ethnic groups; included both local and international students and students living independently and still living at home; and came from a range of socioeconomic backgrounds. Four participants were also studying at a rural campus located 250 kms from the parent campus. The final participant group for Phase Two of the research was very diverse in nature, with the only common variable being their age – between 18 and 22 years.

3.5. Validity of the research method/s and design

The internal validity of any research design is crucial, particularly when establishing any causal relationships to prove or disprove an hypothesis (Nachmias & Nachmias, 1981; Babbie, 2010). Using a mixed methods approach and triangulation helps to ensure that the research design locks together and that the phases of the research are complementary and will produce a consistent, rich and detailed picture of behaviours and beliefs/perceptions of the sample population (Jick, 1979; Greene, Caracelli, & Graham, 1989; Bryman, 2007; Pickard, 2007). While any findings are specific to a particular sample population being examined at a particular time, emerging patterns of use can be described. If the sample is large enough, some conclusions may be reached that can then be applied to the whole population. Internal validity is also enhanced if the research methodology can be verified and replicated easily.

In the case of this research study, a variety of techniques were used to strengthen the internal validity of the research design. Using a Web based questionnaire allowed the researcher to examine the perceptions of a reasonably large sample from the target population (Net Generation users) according to the attributes/characteristics assigned to this group by the proponents of the Net Generation idea. The ING metric was then used to categorise and describe participants according to their levels of confidence (Affective Domain: confidence and self perceptions) and their levels of use (Effective Domain: use and importance of technology). This metric acted as an identifying mechanism for each participant and a descriptor. It also provided a filtering mechanism which allowed for the selection of a wide range of user types for participation in the second phase of the research. The selection of a diverse range of users for the second phase of the research was important for the exploration of the second investigation of the research, ie. to explore critically the notion that young people from the Net Generation have a different culture of technology use when seeking information on the Internet. It was necessary to examine closely the information-seeking behaviour of a range of user types to ascertain if there were any common behaviours across the sample group. The use of the software program *Morae* provided a means of observing participants in an unobtrusive manner while recording a wealth of detail about their information-seeking behaviour using the Internet and electronic resources. The program also allows for ongoing review of the tasks and easy replication of the participant observation section of the data collection.

The extent to which any findings can be ascribed to the whole target population (Net Generation) from which the sample population is drawn is referred to as the external validity of the research (Nachmias & Nachmias, 1981; Trochim, 2006). While the exploratory research as described in this thesis is unlikely to produce a definitive picture of a whole generation of diverse users, it can be used to describe emerging patterns of use. External validity may be affected by the artificial nature of tasks particularly when observing participant behaviour, when the artificial environment or the influence of the researcher may be a factor. In this research, steps were taken to limit external factors and to provide an environment that was as close to 'real life' as possible. Some data

collection methods were delivered anonymously (Web survey) or presented in an unobtrusive manner using technology (*Morae*). The interviews were conducted after the tasks to preserve the 'real life' aspect of each task and to encourage personal reflection by participants.

The representativeness of the sample population also influences external validity and determines whether the findings can be generalised and applied to the target population (Nachmias & Nachmias, 1981; Trochim, 2006; Pickard, 2007; Babbie, 2010). As stated previously, the target population for this research study was the older members of the Net Generation (young people aged between 18 and 22 years), an incredibly large and diverse group (worldwide). While any findings are specific to the sample population (older members of the Net Generation from two Western Australian universities), the participants represented an extremely diverse group within the frame population. The two universities chosen for the study are low to mid-tier ranked institutions and have student populations which represent a wide range of cultural/ethnic groups, have large numbers of international and local students, and serve students from a range of socioeconomic backgrounds. It could also be argued that using university students as the sample population is restrictive. As members representative of the Net Generation, they should have higher skill levels than peers who do not use the Internet on a daily basis for study purposes. This factor was counter-balanced to an extent by the high number of first year students in the sample group and the nature of the university populations. The notion that these participants may have higher skill levels and higher levels of use is a factor to be considered when examining the overall findings of the study. Despite these restrictions, the demographic diversity of the final sample group and the in-depth nature of the research methodology will still provide some very useful information about how this group of young people utilise the Internet and electronic resources to find information. The fact that the observation of participants' behaviour can be easily reviewed and replicated (using *Morae*); and the standardisation techniques used for both the interviews (checklist and semi-structured format) and the task observation (tagging in *Morae*) also strengthen the external validity of the research.

3.6. Conclusion

Most of the research about the Net Generation has asked young people what technologies they use, how often they use them, and what they think they are doing as opposed to examining what they are actually doing when using the Internet to search for information. These studies have provided empirical evidence about the technologies young people use, time estimates for their use of the Internet as perceived by the participants, and descriptions of what they appear to be doing when seeking information in an online environment. Other research studies have worked at a macro level and tracked user behaviour using Web logs or concentrated on specific methods to examine information seeking behaviour in specific contexts with very small groups of young people. However, there does not appear to be any research that examines in depth, the information-seeking behaviour of young people when using the Internet and electronic resources to find information. This study is unique, since the research design allows for a comparative analysis of results from an anonymous Web-based questionnaire (what the Net Generation think they are doing), semi-structured interviews which have a reflective focus (what the Net-Generation say they are doing), and in-depth observation and task analysis (what the Net Generation are actually doing). Using a mixed methods approach and a number of different data collection techniques provides an opportunity to explore the two Research Investigations in detail and to produce a complete picture of how a sample group from the upper end of the Net Generation seek information using the Internet and electronic resources. The mixed method approach provides a framework which allows for the fine-grained examination of the notion that this generation have a different set of attributes when using the Internet. It also enables the comparison of the Net Generation participants' perceptions and beliefs of how they use technology to find information with their actual skill levels, something that has never been done before. Thus, as a piece of exploratory research, this study is unique.

Chapter 4 - Phase One, Web Questionnaire, Findings

4.0. Introduction

This chapter will examine the results of the anonymous Web questionnaire to explore the first investigation posed in this research, ie. to investigate young adults' information-seeking behaviour and their perceived and actual skill levels when using the Internet to access electronic information resources. The complete Web questionnaire is available in Appendix 2, while the results are available in Appendix 8. The Web questionnaire was designed to test the major precepts of the Net Generation hypothesis as outlined in Chapter Two of this thesis and to add to the current body of knowledge by collecting some empirical data about how young people in Australia use technology. Two sections of the questionnaire examined the use of technology by the participants prior to studying at university and information about where or from whom they had gained their skills when using the Internet. The rest of the questionnaire specifically examined participants' levels of use (Effective Domain) and how they felt about using the Internet (Affective Domain) across a range of utilities and activities.

This chapter includes the results of the questionnaire (descriptive statistics), while Chapter 5 contains a correlation analysis of the Web questionnaire results. A cluster analysis (Appendix 3) was also carried out by an external specialist on the data obtained from the questionnaire to determine if there were significant groups of user types. The results from this analysis were inconclusive and have not been included in this thesis. In this chapter, the results from the Web questionnaire are presented first, followed by a discussion of the findings from this phase of the research.

4.1. Anonymous Web Questionnaire

Descriptive statistics are used here to present large amounts of quantitative data in a manageable form and to provide a summary that will

enable comparisons across a number of datasets (Schild, 1999; Dytham, 2001; Trochim, 2006). The data collected from the Web questionnaire is presented as bar graphs (rounded to the nearest 0.5%) for easy interpretation and include the results for the total group and for males and females. Although there were no significant differences for gender in the correlation analysis (Chapter 5), the male and female data has been separated out, as gender has been a significant issue in previous research studies involving young people (Livingstone, 2006; Dutton & Helsper, 2007; Dutton, Helsper & Gerber, 2009). Since the number of participants who indicated a willingness to be part of the follow-up research was very high (43% of the total survey group), overall there was little difference between the male/female results from the total group and those from the follow-up group.

4.1.1. Participant use of technology prior to entering university

This section of the Web Questionnaire examined how much exposure participants had had to the Internet as a learning tool prior to university. It was included in the questionnaire to find out how much participants were using the Internet in formal educational settings as opposed to personal use at home. Participants were asked how much they used the Internet for study, the extent of this use and where they had used it in formal educational settings. They were also asked to describe the extent of their personal use of the Internet for study purposes. These results are presented below in Figures 4-1 – 4-4 below.

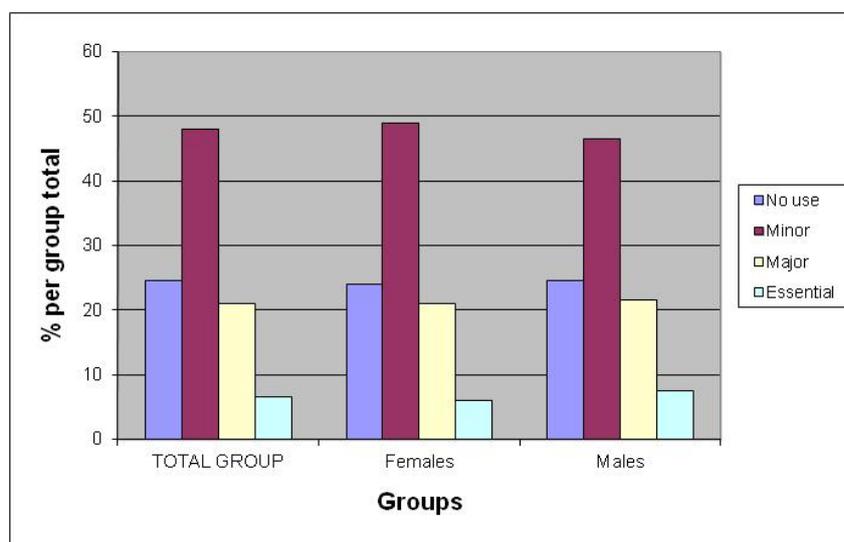


Figure 4-1: Use of the Internet for study prior to university, excluding personal use

In the total group, 28% of participants had had no exposure to using the Internet in an educational environment before entering university, while a further 41% had used it for one or two subjects. So 67% of participants had limited access to the Internet as a learning tool at school or TAFE prior to entering university. 22.5% of the group reported online study materials as a major part of their study environment, with a small number reporting that all their study materials were available online (7.5%). This data indicates that for many of the participants in this study, the Internet had not featured as a major part of their teaching-learning experience in formal educational settings prior to university.

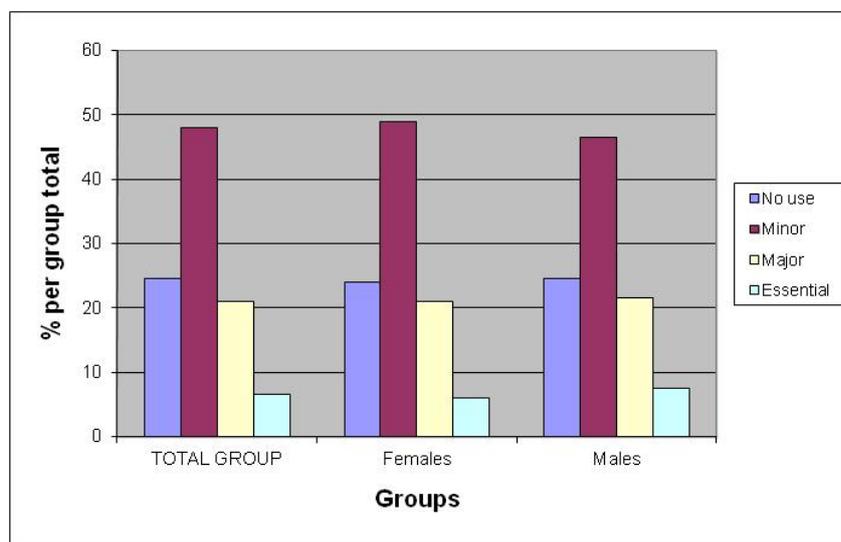


Figure 4-2: Importance of online subject materials prior to university, excluding personal use

Question two examined the importance of online subject materials prior to entering university. Of the total group 24% reported no use, while 48% felt they had made minor use of online subject materials before university. This result is higher than the access result reported in Figure 4-1. While 67% in the previous question reported no or limited access to online study materials, 72% felt these materials were either not important or of minor importance. 27.5% of participants felt their online study materials were an essential or major part of their study experience prior to entering university, which is higher than the access figure reported in the previous question (22.5%). This result indicates that while online materials may have been available, participants may not have been using them to the fullest extent.

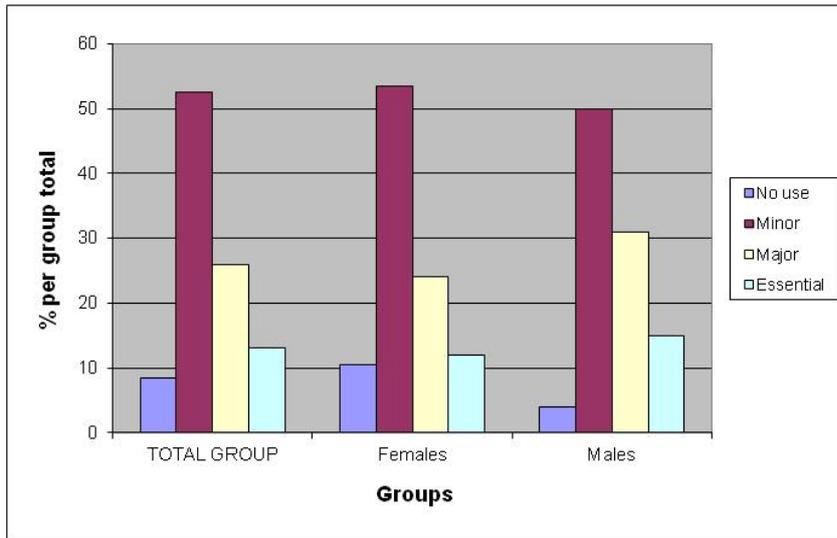


Figure 4-3: Personal use of the Internet for study prior to entering university

Question three asked participants to rate the importance of the Internet for study outside an educational setting. The results in Figure 4-3 indicate that prior to university, 61% of the participants in this research were not using the Internet or using it in a minor way for study purposes outside a formal education setting. In the total group 39% of the participants considered their personal use of the Internet for study as major or essential. This figure is higher than the results presented in Figures 4-1 and 4-2 and indicates that while some participants may not have had access to online materials at school, they were using the Internet for study purposes at home. The results in Figure 4-4 below confirm this result.

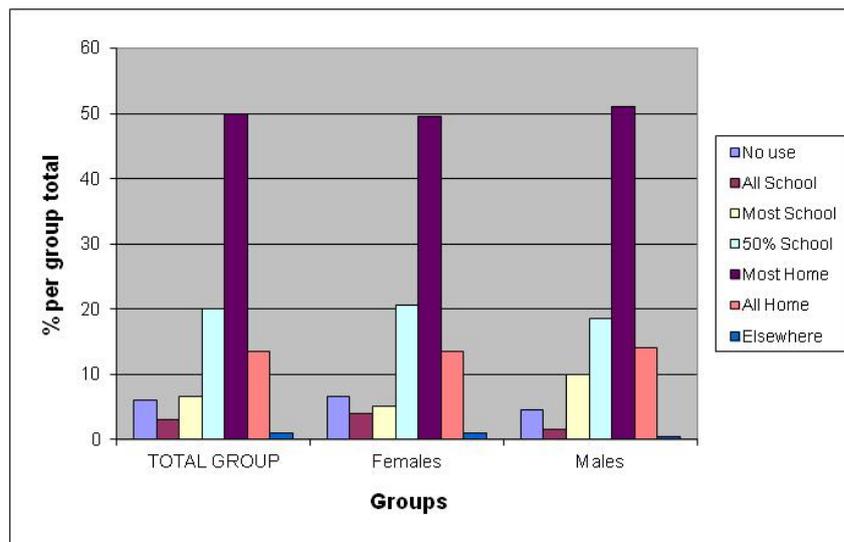


Figure 4-4: Location of Internet use for study purposes before attending university

For the total group 63.5% of participants were using the Internet for study either mostly or all at home, while another 20% were using it at home fifty percent of the time. These results indicate that for this participant group most of their experiences using the Internet for study and finding information prior to entering university, occurred outside formal educational settings and at home.

4.1.2. Internet use Effective and Affective Domains

The second section of the questionnaire examined levels of Internet use for personal and study purposes. It also asked participants to rate themselves as Internet users (Affective Domain), their frequency of use (Effective Domain) and how long they had been using the Internet.

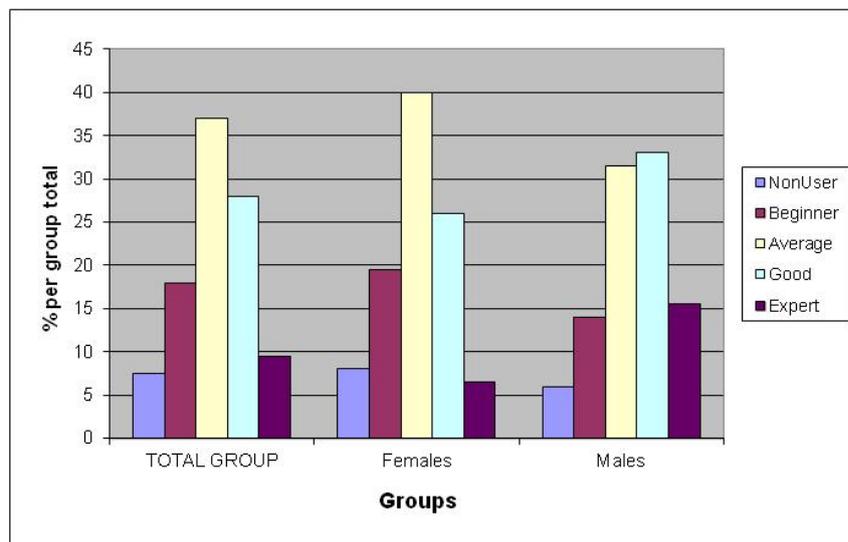


Figure 4-5: Personal rating using the Internet to find information

Question five asked participants to provide a personal rating for using the Internet to find information. Overall, participants considered themselves to have average (37%) or above (37.5%) skills when using the Internet to find information. Approximately 25% of the total group rated themselves as beginners (18%) or non-users (7.5%). In this result there appeared to be a slight difference between males and females with 40% of females rating themselves as average, while only 31.5% of males fell into this category. More females also rated themselves as beginners (19.5%) than males (14%), while the results for non-users were much the same (females 6% : males 8%). This tendency for males to rate their ability levels higher also corresponds with higher levels of confidence reported later in the questionnaire (Section 4.1.7). However, no one

in this participant group reported zero use of the Internet in the three months prior to answering the questionnaire (Question 6, Figure 4-6 below).

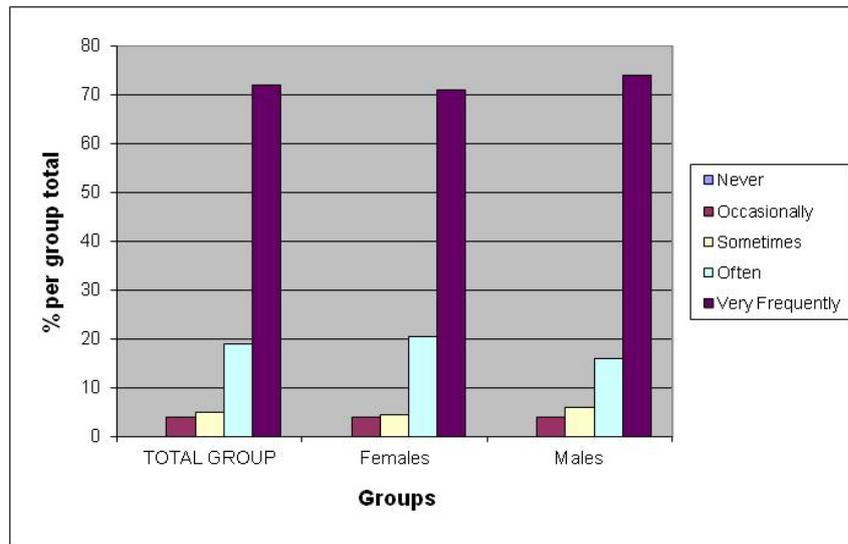


Figure 4-6: Frequency of Internet use in the previous 3 months, for any reason

Even though 25% of the total group rated themselves as beginners or non-users, everyone reported using the Internet during the previous three months. Less than 10% of all the participants reported occasional or sometime use, while 74% reported frequent use of the Internet. This result indicates that participants were heavy users of the Internet. Figure 4-7: indicates how often participants used the Internet for study purposes during the previous three months (Question seven).

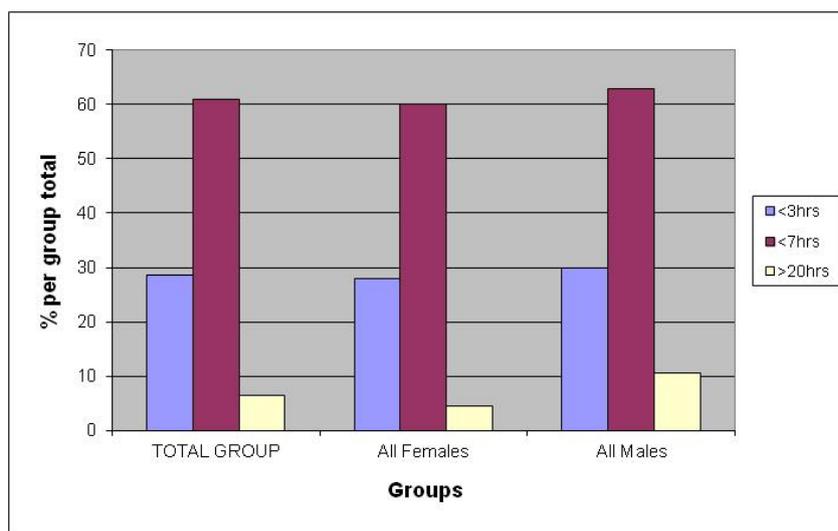


Figure 4-7: Frequency of Internet use per week for study in the previous 3 months

Participants reported using the Internet on average, for one hour or less per day for study purposes, with a small number (6.5%) reporting more than 3 hours per day. However, 29% reported using the Internet for less than three hours per week for study. This figure may be due to the fact that only 19% of participants reported that all their study materials at university were available online with a further 24% reporting some of their units online. Discussion during the interviews in Phase Two of the data collection (Chapter 6) also indicated that some of the participants did not realise they were working via the Internet when using a Learning Management System (LMS) such as BlackBoard/WebCT, so these results may not be a true reflection of how much they were actually using the Internet for study.

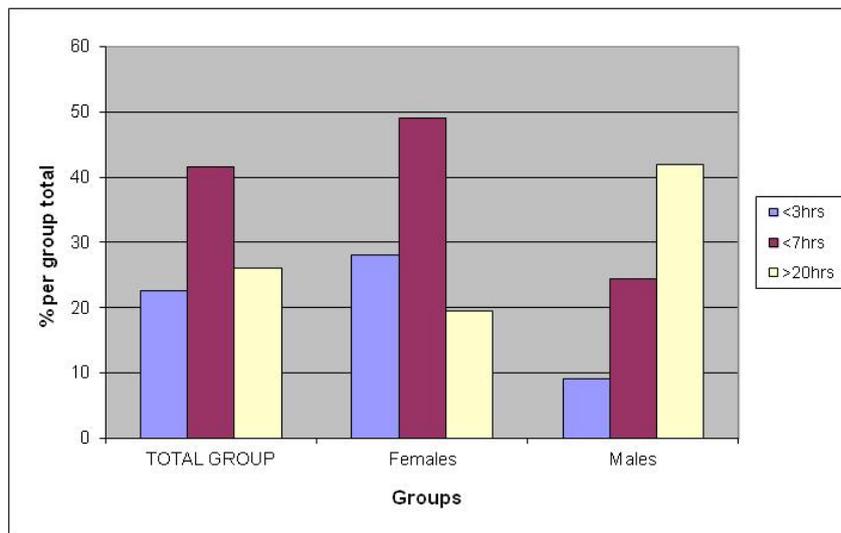


Figure 4-8: Frequency of Internet use per week for personal use in the previous 3 months

Question eight examined how often participants were using the Internet for personal use in the previous three months. Results in Figure 4-8 indicate that participants were using the Internet much more frequently for personal use, with males using it more frequently than females. For the total group 26% were using it more than three hours a day, with 42% of males falling into this category. The results in the previous two questions are dependent on how the participants quantified time and frequency of use, which is subjective and depends on how each individual perceives their Internet use and calculates the time spent. Even though these questions introduce a certain amount of subjectivity, it is important to note here, that participants equate frequency of Internet use much more with

personal activities than with educational/informational use. A comparison of these two datasets is presented in Figure 4-9 below.

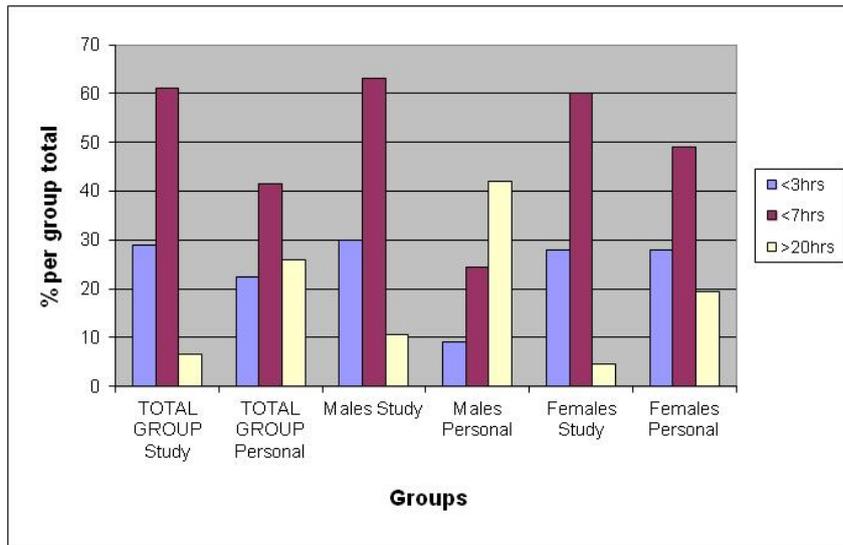


Figure 4-9: Frequency of Internet use per week for study and personal use in the previous 3 months

The last question in this section examined the length of time participants had been using the Internet. These results are presented in Figure 4-10 below.

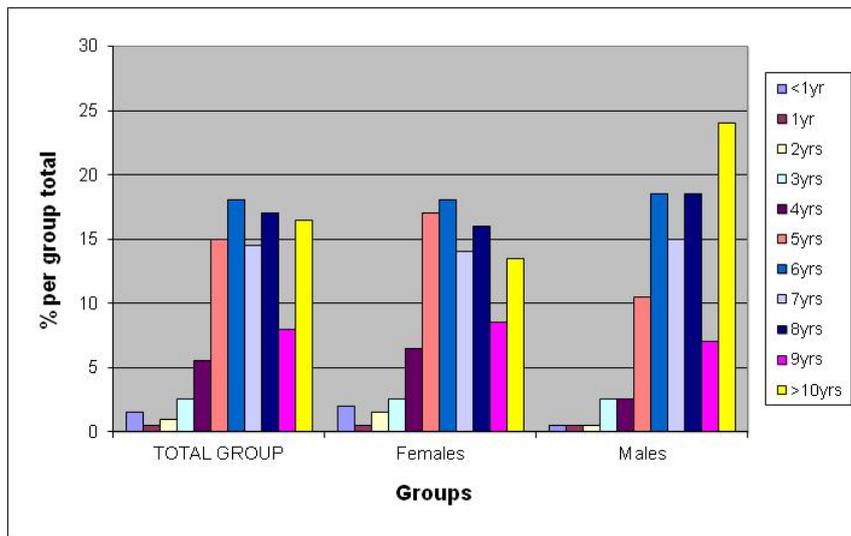


Figure 4-10: Participants length of time using the Internet

The participants in this research were long-term users of the Internet, with 16% of the total group reporting 10+ years of Internet use and a further 39% reporting 7+ years of Internet use. Only a small number had been using the Internet for less than three years (5%), while males (64%, 7+ years) had been using the Internet longer than females (53%, 7+years). The difference between males and females falls however, for 5+ years of use with 93% of males

reporting 5+ years of use against 87% of females, indicating that differences for gender reported in earlier research studies (Livingstone, 2006) were not significant for this group, ie. the girls are catching up. Similar trends have been observed in population studies conducted in the United Kingdom (UK) (Dutton & Blank, 2011). Overall, 55% of the participants in this research had been using the Internet for more than 7 years.

4.1.3. Using the Internet, importance and everyday activities

Section three of the questionnaire explored how participants were using the Internet for a range of activities including study, communication, retail and entertainment. Participants were asked to rate the importance of the Internet when conducting these everyday activities, rather than trying to quantify how often they used it. Results in Figures 4-11 – 4-17 below, indicate that participants in this particular sample group used the Internet mainly for certain activities.

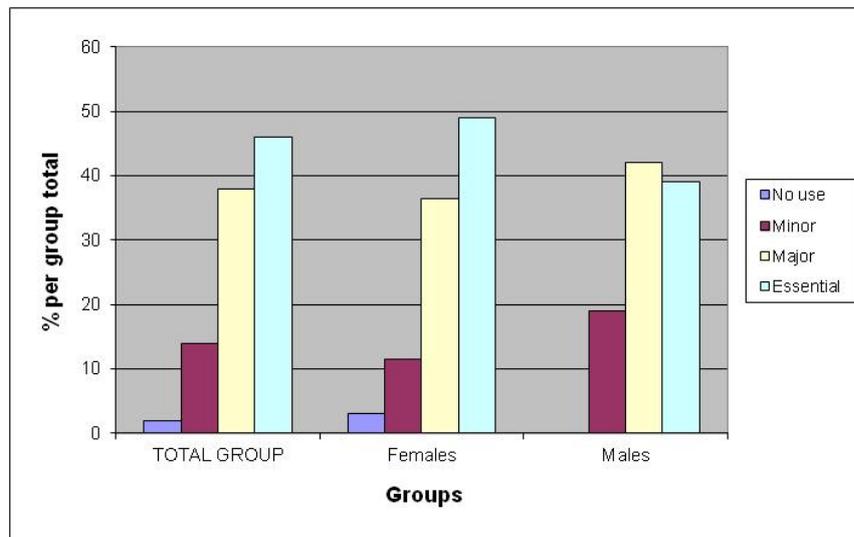


Figure 4-11: Importance of Internet use for study

Across the whole group, participants rated the importance of the Internet for study purposes as either major (38%) or essential (46%). However, 16% of the total group reported no use or minor importance for study which may reflect limited access to online study materials or a preference for not using the Internet for study. This figure becomes important when considered alongside results reported in Figure 4-66 where 19.5% of participants said they either disliked or

strongly disliked using the Internet for study purposes. The importance of the Internet as a communications tool for this group of young people however, is evident in Figure 4-12 below.

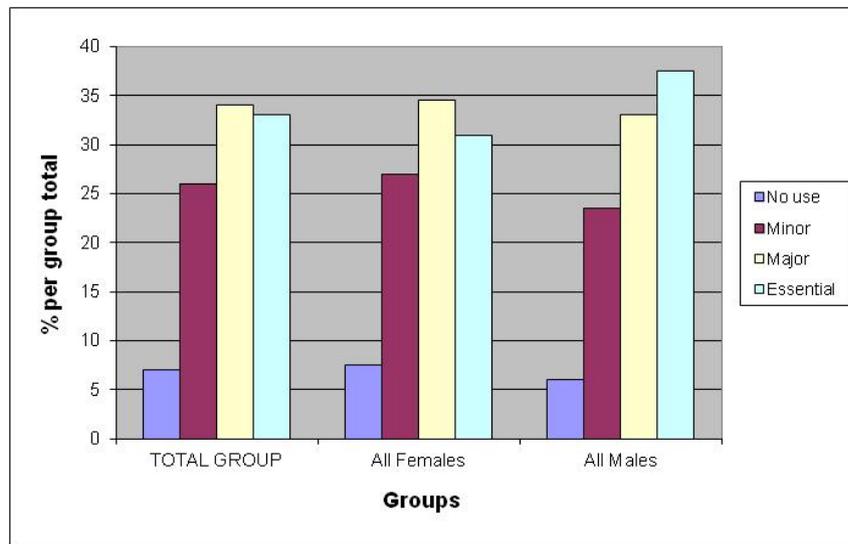


Figure 4-12: Importance of the Internet for communicating with family and friends

Using the Internet for communication purposes was rated highly by this group with major importance at 34% and essential at 33%. A further 33% rated this type of use as minor or no use. This result corresponds with reports in the research literature and the media which have labelled young people as the *connected generation* (Tapscott, 1998; Cole, Smith, & Lucas, 2002; Sujansky, 2009; Roberts, 2010).

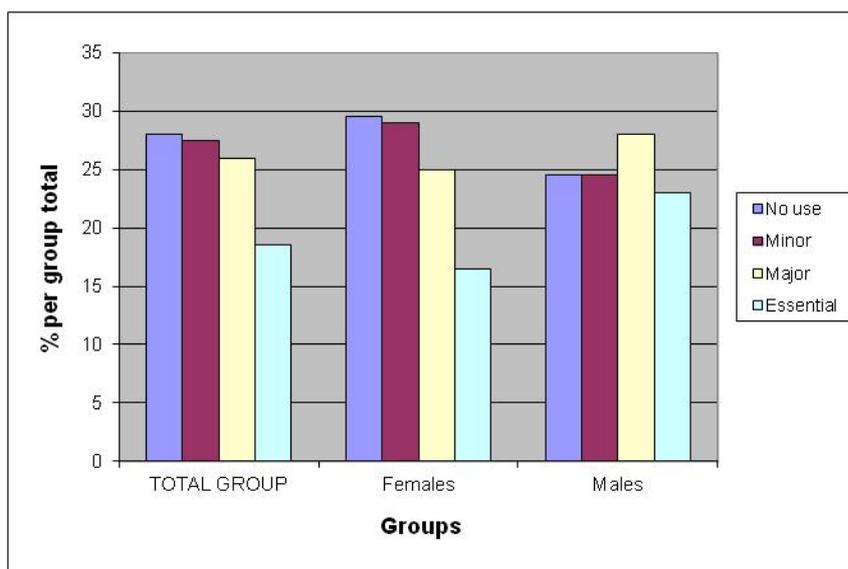


Figure 4-13: Importance of the Internet for financial transactions

The next part of this question examined participants' use of the Internet for conducting financial transactions. At the time this data was collected, 26% of the participants rated this activity as major and 18% as essential, indicating that use of the Internet for conducting financial transactions for this group was not high. There was also a gender difference here, with half of the males (50.5%) rating the Internet as major (27.5%) or essential (23%) for conducting financial transactions, while only 42% of females rated it as important.

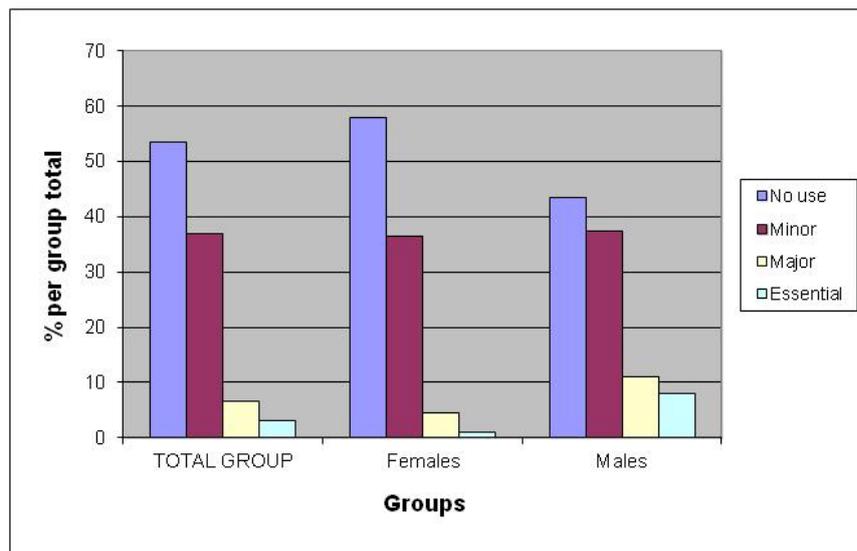


Figure 4-14: Importance of the Internet for buying and selling

The results reported in Figure 4-14 also indicate that the participants in this group were not using the Internet for retail activities (buying and selling). Across the whole group, only a few of the participants rated the importance of the Internet for retail as major (6.5%) or essential (3%), with 53.5% indicating they did not use the Internet for this purpose. Again there was a slight gender difference observed in this dataset.

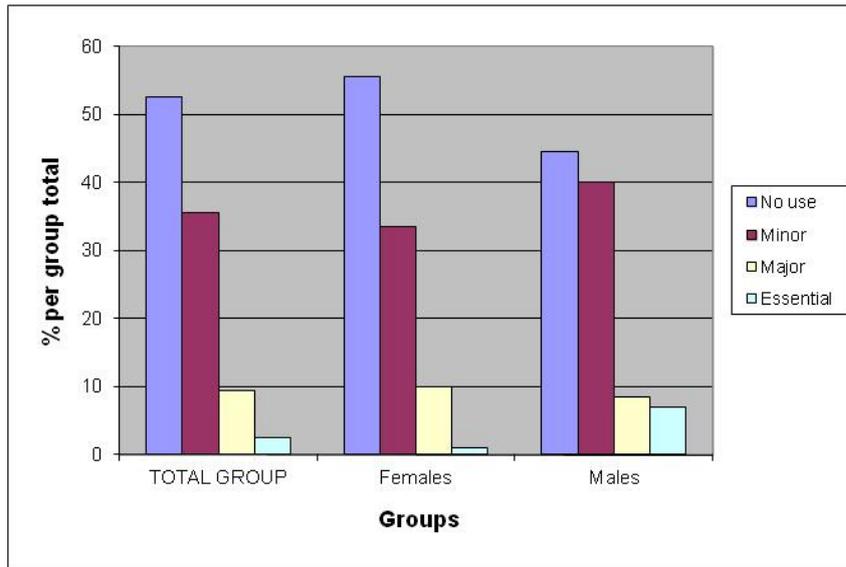


Figure 4-15: Importance of the Internet for organising and planning

Results in Figure 4-15 indicate that only a small number of participants rated the importance of the Internet for organising and planning their lives as major (9.5%) or essential (2.5%), with 52% indicating that they did not use the Internet for this purpose. This result may mean that participants used other technologies/methods or don't use technology for this purpose, or they don't organise and plan their lives to any great extent.

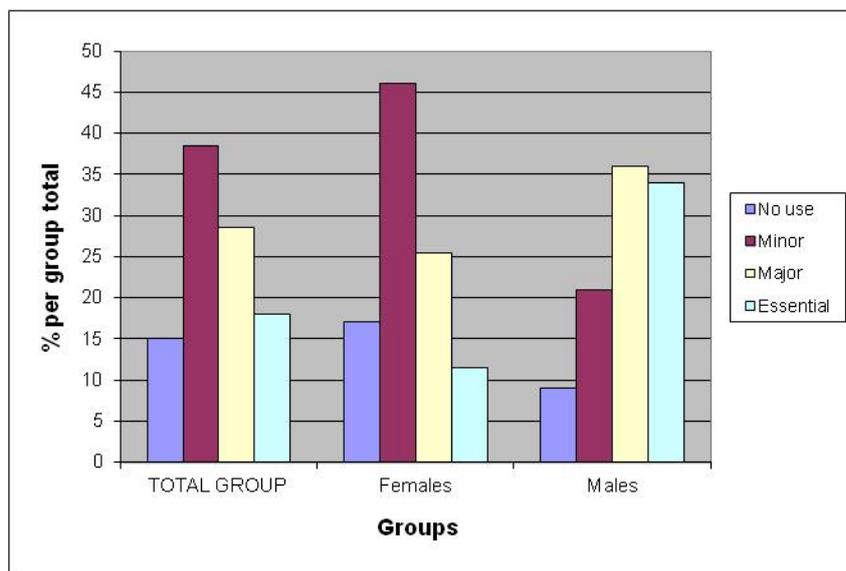


Figure 4-16: Importance of the Internet for entertainment

Results for Figure 4-16 indicate that almost half (46.5%) of the participants rated the Internet highly as a means of accessing entertainment. Across the whole group 28.5% said it was of major importance and 18% said the

Internet was essential. Again males (70%) were using it more than females (36.5%) for this purpose. This result may be a reflection of how males use the Internet for entertainment and is explored further in the correlation analysis in Chapter 5.

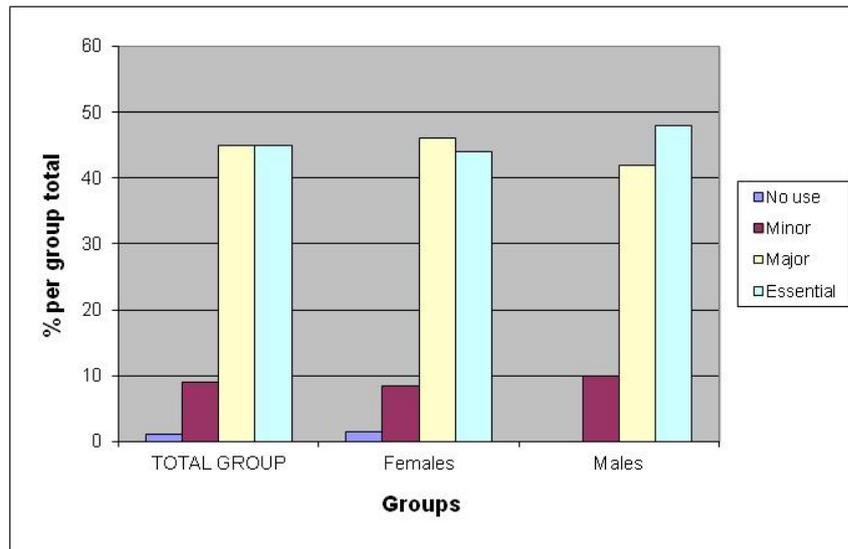


Figure 4-17: Importance of the Internet for finding information

When asked about the importance of the Internet for finding information (Figure 4-17) participants rated this activity as very important, with 90% of the whole survey group rating it as major or essential. In this section of the questionnaire participants were asked to rate the importance of using the Internet for a range of activities. For this sample group, using the Internet for finding information and for communication were rated highly, while more males than females were using it for financial transactions, retail and entertainment.

4.1.4. Internet-based services and utilities, importance and everyday use

This section of the questionnaire explored the different types of Internet-based services and utilities being used by young people in their everyday lives. The importance of social networking, electronic information services, communication utilities and file sharing are reported in this section (Figures 4-18 – 4-28).

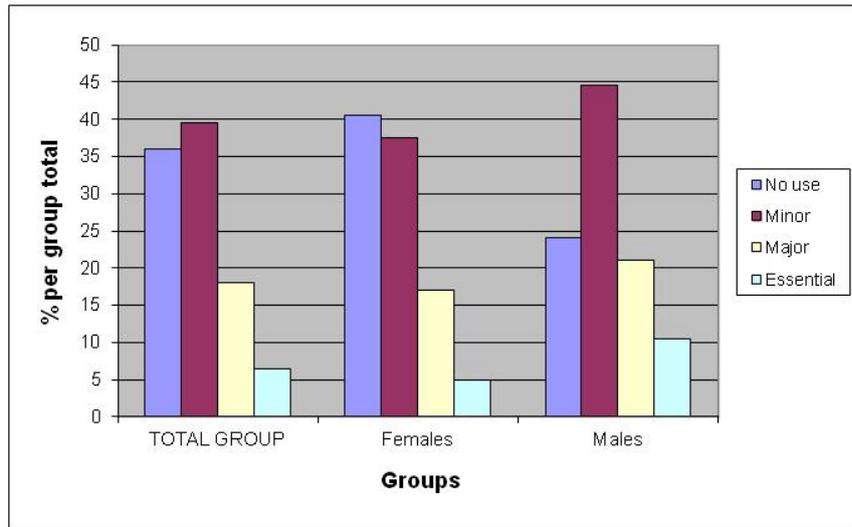


Figure 4-18: Importance of Internet-based services and utilities, bulletin boards/discussion forums

Across the total group, 75% of participants reported no use (35.5%) or minor importance (39.5%) for discussion boards (Figure 4-18). Although both universities were using Learning Management Systems (LMS) which utilised asynchronous communication such as discussion boards to facilitate communication with online students, this result does support demographic data (Appendix 8) collected during the survey which indicated that participants' experience of elearning at university was limited, with 19% reporting all their units online and a further 24% with some of their units online. Since 89.5% of the total group also reported all their units were available on campus, participants may not have been utilising the discussion forums provided.

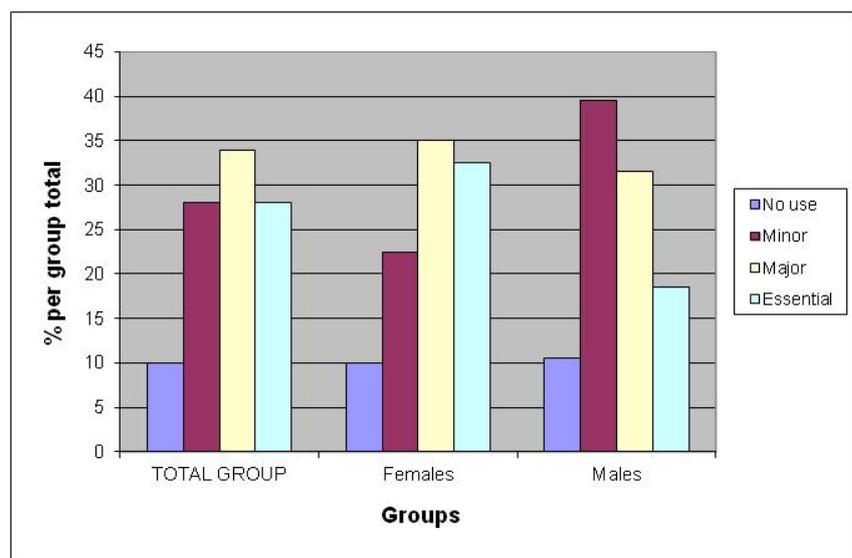


Figure 4-19: Importance of Internet-based services and utilities, library databases

Participants rated the importance of library databases as major (34%) or essential (28%), with females indicating greater importance (67.5%) than males (50%). This finding suggests the participants in this research were using the library databases as sources of information and for study purposes at university.

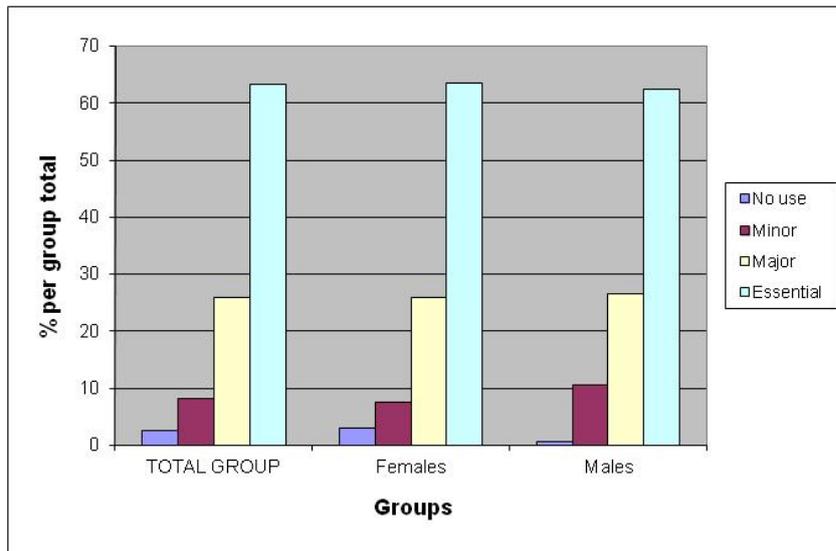


Figure 4-20: Importance of Internet-based services and utilities, email

Results for this question (Figure 4-20) indicate that email was a major means of communication in participants' everyday lives and one they considered to be very important. Overall, 63% of participants rated email as essential, while a further 26% said it was of major importance. The high importance placed on email (89%) may be due to the fact that both universities in the study were conducting all official communication with their students via email.

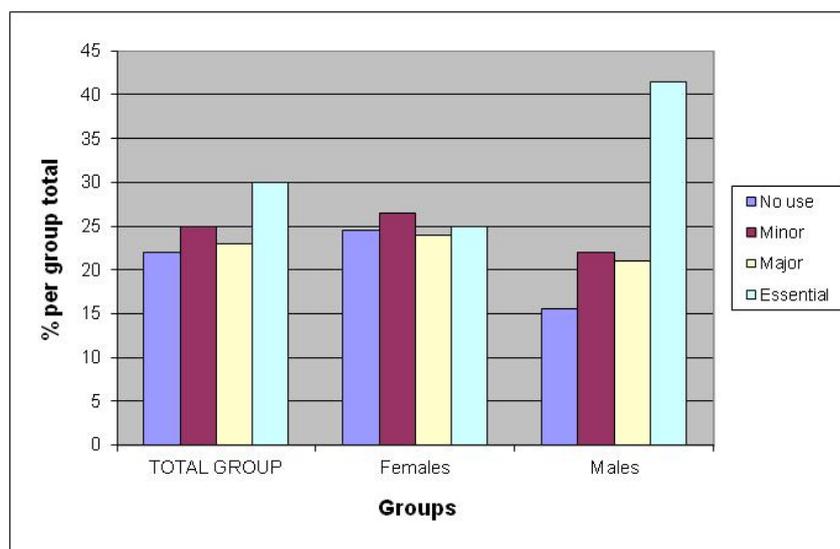


Figure 4-21: Importance of Internet-based services and utilities, instant messaging/chat

Results for this question (Figure 4-21) support the importance of using the Internet for communication. Overall, 53% of the whole group rated msn/chat as important aspects of their Internet use, with more males (41%) than females (25%) rating these utilities as essential.

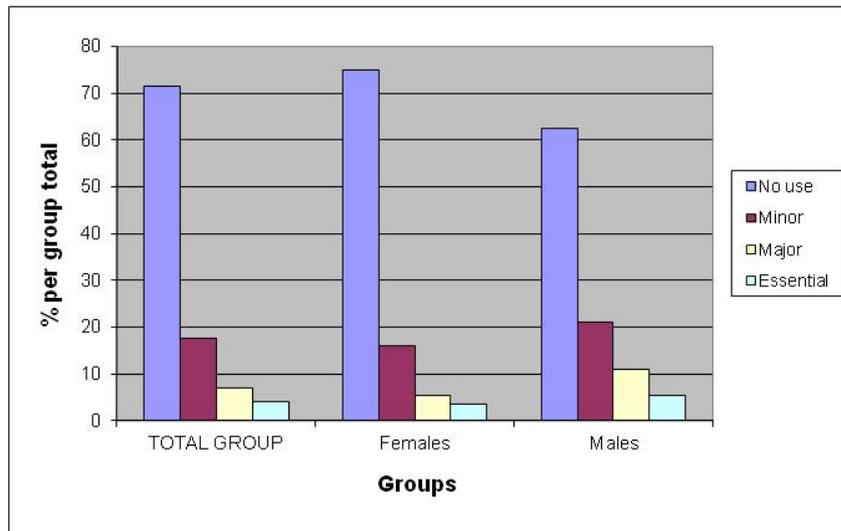


Figure 4-22: Importance of Internet-based services and utilities, Internet telephony/Skype

Results in Figure 4-22 indicate the participants in this research were not using Internet telephony services at this time, with only 11% rating this utility as major or essential.

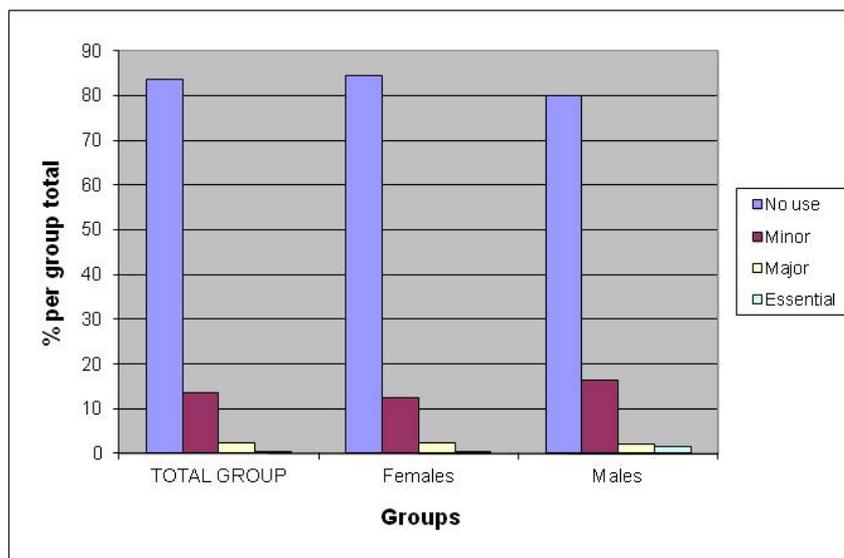


Figure 4-23: Importance of Internet-based services and utilities, listservs

Results in Figure 4-23 indicate that listservs were not a popular form of communication, even though communication using email and msn/chat ranked

high on importance for this group of users. Only 3% ranked listservs as major or essential, with 83% indicating they did not use them.

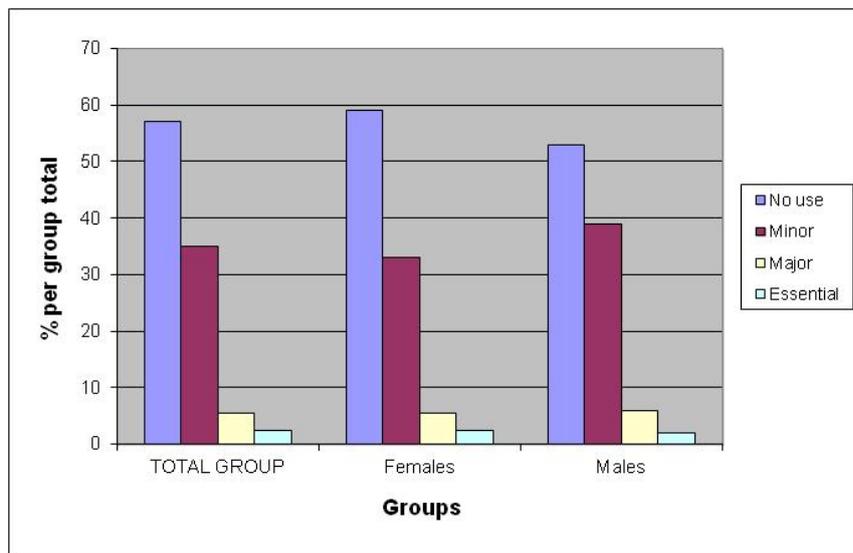


Figure 4-24: Importance of Internet-based services and utilities, electronic newsletters

Results reported in Figure 4-24 would appear to support the findings for listservs (Figure 4-23) and discussion forums (Figure 4-18). Participants in this research did not consider electronic news services very important, with 57% not using them and 34.5% saying they were of minor importance.

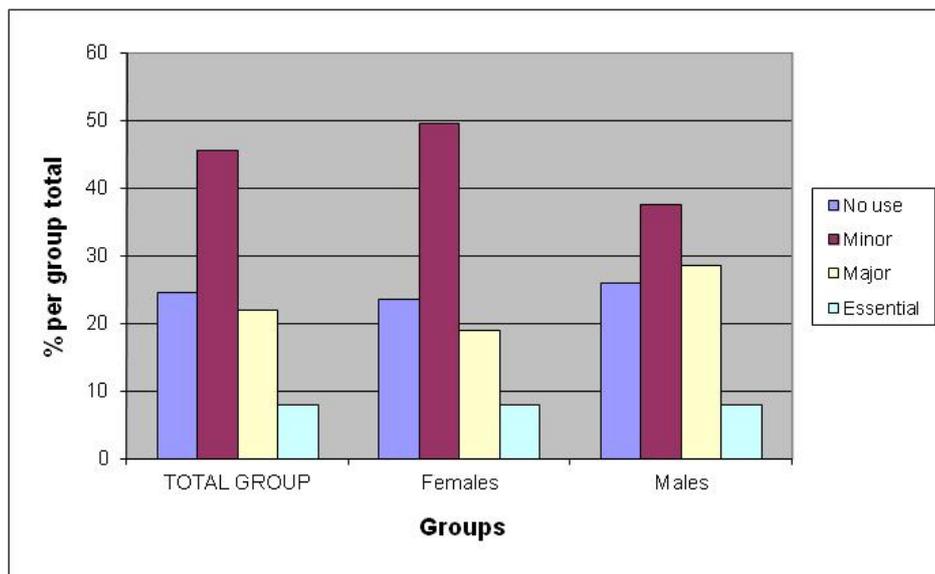


Figure 4-25: Importance of Internet-based services and utilities, Web-based lookups

The results in Figure 4-25 suggest that this group of users are discerning rather than ubiquitous users of technology. Less than a third (29.5%) of the total group rated Internet lookup services such as the White pages as major or

essential. However, 45.5% rated the importance of lookups as minor, indicating that they do use them, but only when they have a need to find information provided by these services.

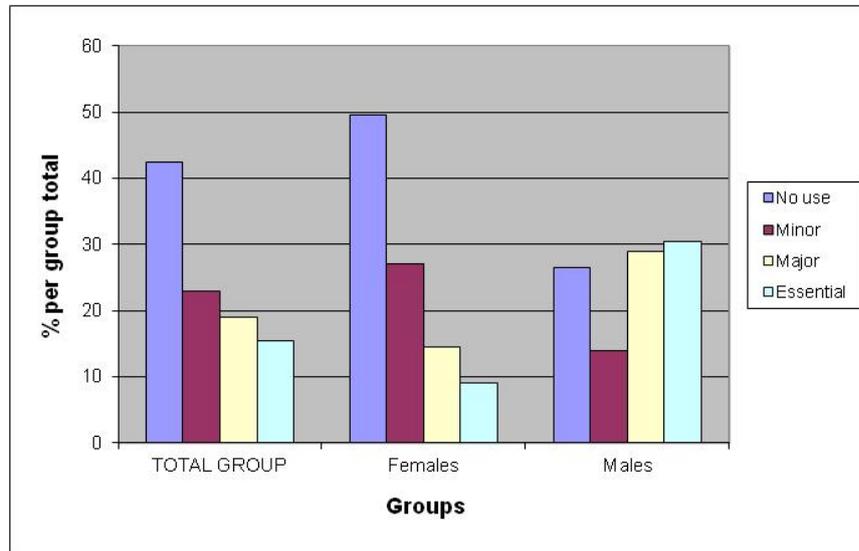


Figure 4-26: Importance of Internet-based services and utilities, peer-to-peer file sharing

The results reported in Figure 4-26 indicate there was a small group of participants, predominantly male, who used the Internet to download and share files. Overall, 34% reported this utility as major or essential. However, 59% of males rated it as important against 23% of females.

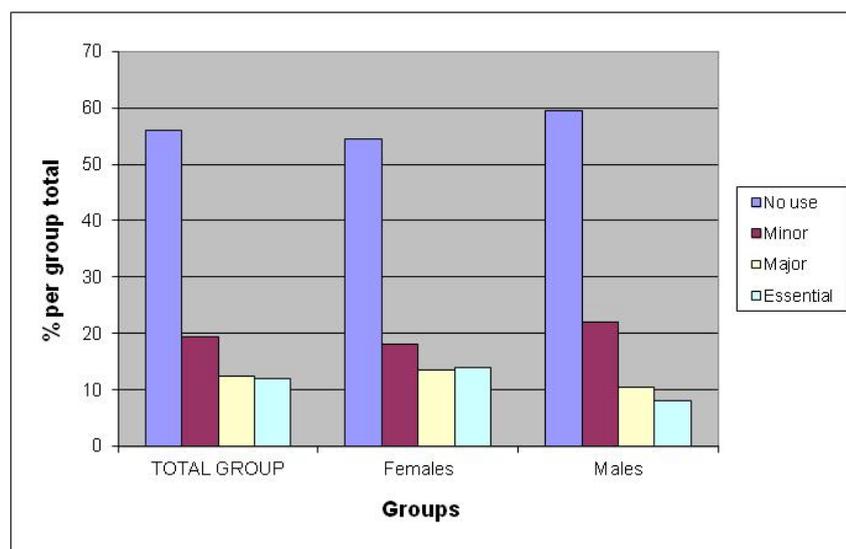


Figure 4-27: Importance of Internet-based services and utilities, MySpace

While the results in Figure 4-27 reflect other Australian research studies (Kennedy et al, 2007) it may not be a true reflection of use. In this study 24.5%

of participants said that MySpace was of major or essential importance. However, this question was very specific and referred to only one social networking service. A more accurate result may have been gained if the term social networking had been used and a number of different services listed as examples, such as FaceBook, Linked-in and Friendster.

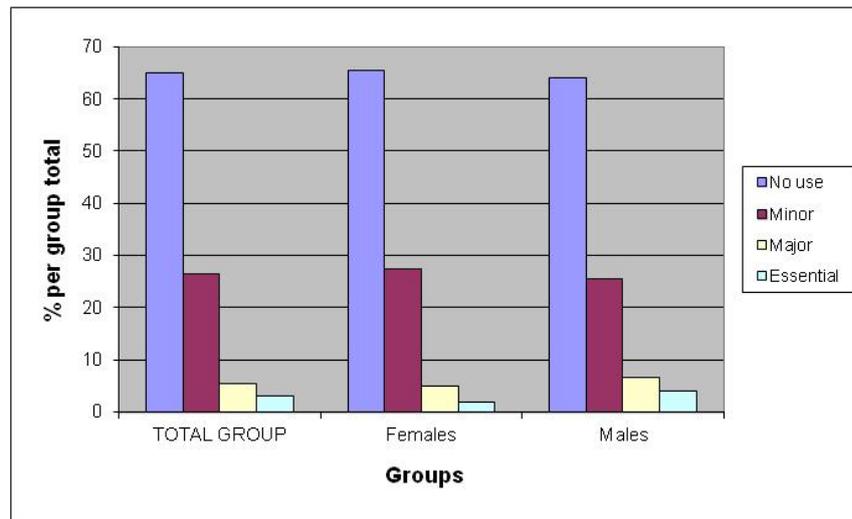


Figure 4-28: Importance of Internet-based services and utilities, Weblogs

Results in Figure 4-28 may also support the notion that young people have specific preferences when it comes to communication via the Internet. In this study only a few of the participants rated weblogs as important (8.5%) in their everyday lives with 65% reporting no use.

Results from this section of the questionnaire indicated that participants in this survey used the Internet heavily for communication. However, they were using specific types of communication utilities such as email and msn/chat rather than social networking, listservs, Internet telephony and blogs. A small group, mainly males, were using the Internet for file sharing.

4.1.5. Using different technologies, importance and everyday uses

Section four of the questionnaire examined the importance of a range of technologies in participants' everyday lives. Results for the importance of a variety of information storage devices, mobile communications, organisational tools, computers, media equipment, and publishing devices are presented in Figures 4-29 – 4-40.

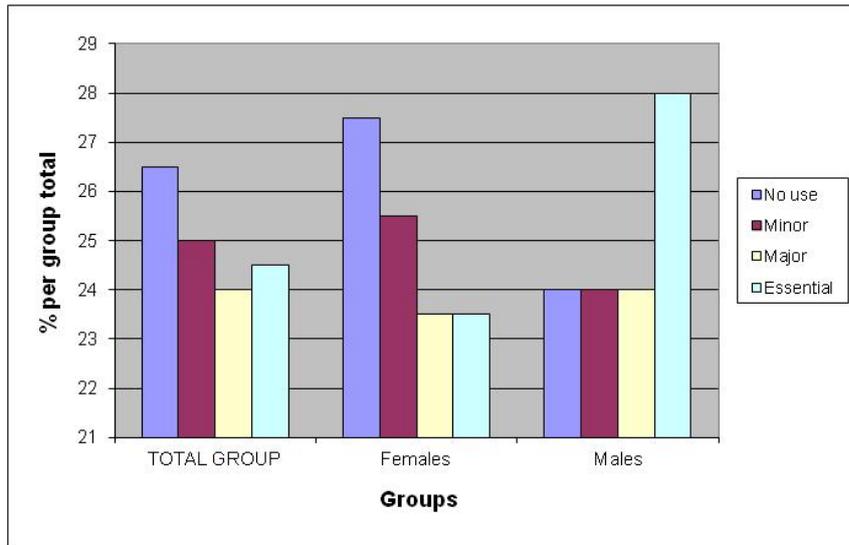


Figure 4-29: Importance different technologies, ipods/portable music player

In this question, participants were asked to rate the importance of portable music players. Overall, 51% of participants reported minor importance or no use of portable music players. More males (28%) than females (23.5%) considered these devices as essential.

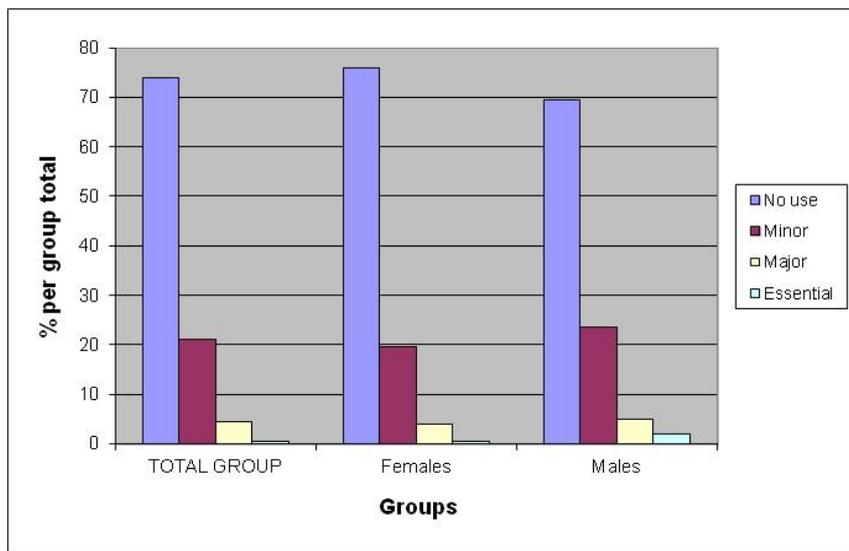


Figure 4-30: Importance different technologies, webcams

Similarly, results reported in Figure 4-30 indicate that few participants were using webcams with 21% reporting minor importance and 74% no use. This result may be a reflection of the time the data was collected since many laptops and multifunctional mobile devices with Internet access also had built-in cameras, making webcams redundant.

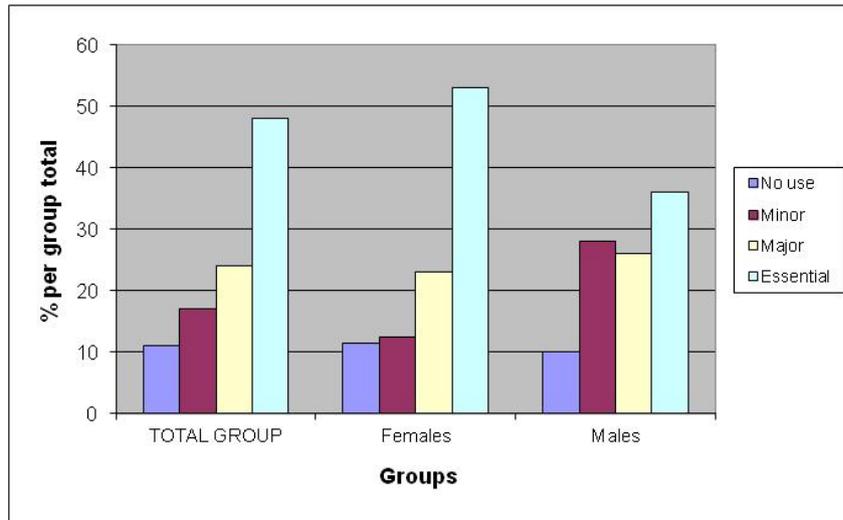


Figure 4-31: Importance different technologies, thumb drive/flash drive/USB drive/memory stick

The results in Figure 4-31 indicate that participants were using portable storage devices, with 48% of the total group considering them essential and another 24% of major importance. Females (53%) considered them more important (essential) than males (36.5%). This result is not surprising, since both universities in the study were providing almost all support services to students and some elearning materials online.

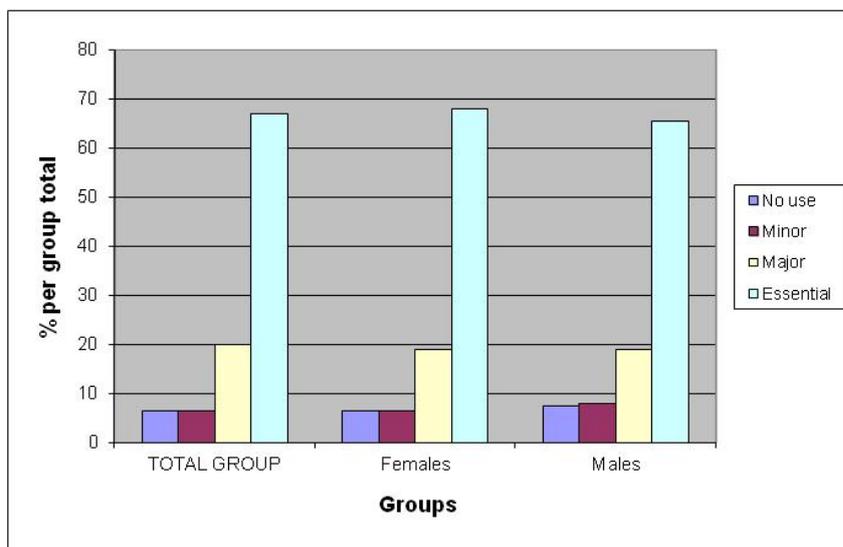


Figure 4-32: Importance different technologies, mobile phone

Of the total group 67.5% considered their mobile phone as essential and a further 20% of major importance. Only 6.5% of the group were not using a mobile phone. These results indicate the importance of mobile phones and ready

access to communication by this group. They also support the notion that young people belong to the *connected generation*.

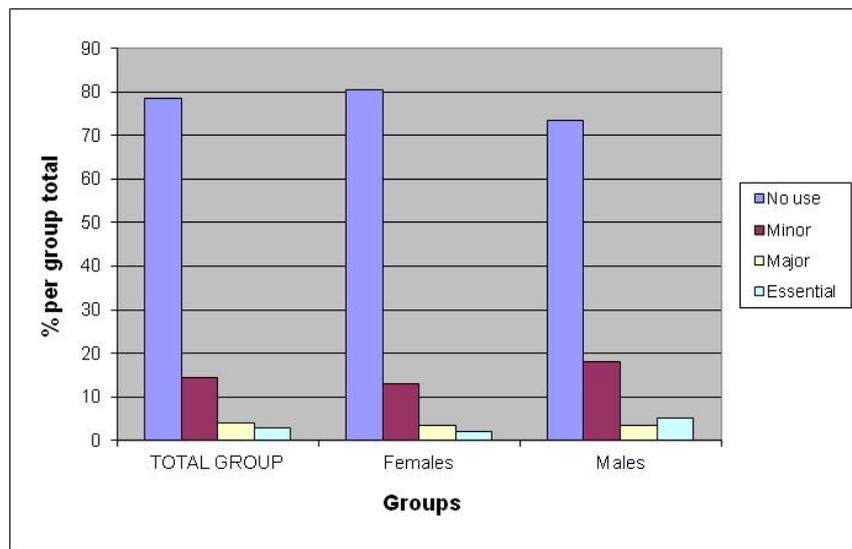


Figure 4-33: Importance different technologies, PDAs

The results in figure 4-33 support previous findings (Figure 4-15) which indicate that participants in this study do not plan or organise their lives using technology. Overall, 78.5% of the group reported no use of PDAs, with 14.5% reporting minor importance.

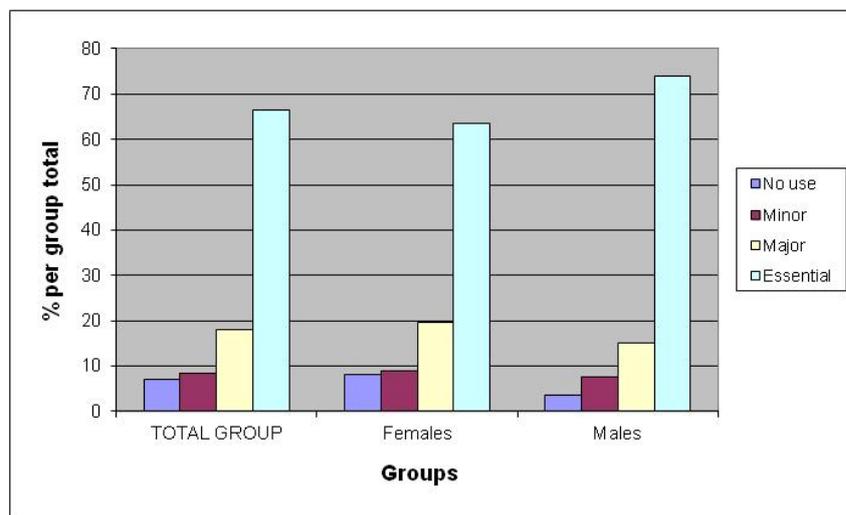


Figure 4-34: Importance different technologies, computers

Overall, only 15% of the participants reported minor importance (8.5%) or no use (6.5%) of computers. Of the total group 66.5% rated computers as essential, with males (74%) higher than females (63.5%) for this question. The importance of computers in the everyday lives of participants is also supported

by the results presented in Figure 4-35 below which examined the importance of laptops.

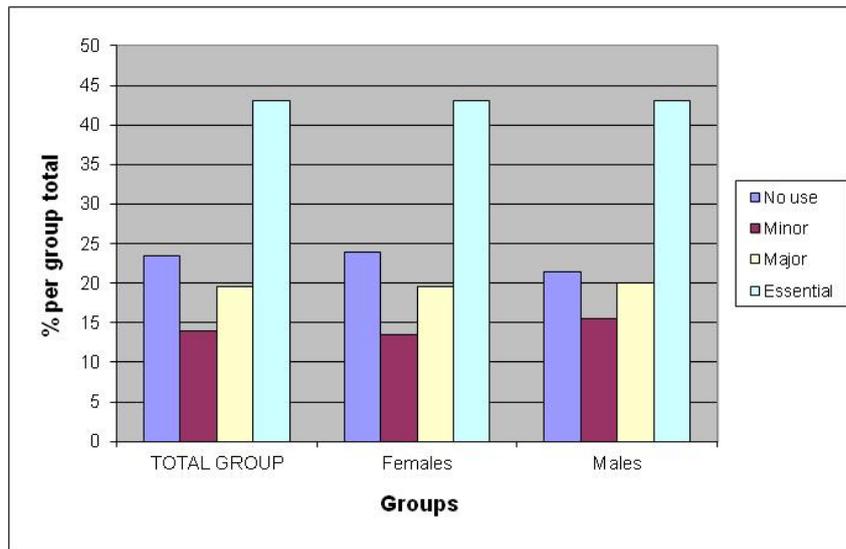


Figure 4-35: Importance different technologies, laptops

Across the total group, 43% rated their laptops as essential and a further 19.5% allocating major importance. Almost a quarter (23%) of participants did not use a laptop. While this result supports the previous result and indicates the importance of computers in participants' everyday lives, it may also indicate that cost is a factor. Laptops are expensive and individual ownership may be beyond the average student's budget. Both universities also provided 24/7 access to computer and Internet facilities on campus. Since 89.5% of the participants reported that all their units were on campus, the need to own a laptop may not have been perceived as an imperative for this group.

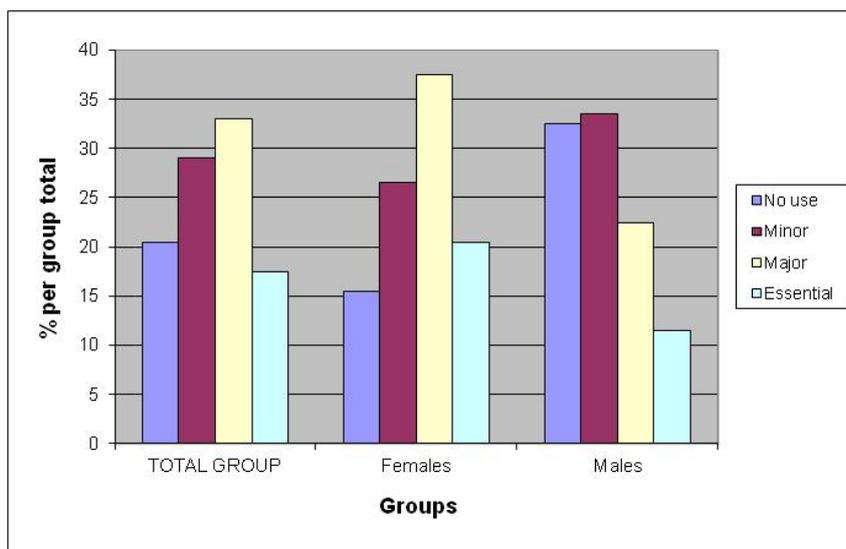


Figure 4-36: Importance different technologies, digital camera

Photography devices such as digital cameras also rated as less important for this group of participants, with 17.5% rating them as essential and 33% of major importance. Females (58%) rated digital cameras as essential or of major importance more than males (34%), while more males (33%) than females (15.5%) were not using them. The results for video cameras reported in Figure 4-37 also suggest that use of these technologies is the result of preference and need rather than ubiquitous use. The fact that many mobile phones also have a digital camera facility may preclude ownership of a separate device.

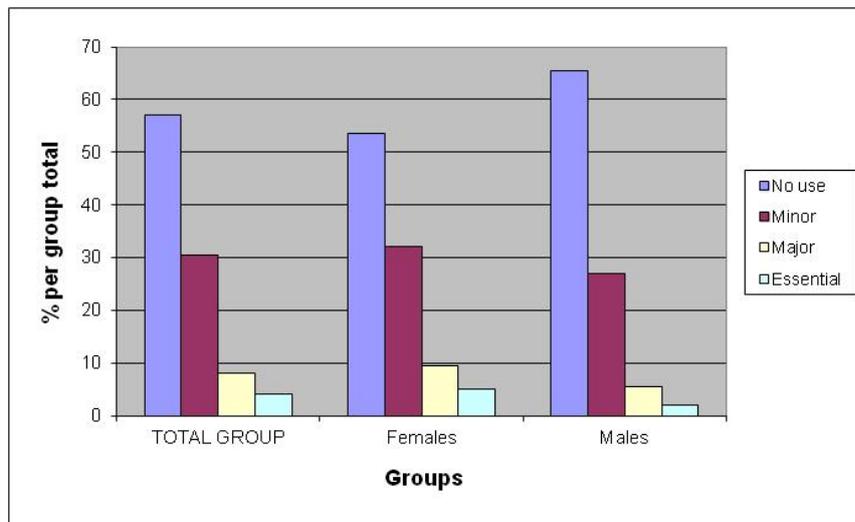


Figure 4-37: Importance different technologies, video camera

More than half of the total group (57%) were not using video cameras at all and a further 30.5% said they were of minor importance. Video cameras have a specific use and are expensive items. These results may indicate that ownership and use of such technologies depends on cost and perceived need or interest by the users.

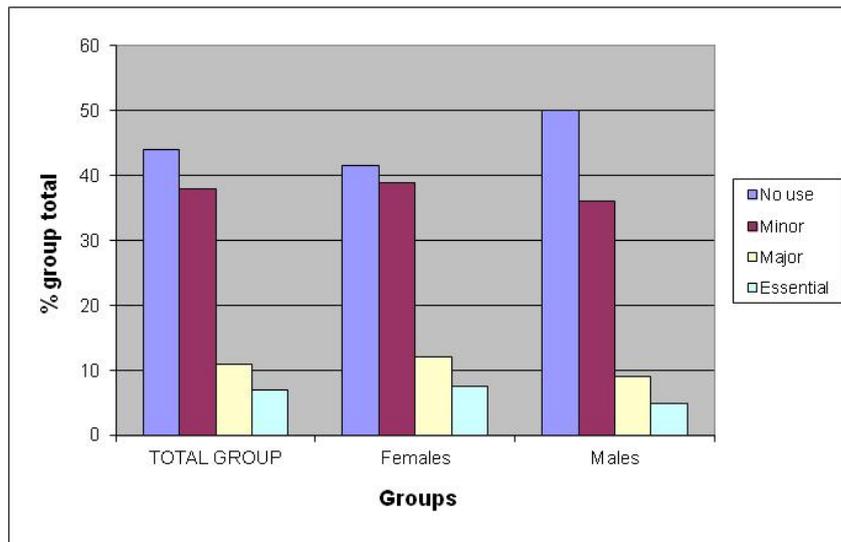


Figure 4-38: Importance different technologies, scanner

The results in Figure 4-38 also indicate this group did not rate all technologies of equal importance. Overall, 44% of participants did not use scanners and 38% said they were of minor importance. While both universities had multimedia facilities available where participants could gain access to these devices, they were obviously not using them. The results for printers reported in Figure 4-39 tell a different story.

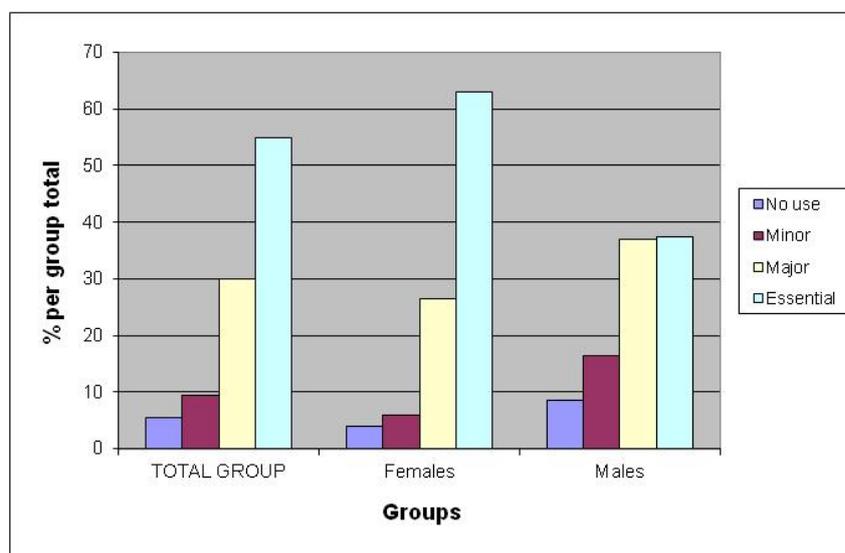


Figure 4-39: Importance different technologies, printer

While participants were not using scanners to copy and store information, they were printing. Overall, 55.5% of participants rated the printer as essential and a further 30% said it was of major importance. Only a few participants were not printing (5.5%). More females (63%) considered it

essential than males (37.5%). What these results do indicate is that the printer and having information in print form was important to these users. Why participants were printing so much was explored further in the second phase of the research in the interviews (Chapter 6).

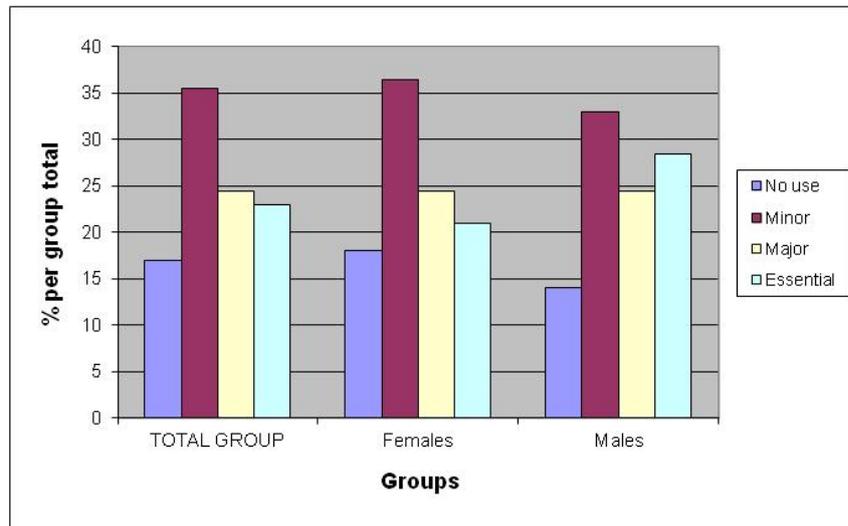


Figure 4-40: Importance different technologies, CD/DVD burner

Results in Figure 4-40 also support the notion the Net Generation are discerning users of technology. Approximately half (47.5%) of the participants in this group said that CD/DVD burners were essential (23%) or of major importance (24.5%), while 16.5% did not use them. More males (28%) regarded these technologies as essential than females (20%).

Results from this section of the questionnaire indicated that these participants were using specific technologies either due to preference or need. Surprisingly the printer was rated very high for importance, as were mobile phones. Computers, laptops and mobile music players appeared to be important to specific groups.

4.1.6. Learning how to use the Internet

Section five of the questionnaire asked participants about learning how to use the Internet, specifically who they considered to have had a significant impact on their acquisition of online skills. This section was designed to determine where participants were acquiring their online skills and the level of

engagement both within and outside formal educational settings. These results are presented in Figures 4-41 – 4-52.

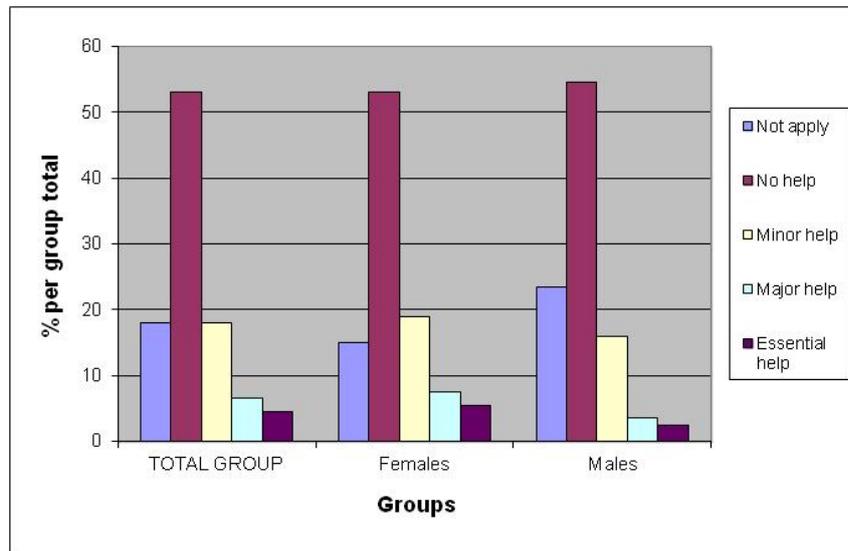


Figure 4-41: Learning to use the Internet, significant influences, mother/female guardian

The results in Figure 4-41 indicate that significant female parental figures in participants' lives had a limited impact on their acquisition of online skills. Only 4.5% overall said they were of essential help, with 71% indicated no help or does not apply. There were only small differences between the genders in these results. For this particular group, female parental figures did not act as positive role models or instructors to their children when they were learning how to use the Internet.

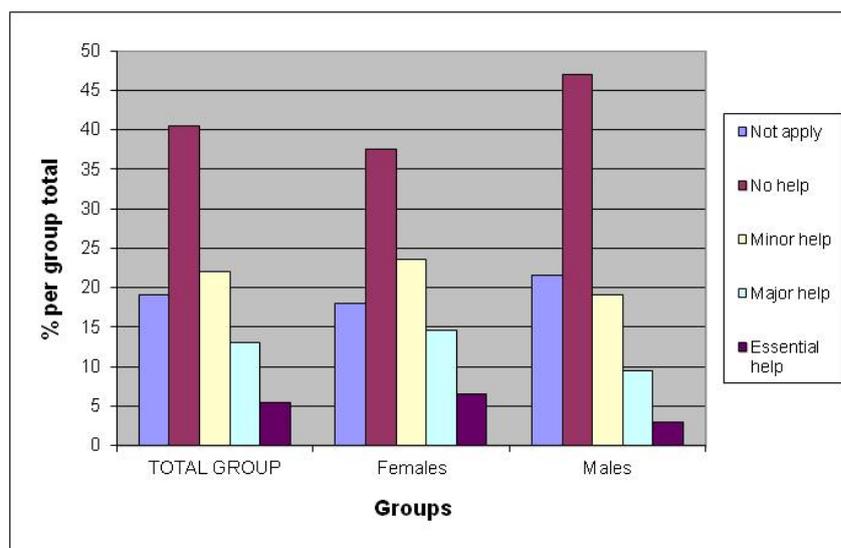


Figure 4-42: Learning to use the Internet, significant influences, father/male guardian

The results for males were similar to those reported in Figure 4-41, with only 5.5% of participants indicating their male parental figures were essential when learning to use the Internet. More males (68.5%) than females (55.5%) said their fathers/male guardians were of no help or does not apply. The results from Figures 4-41 and 4-42 indicate that parental influence when learning how to use the Internet had been very limited, even though participants' Internet use prior to entering university had occurred mostly in the home (Figure 4-4).

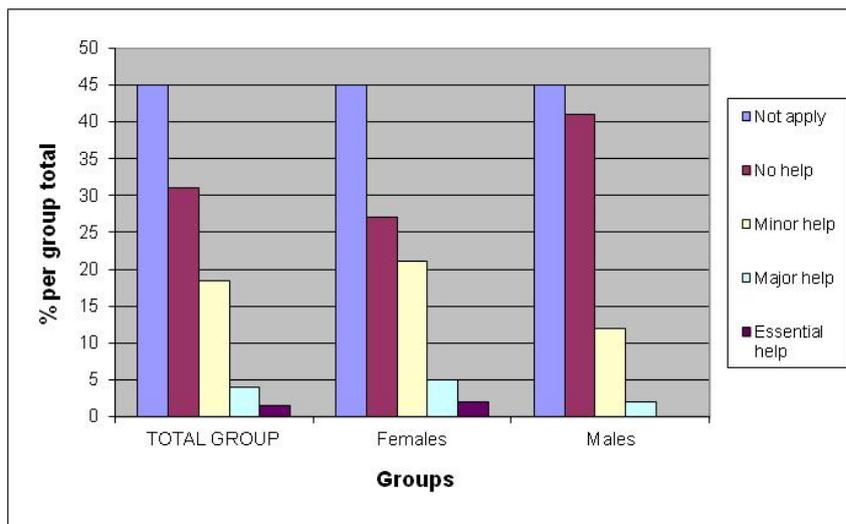


Figure 4-43: Learning to use the Internet, significant influences, sister

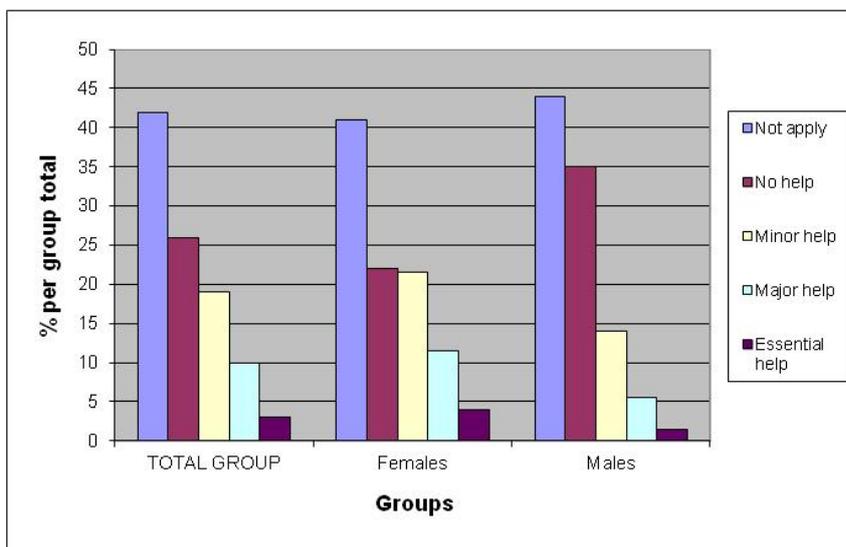


Figure 4-44: Learning to use the Internet, significant influences, brother

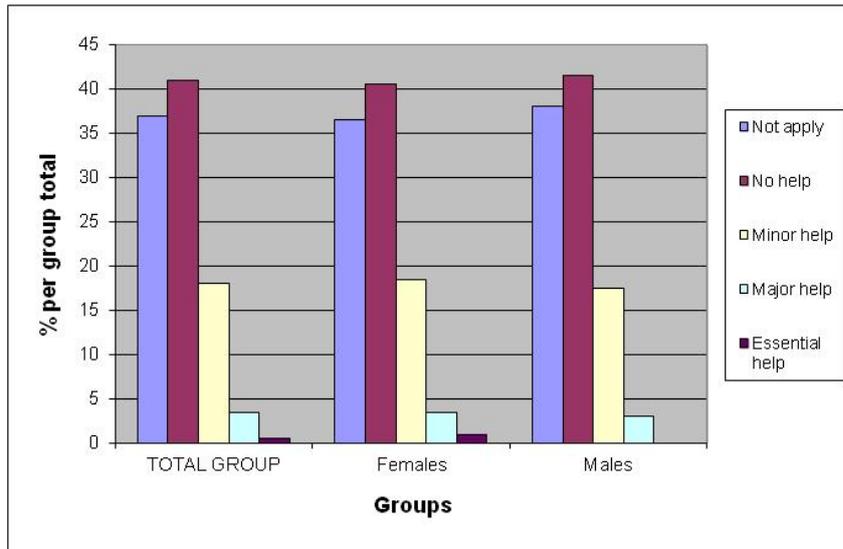


Figure 4-45: Learning to use the Internet, significant influences, other relatives

Results reported in Figures 4-43 -4-45 indicate that other family figures such as sisters, brothers and relatives also had a limited impact on the participants' acquisition of online skills.

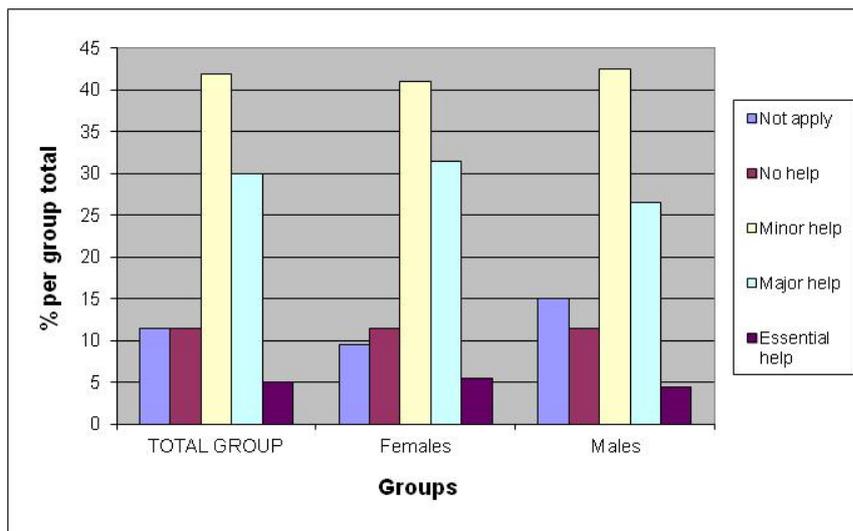


Figure 4-46: Learning to use the Internet, significant influences, friends

However, results in Figure 4-46 indicate that friends were an important information source when acquiring online skills. While only 5% of the total group considered friends essential sources of assistance, 30% said they were a major help. A further 22.5% indicated friends were of no help or does not apply, while 42% reported minor assistance.

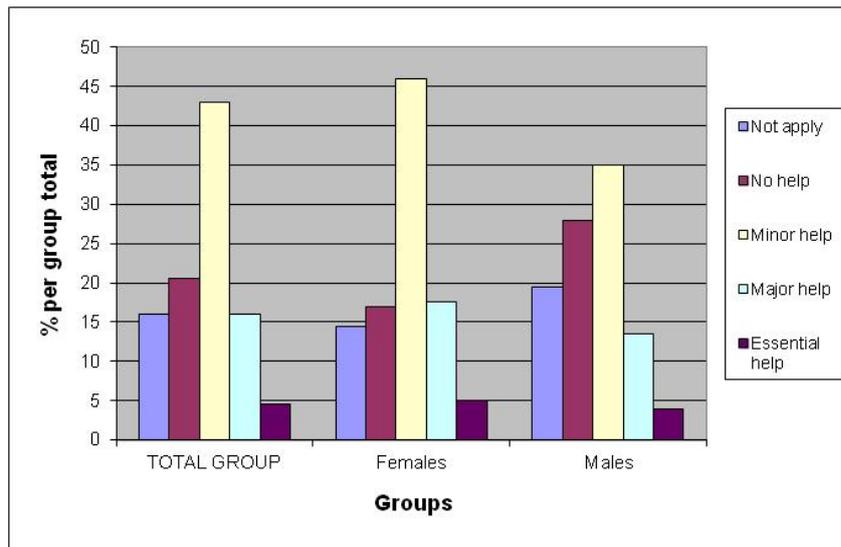


Figure 4-47: Learning to use the Internet, significant influences, teachers at school

Teachers at school also provided limited assistance to participants when learning to use the Internet. Of the total group only 4.5% said teachers were essential, with 16% saying they provided major help. No help or does not apply were reported by 36.5% while 42.5% said their teachers' influence was minor.

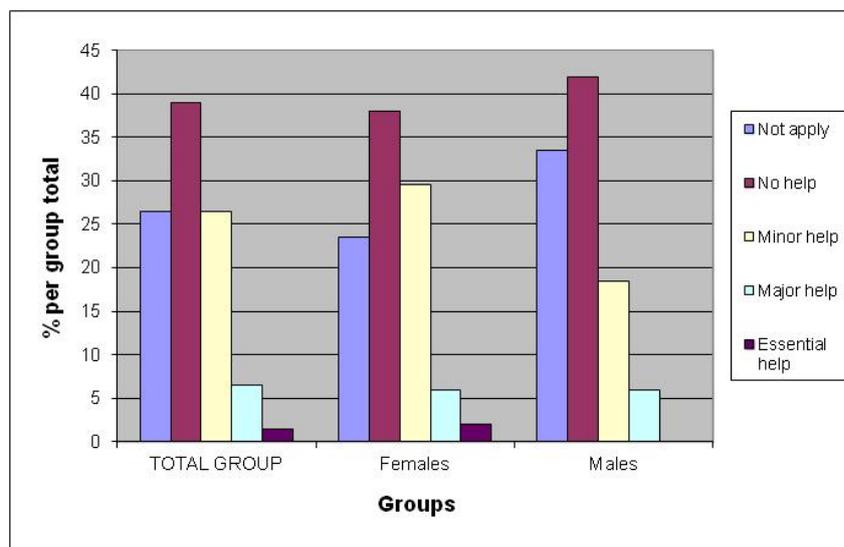


Figure 4-48: Learning to use the Internet, significant influences, school librarian

Results reported in Figure 4-48 also suggest participants did not acquire their skills using the Internet in formal educational settings. Only 8% of participants felt the information specialist in the school (teacher librarian) was an essential or major help in online skills acquisition, with 13.5% reporting no help and 71.5% does not apply. The high percentage for does not apply may indicate these participants did not have access to an information specialist at their school

or did not know this person could be of assistance. Computer teachers in schools fared slightly better as reported in Figure 4-49 below.

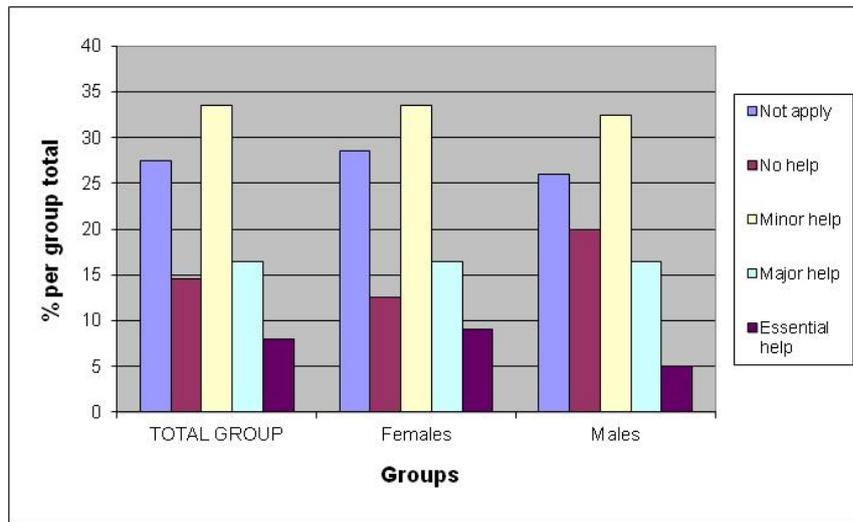


Figure 4-49: Learning to use the Internet, significant influences, computer teacher

Of the total group 24.5% of participants felt their computer teacher at school provided essential or major help when learning to use the Internet while 42% reported no help or does not apply. Participation in educational programs outside TAFE/school also appear to have had little impact on how participants in this sample group acquired their Internet skills, as evidenced in Figure 4-50 below.

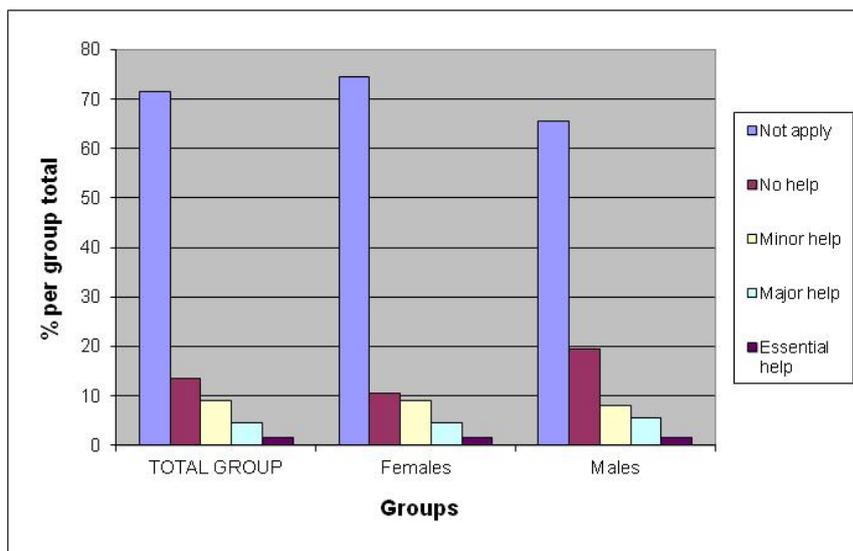


Figure 4-50: Learning to use the Internet, significant influences, short courses undertaken independent of TAFE/school

Overall, 85% of the group reported does not apply or no help for learning to use the Internet as a result of short courses undertaken outside TAFE/school.

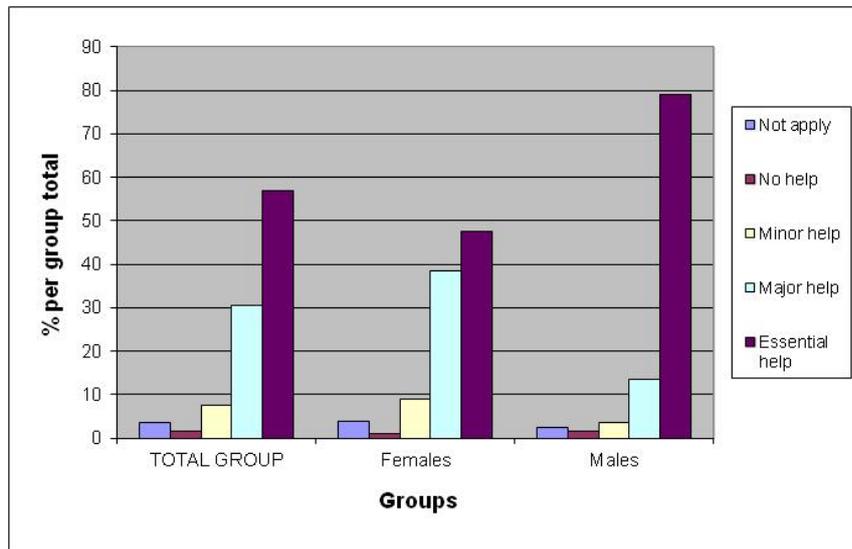


Figure 4-51: Learning to use the Internet, significant influences, experimented by myself

Results presented in Figure 4-51 indicate that participants in this group acquired their Internet skills by themselves. Only 4.5% fell into the does not apply and no help category, while 57% said experimentation was an essential method and a further 30.5% indicated it was a major help. There were some differences between genders in this dataset in the major and essential categories, with males showing a preference for this method of learning. However, self experimentation represented the major method for learning how to use the Internet as reported by the participants in this sample group.

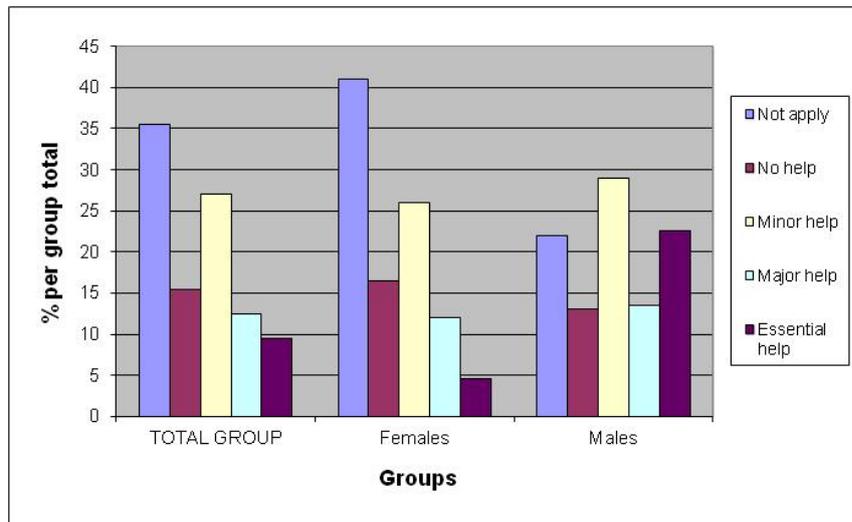


Figure 4-52: Learning to use the Internet, significant influences, learned myself by reading books/magazines

Self-directed learning using books and magazines was also used by this group to acquire their Internet skills. Overall, 22% of participants said this was an essential or major help, with 51% saying this method did not help or did not apply. There is a gender difference in this dataset with 22% of males reporting this as an essential component of their learning.

The results of questions in this section strongly indicate that participants in this study acquired their Internet skills by themselves, outside formal educational settings. Friends represented the group that had the most influence on Internet skills acquisition, followed by self-directed learning using books and magazines. Computer teachers had the greatest influence in the school environment, but this was limited to a quarter of the sample group. Even though most Internet activity associated with information gathering and study occurred in the home, parental and familial role models also had little influence on the acquisition of skills for this group.

4.1.7. Confidence using the Internet

Results reported in Section six of the questionnaire examined participants' confidence when using the Internet for certain activities including study, communication, retail, organising and planning, entertainment and finding information. These datasets are presented in figures 4-53 – 4-59 below.

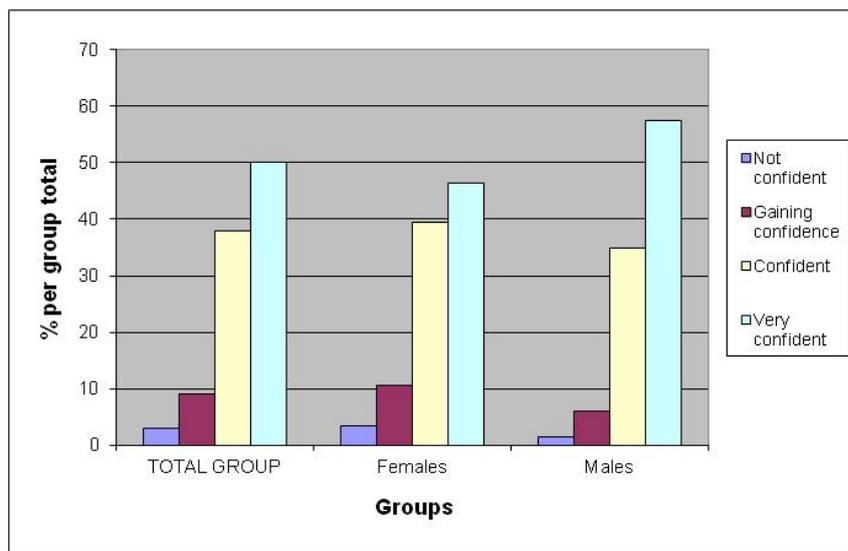


Figure 4-53: Confidence using the Internet for study

The first question in this section examined participants' confidence when using the Internet for study. Results in Figure 4-53 indicate that participants in this group were very confident about using the Internet for study with 50% reporting they were very confident and a further 38% saying they were confident. Males reported higher levels of confidence (66.5% very confident) than females (48.5% very confident). This difference evens out when the confident and very confident results are combined with 95% of males confident/very confident and 89% of females confident/very confident. Overall, 90% of this group reported being confident or very confident when using the Internet for study.

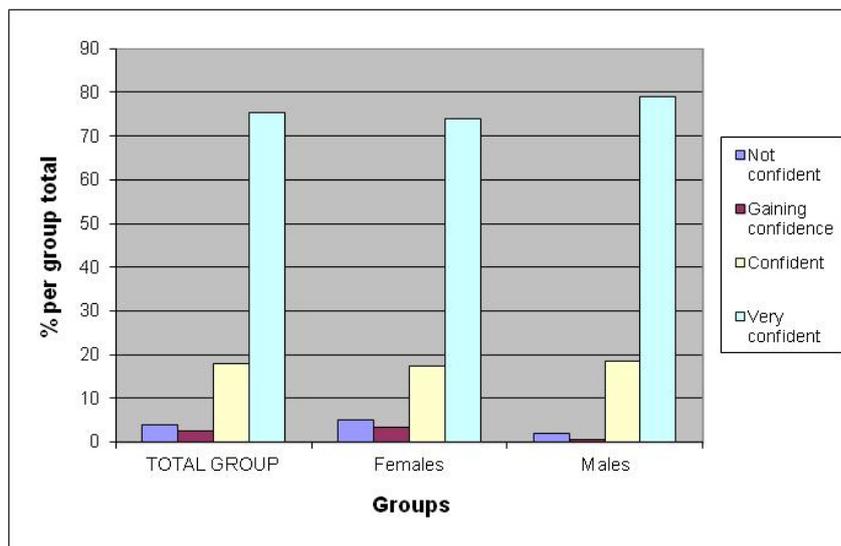


Figure 4-54: Confidence using the Internet for keeping in touch with family and friends

Participants were also very confident using the Internet for communication, with 75.5% very confident and a further 18% confident, even though only 67% reported essential or major use (importance) of the Internet for this purpose earlier in the questionnaire (Figure 4-12). Confidence levels dropped however, when using the Internet for financial transactions and retail purposes (Figure 4-55 below).

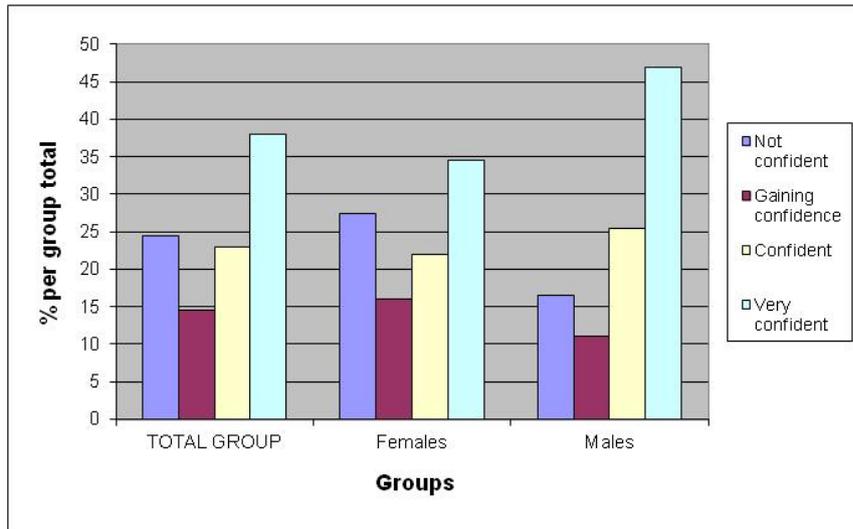


Figure 4-55: Confidence using the Internet for financial transactions

Overall, approximately a quarter of the group (24%) were not confident using the Internet for financial transactions with a further 14.5% gaining confidence. Results for confidence are higher than those reported in Figure 4-13, indicating that even though participants felt confident using the Internet for financial transactions (61%), only 44% considered this use important in their daily lives.

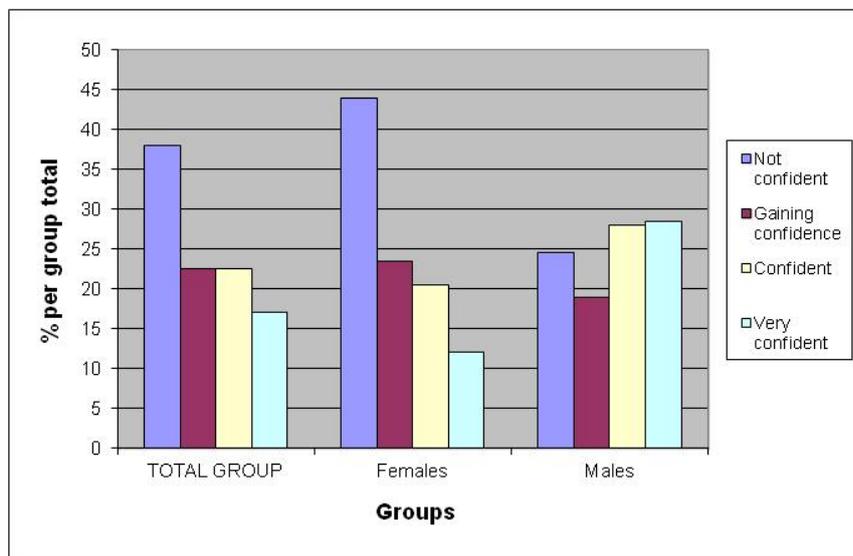


Figure 4-56: Confidence using the Internet for buying and selling

Again, the results in Figure 4-56 indicate higher levels of confidence when using the Internet for buying and selling (17% very confident and 23% confident) even though only 9.5% of participants reported this type of use as major or essential (Figure 4-14). More females reported no confidence (44%)

than males (24.5%), with 60% of participants overall reporting no confidence or gaining confidence when using the Internet for retail purposes.

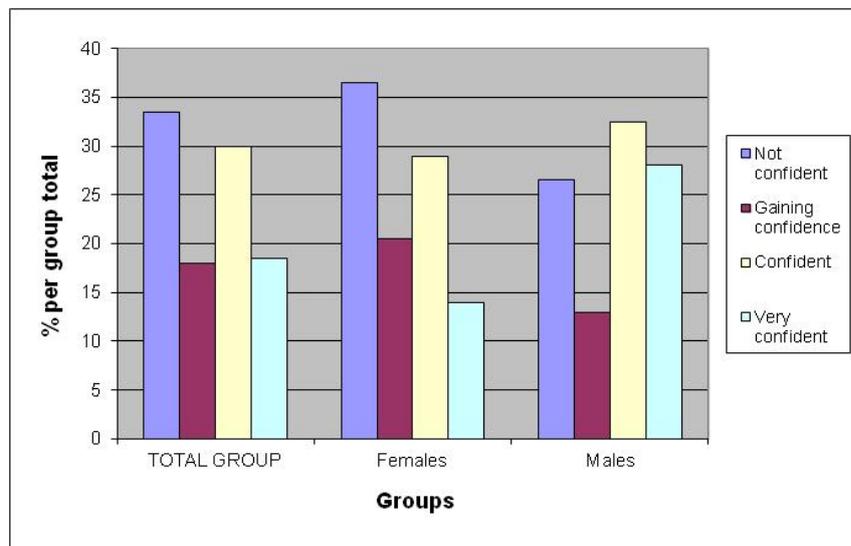


Figure 4-57: Confidence using the Internet for planning and organising my life.

Confidence was also high in the results presented in Figure 4-57 with 48% of participants very confident/confident when using the Internet for planning and organising, even though only a small number of participants (12%) were using it for this purpose (Figure 4-15). However, 52% of the total group were not confident (33.5%) or gaining confidence, with males exhibiting higher confidence levels than females.

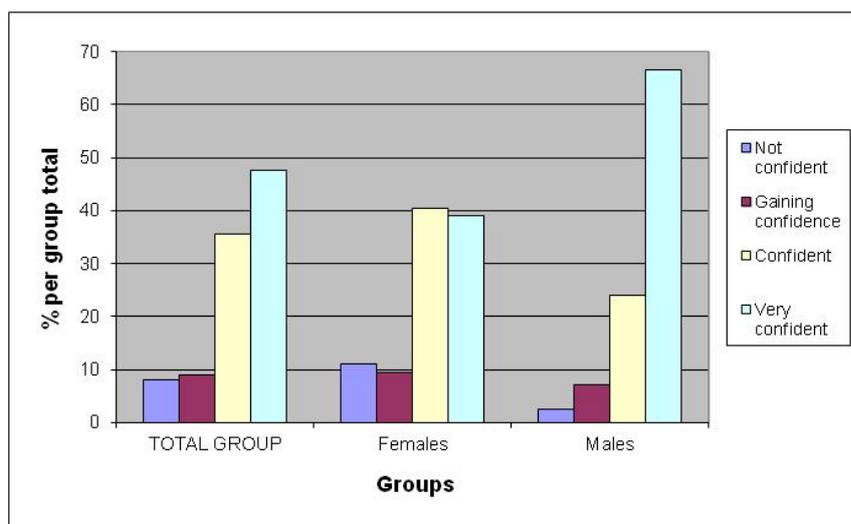


Figure 4-58: Confidence using the Internet for entertainment.

Levels of confidence when using the Internet for entertainment purposes (83% very confident/confident) were also much higher than results for

importance reported in Figure 4-16 (46.5%). These results indicate that even though participants were not using certain technologies in their daily lives, they were very confident they could do so if the need arose.

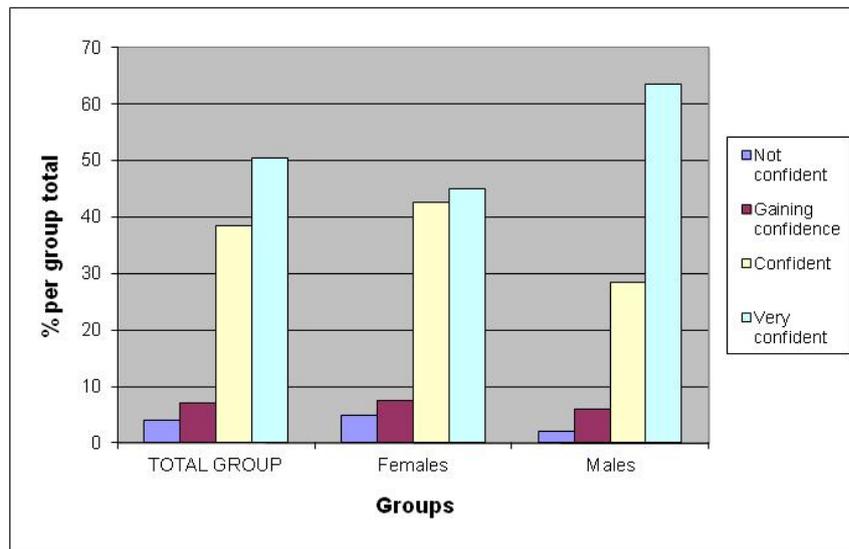


Figure 4-59: Confidence using the Internet for finding information

Overall, 89% of this group were confident using the Internet for finding information, a result that matches the importance of using the Internet for this activity reported in Figure 4-17 (90%).

Results in this section indicate that participants in this group exhibit high levels of confidence in their ability to use the Internet for a range of activities. In all areas except finding information and using the Internet for study purposes, participants' level of confidence does not match their level of use (importance) reported in Figures 4-13 – 4-16.

4.1.8. Confidence and information literacy skills

Section six of the questionnaire also examined participants' confidence and basic information literacy skills. Participants were asked to rate their confidence when using the Internet to find information; judge reliability of the information they had found; being able to collect, organise, and store information for later use (manage information); and re-find information for later use. These results are presented in Figures 4-60 – 4-65 below.

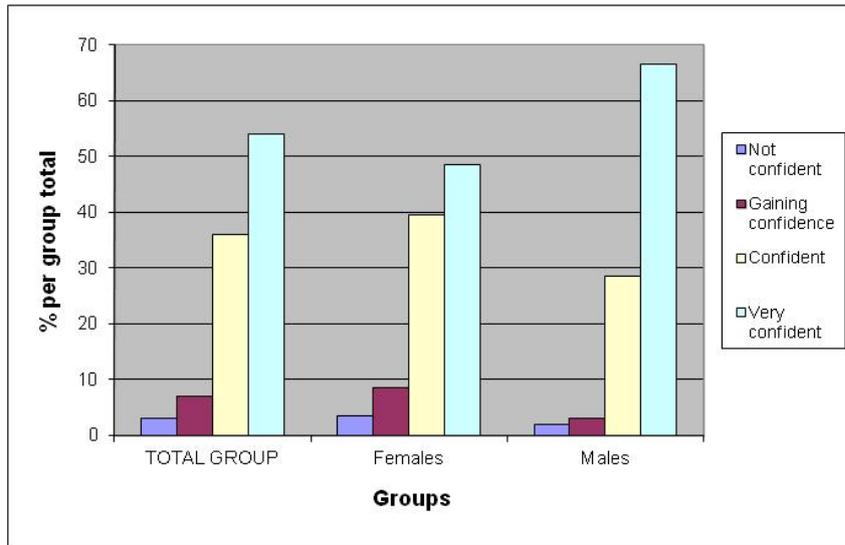


Figure 4-60: Confidence, information literacy skills - using the Internet to find information

The results in Figure 4-60 are similar to previous results reported in Figures 4-59 (89%) and 4-17 (90%), with 90% of participants reporting they felt very confident or confident using the Internet to find information. This confidence is explored further in phase two of the research in the interviews and tasks (Chapters 6 and 7).

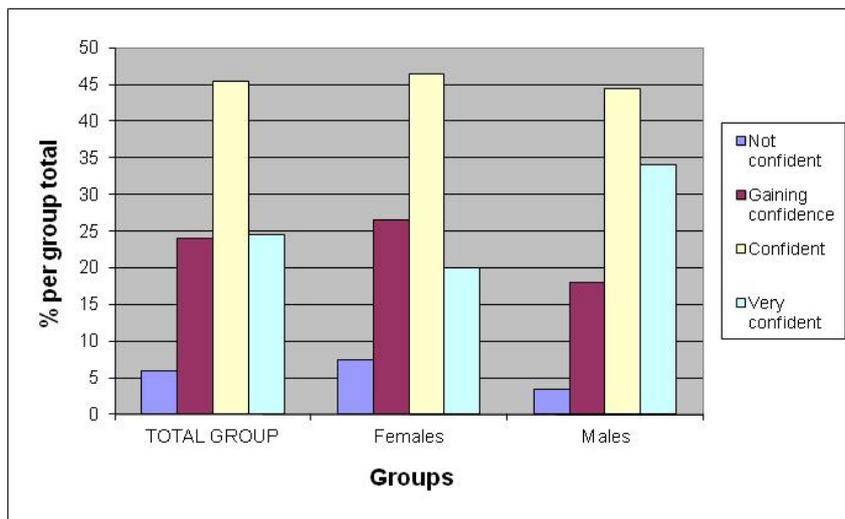


Figure 4-61: Confidence, information literacy skills – judging reliability of information found on the Internet

While participants were confident finding information on The Internet they were less so when judging the reliability of the information they had found. 70% felt very confident/confident, while 24% said they were gaining confidence and 6% were not confident. Males showed higher confidence levels (34% very confident) than females (20% very confident).

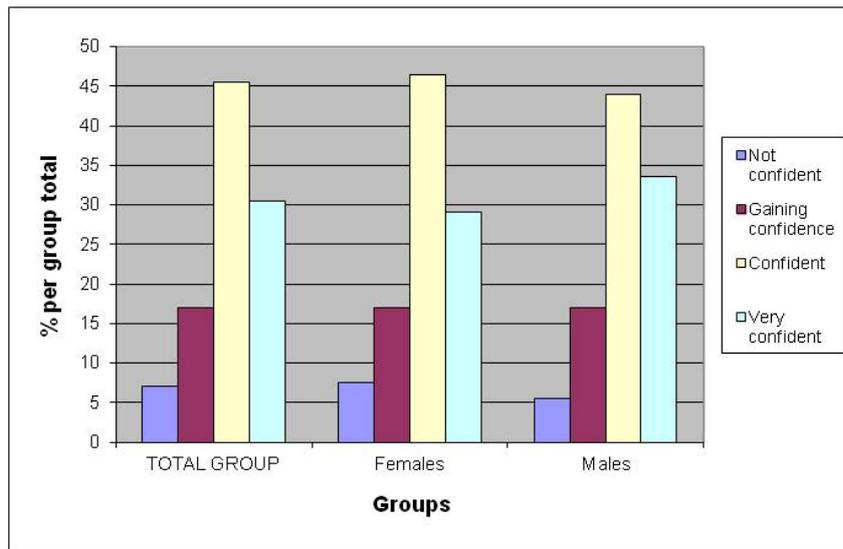


Figure 4-62: Confidence, information literacy skills – collecting information found on the Internet for later use

Almost a quarter of the participants (Figure 4-62) also expressed lower confidence levels when asked about collecting information found on the Internet for later use, with 24% indicating no confidence (7%) or gaining confidence (17%). Males showed marginally higher levels of confidence than females (Males 33.5% very confident : Females 29% very confident).

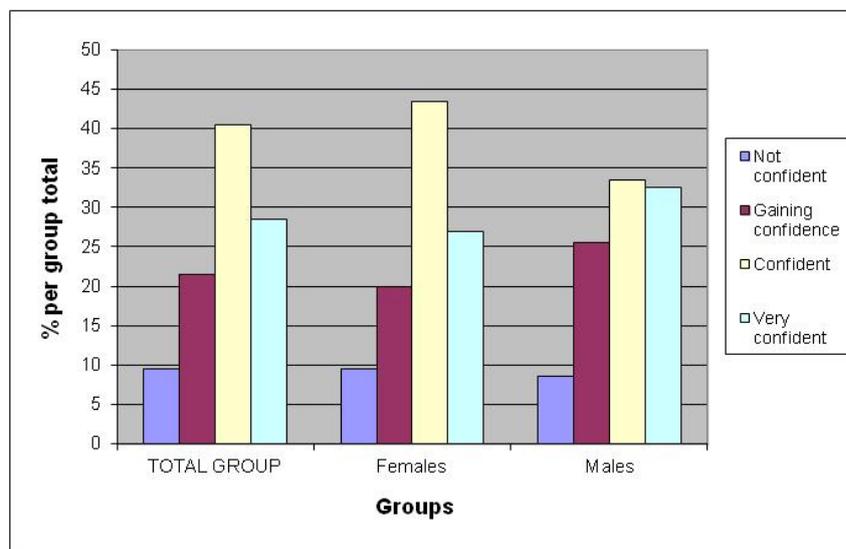


Figure 4-63: Confidence, information literacy skills – organising information found on the Internet for later use

Similar to the results in Figure 4-62, participants reported lower confidence levels when organising information they had found on the Internet for later use. In this case 31% of the total group said they were not confident

(9.5%) or gaining confidence (21.5%) with more males gaining confidence (25%) than females (20%).

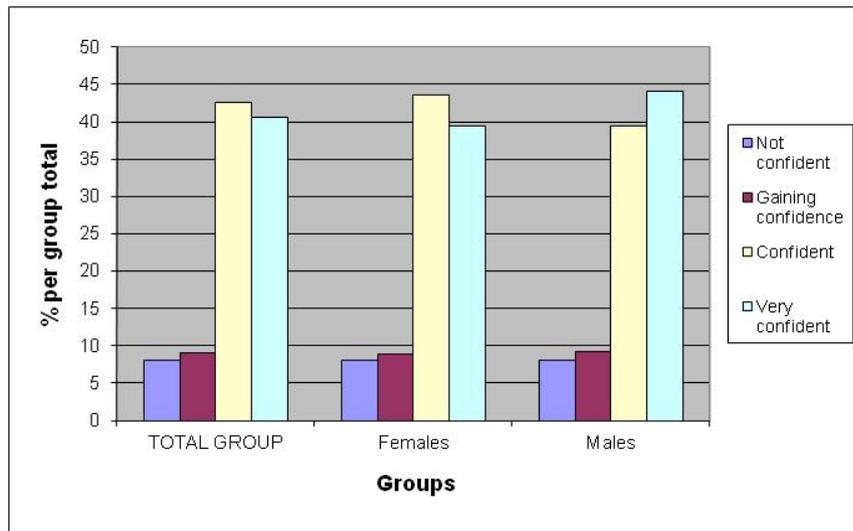


Figure 4-64: Confidence, information literacy skills – storing information found on the Internet for later use

Overall, 17% of this group were not confident (8%) or gaining confidence (9%) when storing information found on the Internet for later use.

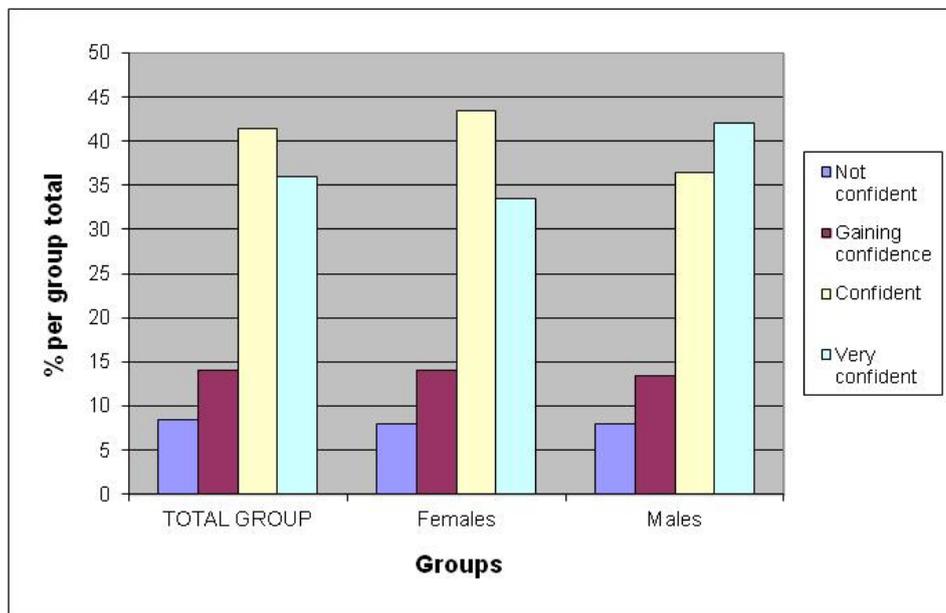


Figure 4-65: Confidence, information literacy skills – re-finding information found on the Internet for later use

Overall, 22.5% of participants were not confident (8.5%) or gaining confidence (14%) when re-finding information they had found on the Internet for later use. While males said they were very confident (42%) more than

females (33.5%), when the results for confidence are combined there is little difference between the sexes (21.5% males not/gaining confidence : 22% females not/gaining confidence). Results presented in Figures 4-60 – 4-65 indicate that while participants were confident using the Internet to find information, their confidence levels were lower for conducting simple information literacy tasks such as determining authority/reliability, collecting and managing, re-finding and even storing information they had found on the Internet for later use.

4.1.9. Preferences and enjoyment using the Internet

The third part of Section six asked participants to rate their enjoyment levels when using the Internet for a range of activities such as studying, communicating with friends, financial transactions, retail, organising and planning and entertainment. The results are presented in Figures 4-66 – 4-71 below.

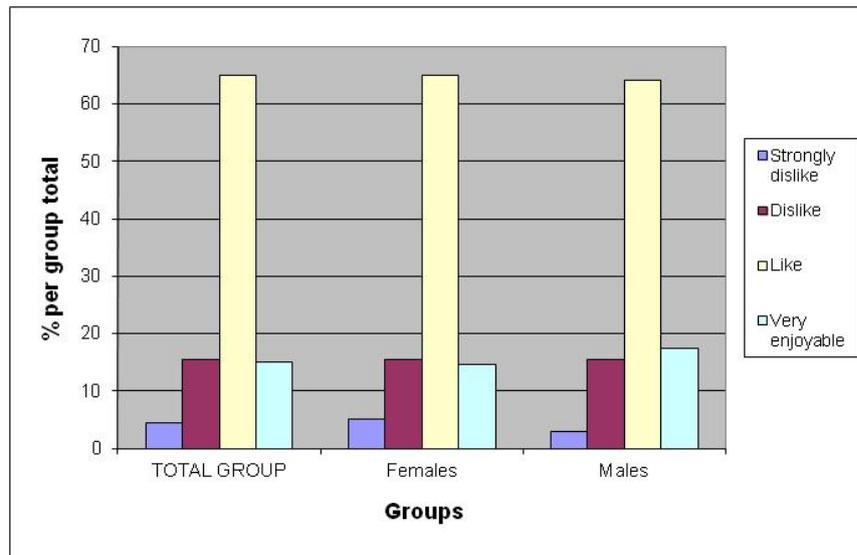


Figure 4-66: Preferences and enjoyment, using the Internet for study

Results in Figure 4-66 indicate that 19.5% of this participant group either strongly disliked or disliked using the Internet for study purposes, with only 15% saying they found it very enjoyable. This result supports results in Figure 4-5 where 25% of the participants rated themselves as non-users or beginners and figure 4-11 where 16% reported minor or no use of the Internet for study purposes. There are no gender differences for this question.

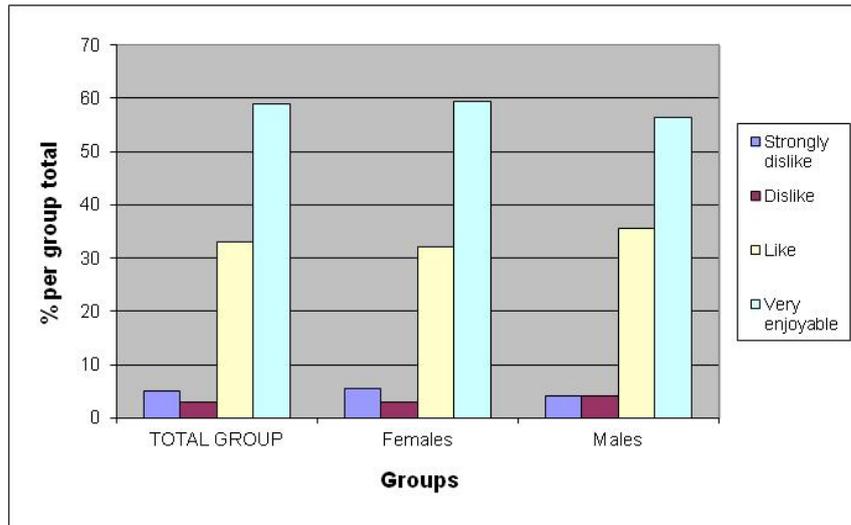


Figure 4-67: Preferences and enjoyment, using the Internet for communicating with friends and family

Results reported in Figure 4-67 indicate that most of the participants enjoyed using the Internet as a communication tool (58.7% very enjoyable, 33% like). This result supports findings reported earlier in the questionnaire in Figures 4-12 (importance of the Internet for communicating with family and friends), 4-20 and 4-21 (importance of the Internet based utilities such as email and msn/chat) and 4-54 (level of confidence using the Internet to communicate with family and friends).

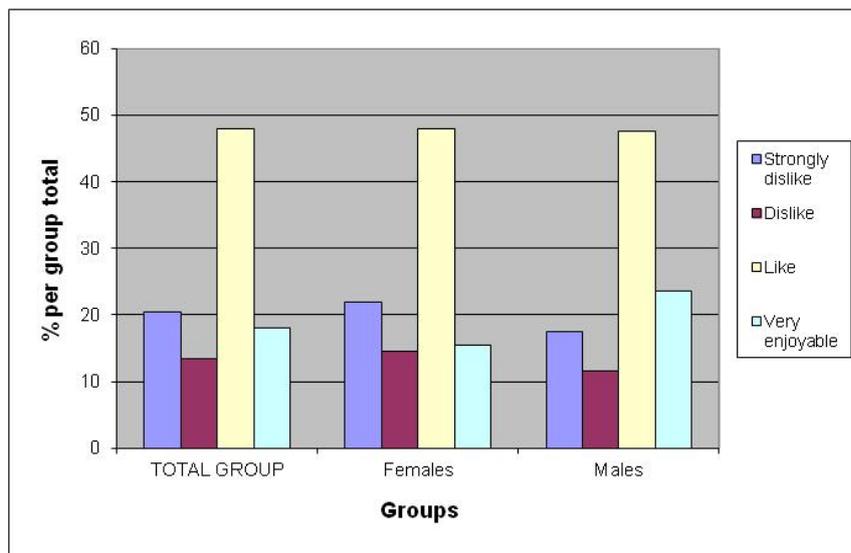


Figure 4-68: Preferences and enjoyment, using the Internet for financial transactions

Overall, 34% of the participants strongly disliked (20.5%) or disliked (13.5%) using the Internet for financial transactions. This result is lower than that reported for importance of the Internet for financial transactions (Figure 4-

13, 55.5% not or minor importance), and the result for confidence (Figure 4-55), where 39% of participants reported no confidence or gaining confidence.

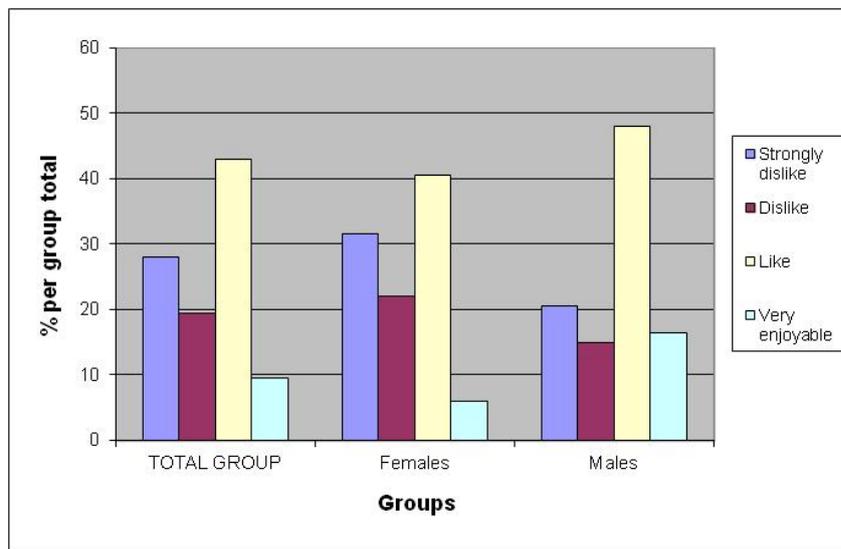


Figure 4-69: Preferences and enjoyment, using the Internet for buying/selling

In this dataset, 47.5% of participants said they strongly disliked (28%) or disliked (19.5%) using the Internet for retail purposes. Males (64.5%) preferred using the Internet for buying and selling more than females (46.5%). Earlier results in the questionnaire revealed that only a few participants were using the Internet for retail (6.5%, Figure 4-14) even though 40% were confident about using it for this purpose (Figure 4-56).

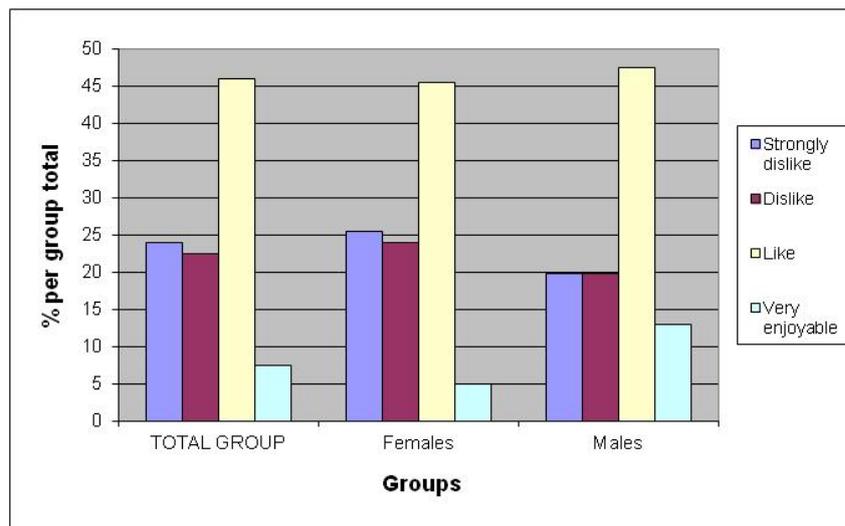


Figure 4-70: Preferences and enjoyment, using the Internet for organising and planning

Across the total group, 46.5% of the participants said they strongly disliked (24%) or disliked (22.5%) using the Internet for organising or planning

their lives, with females indicating a stronger negative response. However, while 52% indicated they did not use the Internet for this purpose earlier in the questionnaire (Figure 4-15), with a further 36% giving it only minor importance; 48% said they were confident they could use it for planning and organising their lives (Figure 4-57).

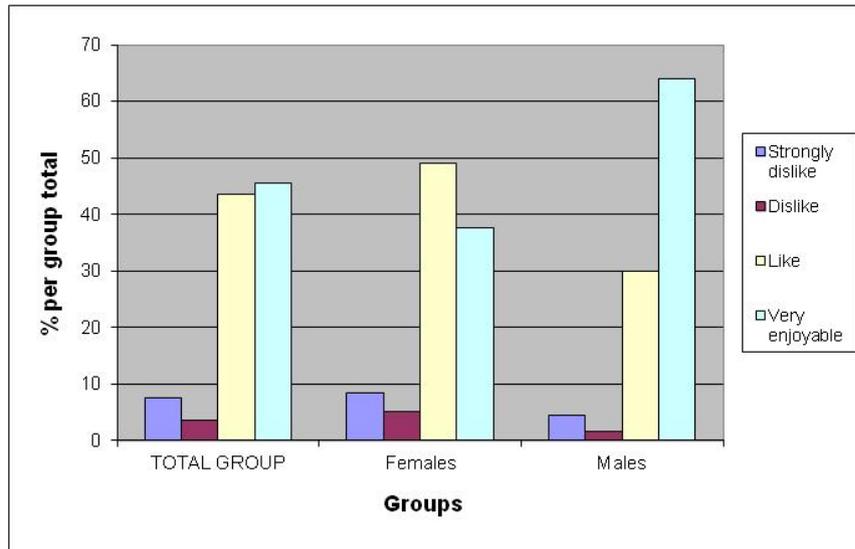


Figure 4-71: Preferences and enjoyment, using the Internet for entertainment

Results presented in Figure 4-71 clearly show that this group of users enjoyed using the Internet for entertainment (89%). Even though less than half the group were using the Internet frequently for entertainment (Figure 4-16, 46.5%), most were confident they could use it for this purpose (Figure 4-58, 83%). When the results for importance/level of use are compared to the results for confidence and enjoyment, it is clear that while many of the participants in the group may not be using the Internet for certain activities, they are confident in their ability to use the technology/utilities and feel they would enjoy the experience. However, almost a fifth of the participant group said they did not like using the Internet for study purposes.

4.2. Phase One, Web Questionnaire – Discussion

The Web questionnaire was designed to provide some empirical data, particularly from an Australian perspective, to add to the current body of knowledge about the oldest members of the Net Generation at the time of data collection (Kennedy et al. 2006; 2007; 2008). It was also designed to test the

characteristics attributed to members of the Net Generation, an hypothesis which postulates that immersion and ready access to technology have created a generation of users who have an almost 'intuitive' knowledge and skills set that enables them to use a wide range of current and new technologies (Chapter 2, Section 2.2.1). These young people are the so-called 'digital natives' (Prensky, 2001; 2007). These characteristics have also been defined under the umbrella term 'tech-savvy' and include high levels of use; using a wide range of technologies, Internet utilities and software; and high levels of confidence and enjoyment when using the Internet to perform a range of daily tasks. Although technology has moved on since this data was collected, the findings of the first phase of this research both support and raise questions about the idea that a generation of users can be assigned attributes based on their exposure and/or use of technology as defined by the Net Generation hypothesis.

Firstly, the findings overwhelmingly support the Net Generation claim that young people from this generation are very confident when using technology and the Internet. This confidence or appearance of confidence has been a major contributing factor to the idea that young people have an innate ability to use technology. Proponents of the Net Generation idea maintain that young people have grown up in an environment where they are immersed in and live in a society that is saturated with technology and as a result are confident in their ability to use technology and do so with little or no formal instruction (Chapter 2, section 2.2.1). In view of the Net Generation observations about young people and how they appear to be using the Internet and electronic devices, it is no surprise that the initial results from the Web survey also indicate that confidence is a major factor that affects how young people use technology and this confidence extends beyond their current technology use. Participants consistently reported they could use confidently technologies they were not using currently, if they chose to do so. The confidence of this generation of users may also explain why they have been described as tech savvy in the popular press, since they appear to know what they are doing when using the Internet and information communications technologies (ICTs).

The results from this initial analysis of Phase One also suggest the way these members of the Net Generation acquired their skills (by themselves) may have produced a culture of technology use. Participants in this research overwhelmingly claimed to have acquired their skills by personal experimentation and to a lesser extent from friends, or by self-directed learning using books and magazines. Learning by trial and error (experiential learning) (Kolb, Boyatzis & Mainemelis, 1999; Kolb, & Yeganeh, 2012) with continual self-affirmation at points of success, and the internalisation of knowledge and skills by building on previous successes utilises a constructivist pedagogy (Richardson, 1997; Bednar, Cunningham, Duffy & Perry, 1998; Smith, 2002; Educational Broadcasting Commission, 2004), while learning from friends relies on social development and situated learning (Smith, 1999, 2001; Kearsley, 2010a, 2010b; Huang, Lubin & Ge, 2011; Gebhard, 2012). Both pedagogies have long been recognised as extremely powerful in education and create deep learning experiences (Moon, 2004; Chapman, Ramondt & Smiley, 2005) which are not forgotten by the learner since they are based on personal success and both internal and external validation. The fact that participants in this research were long time users (7 years or more), mostly used the Internet at home and were introduced to the Internet as an information source during their pre-teen years, also supports the notion that students from the Net Generation arrive at university with an established culture of technology use that is not based on established information skills theory and instruction in formal educational settings. Participants were also learning from friends or from magazines rather than significant adults either at school or at home, which suggests that most of their Internet skills were acquired in an unsupervised environment. Learning to use the Internet in isolation, mostly by themselves only serves to consolidate and entrench the learning since it is based on personal success and self-affirmation. The relationship between confidence and how participants learnt to use the Internet is explored further in Chapter Five which discusses the results of the correlation statistics from the Web questionnaire. The notion of a culture of technology use is also examined in Phase Two of the research, which focuses closely on how the participants in this group actually used the Internet for information-seeking.

Secondly, the findings from this phase of the research confirm the Net Generation claim that young people are the *connected generation* (Tapscott, 1998; Cole, Smith, & Lucas, 2002; Sujansky, 2009; Roberts, 2010). Participants in the study were heavy users of mobile phones, email and to a lesser extent, msn/chat and social networking. They placed high importance on communicating with friends and family, but they did not appear to be exclusive communicators when using the Internet. Hence, they were not using one-to-many communication utilities such as electronic news services, listservs, discussion forums or weblogs. Rather, they were using peer-to-peer technologies such as email, msn/chat and social networking to stay connected. Although the limited use of social networking sites by this group is supported by other Australian research (Kennedy et al., 2007), it may be due to the way the question was phrased, citing only one social networking utility, MySpace, as an example. The results may also be a true description of how the older members of the Net Generation are using social networking since the research conducted by Kennedy and associates also used university level students as their target population. Media reports suggest that members of the Net Generation change their use patterns according to need or to what is fashionable/in vogue. Changing patterns of use may also simply be the result of maturation ie. as they grow up, their patterns of use change as a result of changes in lifestyle, study and work responsibilities. Research is indicating that young people are also moving out of popular social networking sites as the adults move in (Wray & Jones, 2009; della Cava, 2010; Imam, 2012). The popular press reports examples of young people exhibiting signs of burnout and turning their backs on social networking (Lee, 2006; Laidlaw, 2010; Damle, 2012; Tugend, 2012), a phenomenon first discussed by Shenk in the early days of the Internet (Shenk, 1997).

Peer-to-peer modes of communication are also part of an individual's personal use, while discussion boards and listservs are more likely to be part of an educational or workplace experience. The idea of needing to be connected to their peers appears in much of the Net Generation literature discussed in Chapter Two (Section 2.2). Although using the Internet for communication is an important activity conducted by this group, how they communicate and what utilities they use appears to be dictated by preference and need, since only a

small group were using Internet telephony at the time of data collection. Since this data was collected new technologies such as iphones and Web-based multimedia communications software like Skype and Google Hangout have made the peer-to-peer/s type of communication easier and more cost effective, since many of these utilities are freely available on the Web or cheaply as iphone apps. The findings in this research support the notion that young people use technology based on perceived need rather than being ubiquitous users, ie. if they do not have a need to use a particular form of communication, then they do not use it. Communication preferences and how participants were using the Internet to stay connected were also examined further in Phase two of the research.

Another major finding from Phase One was the tendency of participants to use a limited range of technologies, Internet utilities and software. They did not present as the ubiquitous users as described by the Net Generation hypothesis, but appear to be discerning and use technology based on specific needs/wants. Most of the participants were using mobile phones, but only half were using other devices such as digital cameras and ipods. Computers and laptops were important pieces of equipment and surprisingly, so was the printer. It would appear that having access to printed information is still very important to this generation of users. This finding was also explored further in Phase Two of the research.

Participants were also hesitant about using Internet utilities such as financial services and online shopping, a result that contradicts the Net Generation hypothesis. Shopping is an activity where individual choice and enjoyment of the activity are major participation factors, while paying the bills and banking (financial transactions) are activities where necessity and convenience are more important. This distinction between these activities may explain the difference between the results for these two questions. While issues with security or the perception that the Internet is not secure may go some way towards explaining why large numbers of participants were not using the Internet for financial transactions and retail (Keating, Quazi, & Kriz, 2009; Susskind, & Stefanone, 2010; Taylor & Strutton, 2010), this does not appear to

be the sole reason behind the behaviour reported here, since 44% of the total group used the Internet for financial transactions and only 9.5% used it for retail purposes. These results suggest that the individuals in this group used the Internet based on perceived need and/or convenience, rather than ubiquitous use even though the facilities were available ie, they are discerning users of technology. Males also used these services more than females which may be related to confidence, an aspect explored in Chapter 5 of this thesis.

Another finding of this phase of the research indicates that participants, while confident in their ability to find information, were not as confident in their ability to manipulate, collate, organise and re-find information. It would appear that frequent and long term use of the Internet in this study does not equate with the acquisition of information literacy skills, a fact recognised by participants who reported lower levels of confidence in this area. The issue of information literacy skill levels as a defining factor when examining the expertise of young peoples' use of technology emerged in the research literature approximately 6 years ago (Lorenzo & Dziuban, 2006; Geck, 2006; Barnes, Marateo & Ferris, 2007; Nicholas, Rowlands & Huntington, 2008; Head & Eisenberg, 2010). Early reports in the media, which were then used in some of the research literature, appear to have depended upon external observation, reports from the popular press and personal accounts by young people rather than an in-depth examination of how members of the Net Generation actually use technology for information-seeking. This research seeks to clarify exactly what young people are doing when they use the Internet and electronic resources.

A fifth of the participants also said they strongly disliked or disliked using the Internet for learning. This finding has also appeared in previous research examining how young people use the Internet and population studies in the United Kingdom (Aldridge, Fraser, Murray, Combes, Proctor & Knapton, 2002; Dutton & Helsper, 2007; Dutton, Helsper & Gerber, 2009). While beyond the scope of this research, this finding does require further examination, especially when Government agencies and education systems at all levels appear to be moving towards to wholly online information and service delivery and online curriculum (elearning). In Australia, the Federal Government's *Digital*

Education Revolution (Commonwealth Government of Australia, 2011a) is an example of a major funding initiative to provide access to laptop computers and associated technologies for every school-aged child in Australia. If this 20% figure is a population statistic and one fifth of young people do not like using technology for learning, then this delivery mode will not be catering for the learning preferences of a large proportion of the school-aged population. The delivery of government services (egovernance) and education online may also disenfranchise a large percentage of the population who do not like using technology.

Although there were some minor differences between males and females, the results suggest that these differences were strongly related to types of use for particular Internet utilities, services and activities. These results may be due to a specific type of use, personal preferences or that some technical ability/understanding is required to set up and use particular utilities such as those required for peer-to-peer file sharing. Overall, levels of confidence and levels of use for both sexes were very similar for both males and females in this survey. This levelling out of differences for gender has also been observed in a recent population study in the United Kingdom (Dutton & Blank, 2011). Findings in this Phase of the research indicate that how the participants in this sample group use and feel about the Internet may be more homogeneous in nature. This conclusion is explored further in Chapter 5.

The data reported in this first Phase of the research raises some interesting points that challenge the idea of a Net Generation of 'tech-savvy', super users entering universities. While the participants in the survey group were very confident in their ability to use technology to find information, they were less confident in their ability to manage, manipulate and use the information they found. They also appeared to be discerning users and tended to use certain technologies for communication and entertainment rather than using a range of technologies for a variety of activities. They also preferred to use more traditional technologies associated with the production of print media such as computers, laptops and printers. Certainly the students in this sample group did not demonstrate all of the attributes as espoused by the Net Generation

hypothesis. However, their patterns of use and levels of confidence do reflect the findings of other research studies on how young people actually use technology in their everyday lives (Livingstone, 2006; Kennedy, et al, 2007; Nicholas, Rowlands & Huntington, 2008; Combes, 2009; Corrin, Bennett and Lockyer, 2010). A major concern for educationalists and schools is the fact that the students in this survey group acquired their Internet skills mainly by experimentation and not via formal information skills teaching. The way participants acquired their online skills also appears to be closely related to their level of confidence. This finding supports the notion that students already have a culture of technology use when using the Internet to seek information. Since a culture of use is usually demonstrated by entrenched behaviour, this finding, if accurate, may affect students' capacity to improve their information-seeking behaviour as a result of information literacy instruction. The findings from this first Phase of the research certainly supports other research evidence (Chapter 2, section 2.3) and the *ICT Literacy Assessment* from the US Educational Testing Service (ETS, 2006; Katz, 2005; Katz & Macklin, 2007) that students entering tertiary studies currently do not have the sophisticated information literacy skills or attributes posited by the Net Generation hypothesis.

Chapter 5 - Phase One, Correlation Analysis, Findings

5.0. Introduction

This chapter also examines the results of the anonymous Web questionnaire to explore the first investigation posed in this research, ie. to investigate young adults' information-seeking behaviour and their perceived and actual skill levels when using the Internet to access electronic information resources. The results of a correlation analysis are presented and discussed in the following sections. As mentioned previously a cluster analysis (Appendix 3) was carried out by an external specialist on the data obtained from the questionnaire to determine if there were significant groups of user types. The results from this analysis were inconclusive and have not been included in this thesis .

5.1. Web Questionnaire – nature of the survey group

There were no discernable clusters emerging from the data collected in the Web questionnaire. In order to gain a visual representation of how participants felt about using the Internet (Affective Domain) and their levels of use (Effective Domain), scattergrams were created using the Index of Net Gen-ness (ING) discussed in Chapter 3 (Section 3.3.2.). These graphs appear in Figures 5-1 – 5-5 below, for the total group, all males and all females and follow-up males and females. In each graph the mean score for the Affective Domain and the Effective Domain for the sample group appears in blue, while the scores for one standard deviation of significance from the mean appears in red. The four ING groups of High Confidence/Low Use (HC/LU), Low Confidence/Low Use (LC/LU), High Use/Low Confidence (HU/LC) and High Confidence/High Use (HC/HU) also appear on the graphs. In all cases there is a central cluster of participants within one standard deviation of the mean scores for the Affective and Effective Domains.

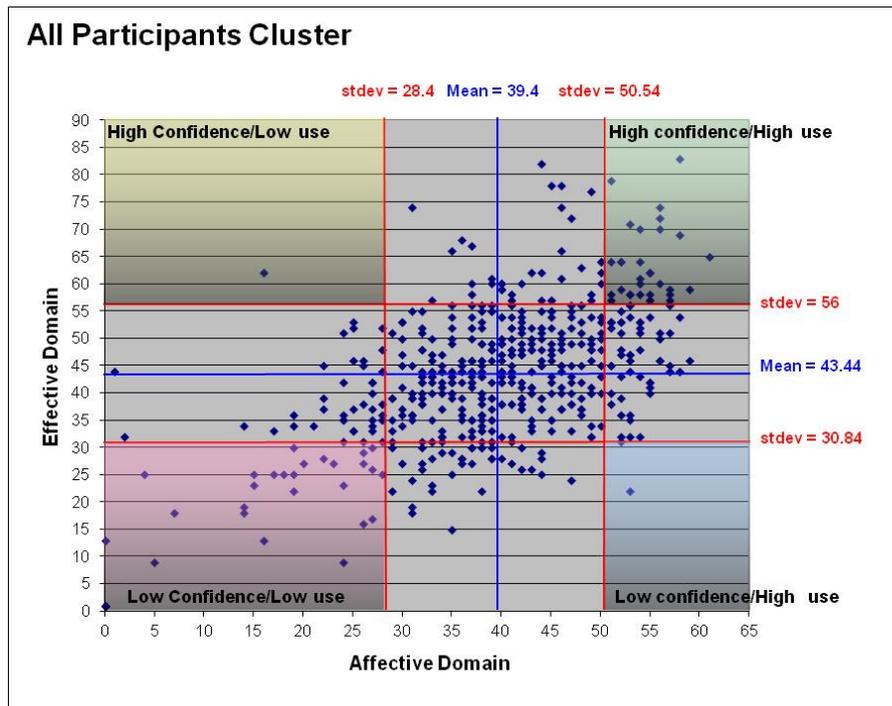


Figure 5-1: Scattergram for all survey participants: ING scores

In Figure 5-1 the mean for the whole survey group for level of confidence and feelings was 39.4 (Affective Domain), while the mean for level of use (Effective Domain) was 43.44. The mean score using the ING metric for these questions was 30.5 for the Affective Domain and 47 for the Effective Domain (Chapter 3, Table 3.1). Overall, the levels of confidence for this group were almost 9 points higher (nearly one standard deviation) than the ING mean while the levels of use were 3.5 points below the ING mean, indicating that this group were very confident users.

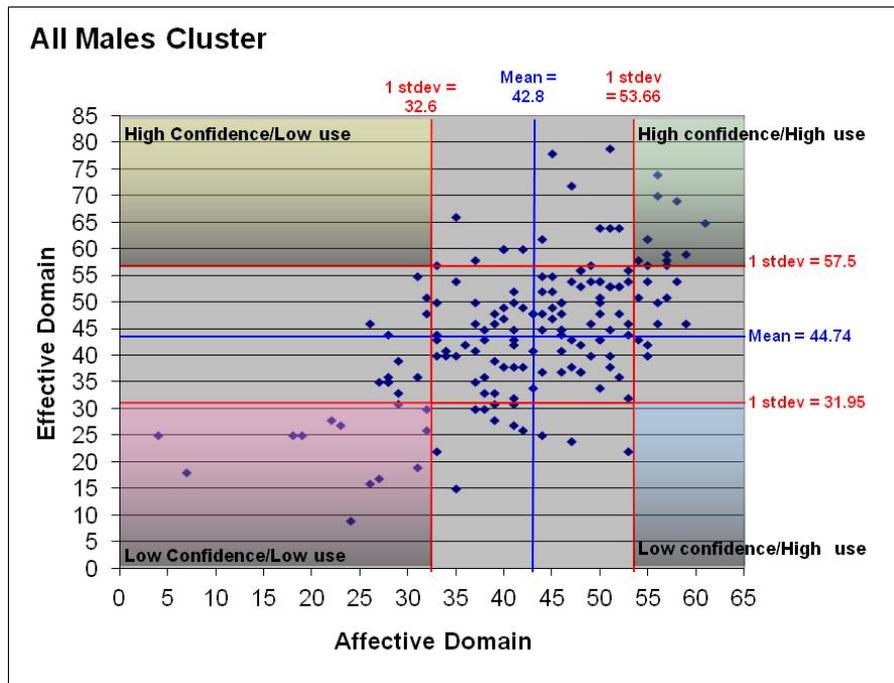


Figure 5-2: Scattergram for all male participants: ING scores

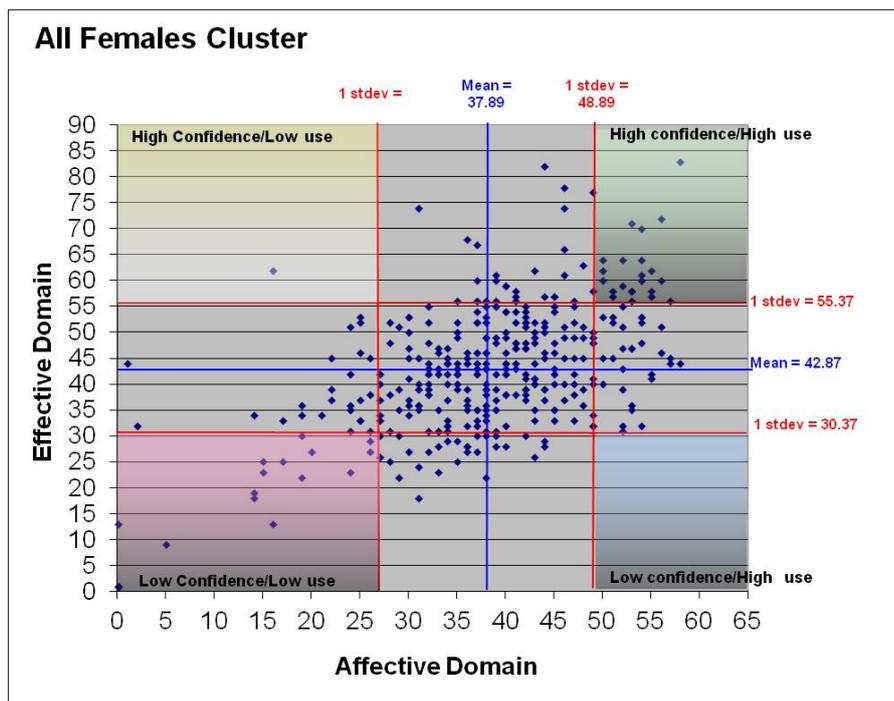


Figure 5-3: Scattergram for all female participants: ING scores

In the all male and all female graphs there is a 5 point difference between the levels of confidence means (Affective: 42.8 Males – 37.9 Females), but only a 1.8 point difference between the levels of use (Effective Domain: 44.7 Males - 42.9 Females). These results indicate that that while males were more confident than females, both genders had similar levels use, and the gap between males

and females for both levels of use and confidence were not significant. Graphs 5-4 and 5-5 are included to show that the participants who volunteered for the follow-up study were generally representative of the gender groups from the whole survey.

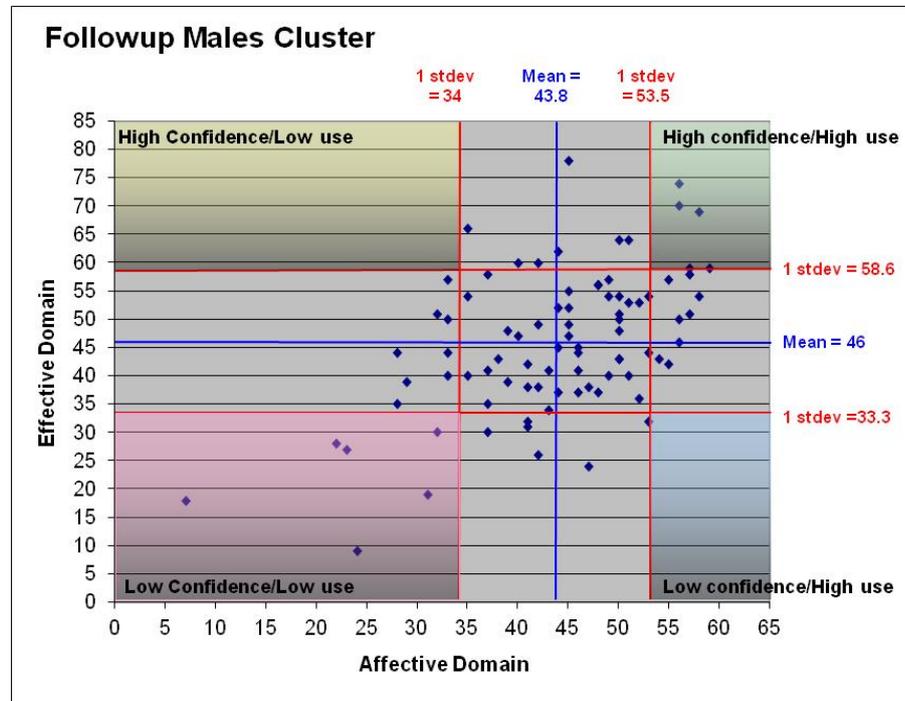


Figure 5-4: Scattergram for follow-up males: ING scores

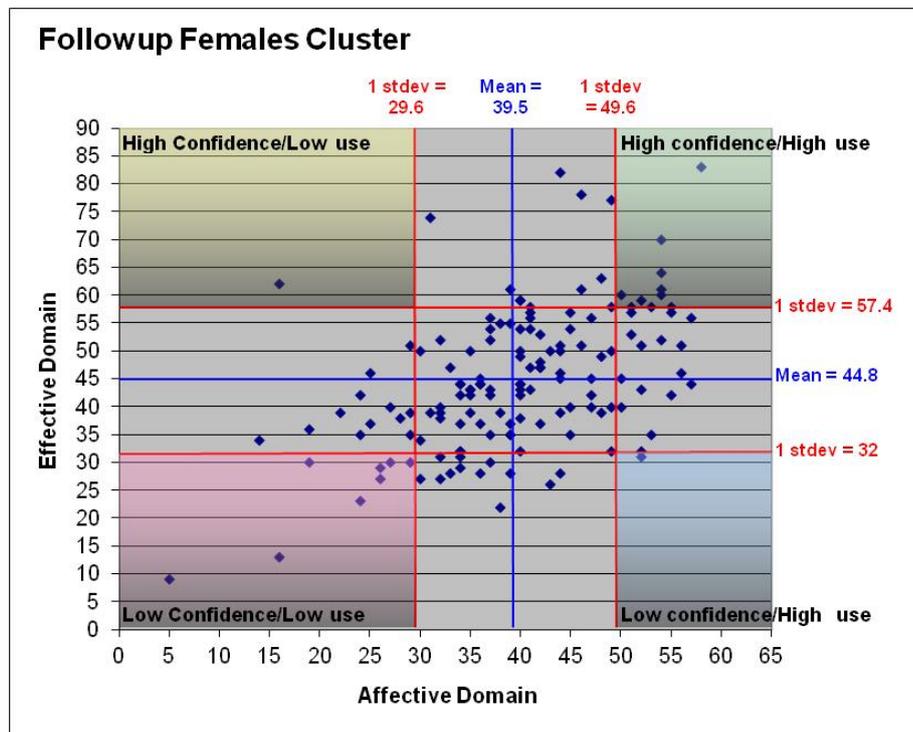


Figure 5-5: Scattergram for follow-up females: ING scores

The forty participants (20 male and 20 female) from the follow-up volunteers were chosen for the semi-structured, in-depth interviews, observation and task analysis using random sampling (every fifth participant in each ING category): 5 females and 5 males from each ING. Final participants were chosen by firstly determining their Index of Net Gen-ness (ING), and then randomly choosing within the four ING categories: High Confidence/Low Use (HC/LU), Low Confidence/Low Use (LC/LU), Low Confidence/High Use (LC/HU) and High Confidence/High Use (HC/HU). Using the ING metric allowed for the objective identification of a range of user types for participation in Phase Two of the research. The homogenous nature of the whole group meant that the final participants in the interviews and task analysis represented a mix of ING descriptors, with only a few falling into the four ING categories of HC/LU, LC/LU, LC/HU and HC/HU (see Table 3-8).

5.2. Web Questionnaire – Correlation analysis

To examine the significance of confidence and level of use as factors which affect how the young people in this sample group were using technology, a bivariate correlation analysis was conducted using Excel. ‘A correlation is a single number that describes the degree of relationship between two variables’ (Trochim, 2006). Since correlation does not signify causation (Schield, 1999), but rather a possible relationship, the findings are presented as groups of results/relationships rather than single results. Large samples will often produce some degree of significance, so only results for the maximum level of significance/probability ($p < 0.0005$) were considered (Dytham, 1999). The findings of this analysis are presented in the following order: the Effective Domain first (level of use) and the Affective Domain (confidence) second; followed by length of time using the Internet, gender and age. The Figure numbers used in the previous Chapter are used to identify the questions in the Web questionnaire to allow for easier comparison between the two sections of data presented for Phase One of the research (eg. Chapter 4, Figure 4-1 = F4-1).

5.2.1. Web Questionnaire – Correlation analysis, Effective Domain

Participants’ level of use was measured in two ways: participants’ estimation of how often they used the Internet for personal and study purposes;

and a rating of the importance of certain Internet utilities, hardware and software. Correlations for Internet use in the previous three months (any use) are presented in Table 5-1 below. Insignificant correlations ($p < 0.0005$, $r < 0.321$) are grey and italicised for clarity.

Table 5-1: Level of Internet use, frequency, previous 3 months (any use)

Correlation Matrix, $p < 0.0005$, $r = 0.321$						
	F4-8	F4-54	F4-58	F4-59	F4-67	F4-18
F4-6 Frequency of use, previous 3 months	0.426	0.389	0.321	0.359	0.370	0.347
F4-8 Previous 3 months for personal use		0.302	0.390	<i>0.285</i>	<i>0.270</i>	<i>0.304</i>
F4-54 High confidence, communication			0.331	0.395	0.407	0.601
F4-58 High confidence, entertainment				0.461	0.394	0.289
F4-59 High confidence, finding information					0.700	0.408
F4-67 High enjoyment, communication						0.365
F4-18 High importance, discussion forums						

In this dataset, students who rated themselves as very frequent users of the Internet were also more likely to use it for personal use; consider the Internet as essential for communication, finding information and entertainment; use discussion forums more often and enjoy using the Internet for communication purposes. They were more likely to be very confident about their ability to find information using the Internet. Since 74% of the respondents reported frequent use of the Internet it is surprising that the number of correlations is so low. This finding supports the notion that while the participants were frequent users of the Internet, they were discerning rather than ubiquitous users of technology. The correlations for personal use are examined further in Table 5-2, which exhibit a different set of results.

Table 5-2: Level of Internet use, personal, previous 3 months

Correlation Matrix, $p < 0.0005$, $r = 0.321$					
	F4-16	F4-21	F4-26	F4-58	F4-71
F4-8 Previous 3 months for personal use	0.540	0.483	0.392	0.390	0.463
F4-16 High importance, entertainment		0.456	0.450	0.576	0.593
F4-21 High importance msn/chat			0.402	0.335	0.353
F4-26 High importance peer-to-peer file sharing				0.336	0.358
F4-58 High confidence, entertainment					0.631
F4-71 High enjoyment entertainment					

Participants using the Internet more frequently for personal use were also more likely to be using it for entertainment. They were also more likely to be using msn or chat for communication using the Internet and peer-to-peer file sharing utilities. They were confident in their ability to use the Internet for this activity and found it very enjoyable. However, there were no significant correlations between the group who reported using the Internet extensively for study and those who were using it frequently for personal use. There were no significant correlations for gender differences either, although participants who used the Internet more often for personal use were more likely to be male ($p < 0.005$, $r = 0.271$). These results indicate that frequency of Internet use in the home doesn't necessarily equate with using the Internet for educational purposes. In this group, very frequent personal users of the Internet appeared to be a small group of participants who used it mainly for entertainment and communicating with family and friends.

To explore further how these participants were using the Internet for entertainment and communication, correlations for the group using the Internet for peer-to-peer file sharing and Internet telephony were examined. While most Internet utility services now use artificial intelligence (AI) to ensure that installation and use are very user-friendly, setting up and using Internet telephony programs such as Skype and peer-to-peer file sharing software such as eDonkey, Kazaa and Bit Torrent requires users to have a greater knowledge of how the technology works, ie. they need to be more 'tech-savvy'. Across the total group, only a small number of participants indicated they used Internet telephony (11%) and a third of the survey group used peer-to-peer file sharing software (34%). The correlation results for these two sub-sets indicate that they were not the same group of users. These results are presented below in tables 5-3 and 5-4.

Table 5-3: Level of Internet use, sub-group - Internet telephony, eg. Skype

Correlation Matrix, p<0.0005, r = 0.321				
	F4-23	F4-24	F4-30	F4-33
F4-22 High importance Internet telephony services	0.446	<i>0.265</i>	0.378	<i>0.251</i>
F4-23 High importance, listservs		0.340	0.327	<i>0.277</i>
F4-24 High importance, electronic newsletters			<i>0.244</i>	<i>0.141</i>
F4-30 High importance, webcam				0.327
F4-33 High importance, PDAs				

In the group using Internet telephony software, there was a strong positive correlation with those who used listservs and Web cams. This group also showed a weaker correlation with the use of PDAs ($p < 0.005$, $r = 0.251$) and electronic newsletters ($p < 0.005$, $r = 0.265$). Even though most participants were using the Internet for communication there was no significant correlation between Internet telephony users and those using the Internet to contact family and friends. These results suggest that this sub-group of users were being motivated by a different need when using technology.

Table 5-4: Level of Internet use, sub-group - peer-to-peer file sharing, eg Bit Torrent

Correlation Matrix, p<0.0005, r = 0.321								
	F4-8	F4-16	F4-21	F4-25	F4-25	F4-30	F4-28	F4-71
F4-26 High importance, peer-to-peer file sharing, eg Bit Torrent	0.392	0.450	0.402	<i>0.303</i>	0.377	0.336	0.358	0.327
F4-8 Internet use previous 3 months, for personal use		0.540	0.483	<i>0.109</i>	<i>0.229</i>	0.389	0.463	<i>0.271</i>
F4-16 High importance, entertainment			0.456	<i>0.180</i>	<i>0.320</i>	0.575	0.593	0.308
F4-21 High importance, msn/chat				<i>0.225</i>	0.343	0.335	0.353	<i>0.042</i>
F4-25 High importance, web based lookups					<i>0.166</i>	<i>0.205</i>	<i>0.174</i>	<i>0.039</i>
F4-30 High importance, webcam						<i>0.216</i>	<i>0.259</i>	<i>0.077</i>
F4-28 High confidence, entertainment							0.631	<i>0.235</i>
F4-71 High enjoyment, entertainment								<i>0.039</i>

Participants using file sharing programs such as eDonkey, Kazza and Bit Torrent which require some technical knowledge, show a different set of positive correlations. Members of this group were more likely to be male ($p < 0.0005$, $r = 0.327$); heavy users (>25 hours per week) of the Internet for personal use and more likely to use msn/chat for communication. They were

also more likely to use webcams and enjoy using the Internet for entertainment. However, the correlation data indicates that using web-based lookups, webcams and msn/chat were not specific to this group. Females were using the Internet for entertainment just as much as their male counterparts, only they were less likely to be using peer-to-peer file sharing technologies and did not rate importance as highly as males ($p < 0.001$, $r = 0.308$).

These two datasets (Tables 5-3 and 5-4) support the notion that the participants in this research were discerning users of technology rather than the ubiquitous users as posited by the proponents of a Net Generation. They were using a limited range of Internet utilities for a variety of activities, with personal preference and convenience appearing to influence what they choose to use and do on the Internet. Cost as a factor was explored in the interviews in the second phase of the research.

5.2.2. Web Questionnaire – Correlation analysis, Affective Domain

In the first section of these findings (Chapter 4), confidence emerged as a factor that appeared to be affecting how young people use technology. In this section positive correlations are examined for how participants rated their own skill levels, confidence using the Internet for study, whether they enjoyed using the Internet for study, level of confidence using the Internet to find and use information, and whether length of time using the Internet affected confidence levels. These results are presented in Tables 5-5 – 5-9 below.

Table 5-5: Level of confidence, personal rating

Correlation Matrix, $p < 0.0005$, $r = 0.321$					
	F4-1	F4-2	F4-3	F4-59	F4-65
F4-5 Level of confidence, personal rating	0.458	0.463	0.492	0.335	0.321
F4-1 Internet use for study prior to university		0.633	0.393	<i>0.114</i>	<i>0.172</i>
F4-2 Use of online materials for study prior to university			0.465	<i>0.165</i>	<i>0.200</i>
F4-3 Personal use of the Internet for study prior to university				<i>0.214</i>	<i>0.193</i>
F4-59 High confidence, finding information					0.510
F4-65 High confidence, re-finding information					

Users who rated their ability to use the Internet highly were also more likely to have used electronic resources and online subject materials prior to entering university. These students were also more likely to have used the Internet for study purposes as an essential part of their personal study experience prior to entering university. However, these students were in a minority with only 7.5% of the group studying wholly online and 23% using some online materials. Only 6.5% considered online materials to be an essential part of their study experience and 21% considered it a major part before university. These results indicate that even though the participants were long term users of the Internet, exposure to the use of online materials and technologies prior to entering university was limited. However, exposure to online materials before university and personal use of the Internet for study did not significantly affect participants' level of confidence to find and re-find information. The high correlation between confidence in finding information and re-finding information, suggests that confidence is a key factor when considering how participants use the Internet and technology, and is not necessarily the result of using the Internet in formal educational settings.

Table 5-6: Level of confidence, using the Internet for study

Correlation Matrix, $p < 0.0005$, $r = 0.321$						
	F4-17	F4-54	F4-56	F4-57	F4-58	F4-59
F4-23 High confidence, using the Internet for study	0.398	0.331	0.356	0.353	0.380	0.536
F4-17 High importance, finding information		<i>0.302</i>	<i>0.175</i>	<i>0.213</i>	<i>0.246</i>	0.394
F4-54 High confidence, communication			<i>0.308</i>	0.354	0.399	0.395
F4-56 High confidence, buying/selling				0.533	0.326	<i>0.300</i>
F4-57 High confidence, planning/organising					0.410	0.331
F4-58 High confidence, entertainment						0.410
F4-59 High confidence, finding information						

Participants who were confident using the Internet for study were also more likely to be more confident using the Internet for communication, buying and selling, planning and organising, for entertainment and finding information. However, participants who were confident using the internet to buy and sell, plan and organise, and for entertainment, did not necessarily rate the Internet as highly important for finding information. This result again suggests that the

participants' personal use of technology is different from their educational use and is based on satisfying perceived needs rather than ubiquitous use.

Table 5-7: Level of enjoyment, using the Internet for study

Correlation Matrix, $p < 0.0005$, $r = 0.321$								
	F4-11	F4-53	F4-60	F4-61	F4-62	F4-63	F4-64	F4-65
F4-66 Like using the Internet for study	0.35	0.378	0.358	0.335	0.345	0.365	0.278	0.372
F4-11 Importance of the Internet for study		0.383	0.238	0.283	0.274	0.275	0.182	0.225
F4-53 High confidence, study			0.59	0.516	0.484	0.483	0.409	0.477
F4-60 High confidence, finding information				0.558	0.553	0.513	0.474	0.51
F4-61 High confidence, judging reliability					0.682	0.656	0.502	0.593
F4-62 High confidence, collecting information						0.78	0.67	0.71
F4-63 High confidence, organising information							0.704	0.73
F4-64 High confidence, storing information								0.742
F4-65 High confidence, re-finding information								

The results in this dataset indicate that enjoyment is a factor closely related to confidence when using the Internet for study. Participants who liked using the Internet for study were also more confident in their ability to manipulate and use information (information literacy). However, storing information shows a weaker correlation. While participants valued the Internet as a tool for study (importance) and there was a positive correlation between importance and enjoyment, the correlations between importance and their confidence to perform basic information literacy skills was much lower. This result indicates that information literacy skills (judging reliability, collecting, organising, storing and re-finding information for later use) were recognised by participants as a different skill set where they exhibited less confidence.

Table 5-8: Level of confidence, using the Internet to find information

Correlation Matrix, $p < 0.0005$, $r = 0.321$						
	F4-5	F4-6	F4-17	F4-53	F4-54	F4-58
F4-59 High confidence, using the Internet to find information	0.335	0.370	0.337	0.589	0.407	0.393
F4-5 High confidence, personal rating		<i>0.241</i>	<i>0.159</i>	<i>0.260</i>	<i>0.275</i>	<i>0.287</i>
F4-6 High level of use			<i>0.292</i>	<i>0.311</i>	0.389	0.321
F4-17 High importance, finding information				0.398	<i>0.302</i>	0.394
F4-53 High confidence, study					0.331	0.380
F4-54 High confidence, communication						0.399
F4-58 High confidence, entertainment						

Participants who were confident using the Internet to find information were more confident users, tended to use the Internet more frequently, rated the Internet as an important information resource for study, and were more likely to be confident using the Internet for communication and entertainment. However, the correlations between high confidence (personal rating) and frequency of use, the importance of the Internet as an information source and high confidence levels for using the Internet for study, communication and entertainment were low. This result suggests that frequency of use was not a significant factor in determining level of confidence for participants in this research study.

5.2.3. Web Questionnaire – Correlation analysis, Length of time using the Internet

Since frequency of use does not appear to be a significant factor affecting the confidence of participants, the length of time using the Internet was examined. The results for these correlations appear in Tables 5-9 and 5-10 below.

Table 5-9: Length of time using the Internet, confidence using information

Correlation Matrix, $p < 0.0005$, $r = 0.321$						
	F4-60	F4-61	F4-62	F4-63	F4-64	F4-65
F4-10 Length of time using the Internet	<i>0.275</i>	<i>0.241</i>	<i>0.274</i>	<i>0.263</i>	<i>0.284</i>	<i>0.332</i>
F4-60 High confidence, finding information		0.557	0.553	0.513	0.474	0.51
F4-61 High confidence, judging reliability			0.682	0.656	0.502	0.593
F4-62 High confidence, collecting information				0.779	0.67	0.709
F4-63 High confidence, organising information					0.704	0.73
F4-64 High confidence, storing information						0.742
F4-65 High confidence, re-finding information						

The correlation between the length of time participants had been using the Internet and their levels of confidence to conduct basic information literacy skills such as finding, judging reliability, collecting, organising and storing information was much weaker. There was a positive correlation between length of time using the Internet and participants' confidence in their ability to re-find information. This result further supports the correlations in Tables 5-7 and 5-8 which indicate that information literacy skills were perceived as a different skill set by this group and level of confidence is not entirely based on either frequency of use or the length of time participants had been using the Internet. This conclusion is further supported by the results in Table 5-10 below.

Table 5-10: Length of time using the Internet, confidence using the Internet

Correlation Matrix, $p < 0.0005$, $r = 0.321$							
	F4-53	F4-54	F4-55	F4-56	F4-57	F4-58	F4-59
F4-10 Length of time using the Internet	<i>0.263</i>	<i>0.236</i>	<i>0.261</i>	<i>0.253</i>	<i>0.244</i>	<i>0.267</i>	<i>0.268</i>
F4-53 High confidence, study		0.331	<i>0.300</i>	0.356	0.353	0.380	0.536
F4-54 High confidence, communication			<i>0.283</i>	0.308	0.354	0.399	0.395
F4-55 High confidence, financial transactions				0.575	0.388	<i>0.166</i>	<i>0.217</i>
F4-56 High confidence, buying/selling					0.533	0.326	<i>0.300</i>
F4-57 High confidence, organising/planning						0.410	0.331
F4-58 High confidence, entertainment							0.461
F4-59 High confidence, finding information							

Clearly, for the participants in this research, length of time using the Internet did not affect their feelings of confidence when using it for study, communication, financial transactions, retail, organising and planning, entertainment and finding information. Feelings of confidence were being

engendered in this group by other factors. If we consider how participants acquired their Internet skills (Table 5.11), some interesting correlations appear.

Table 5-11: Skills acquisition using the Internet, confidence using the Internet

Correlation Matrix, $p < 0.0005$, $r = 0.321$						
	F4-53	F4-54	F4-60	F4-61	F4-63	F4-65
F4-10 Skills acquisition, by myself	0.344	0.357	0.357	0.329	0.28	0.301
F4-53 High confidence, study		0.331	0.589	0.484	0.408	0.477
F4-54 High confidence, communication			0.407	0.265	0.312	0.358
F4-60 High confidence, finding information				0.557	0.513	0.51
F4-61 High confidence, reliability					0.656	0.593
F4-63 High confidence, organise information						0.73
F4-65 High confidence, re-finding information						

In Table 5-11 there are strong positive correlations between how participants gained their skills and levels of confidence when using the Internet for study and communication. There is also a positive correlation between personal skills acquisition and confidence levels for finding information and judging the reliability of the information found, but not for organising information or re-finding information, ie. information literacy skills. Since 88% of the survey group said they had acquired their Internet skills by self experimentation and high confidence levels for finding information (90%) were also reported, this finding is significant and applies to most of the participants in this study. These results indicate that how participants acquired their skills (personal experimentation) was an important factor in determining their levels of confidence. There were no other positive correlations recorded for this question (Internet skills acquisition, Chapter 4, Figure 4-51).

5.2.4. Web Questionnaire – Correlation analysis, Gender and age

There was only one positive correlation for gender in this participant group. A significant correlation indicated that males were more likely to be using peer-to-peer file sharing software ($p < 0.0005$, $r = 0.327$). This result indicates that while there were some differences appearing in the percentage figures between males and females in the descriptive analysis of the Web questionnaire (Chapter 4), these differences were not significant. It would appear that females and males in this group were using the Internet the same

way and to the same extent. There were no significant correlations recorded for age in this group either, indicating that the younger members (18 years old) and the older members (22 years of age) were all using the Internet in a similar fashion.

5.3. Phase One, Correlation Analysis – Discussion

A major finding in this research relates to the homogeneous nature of the participant group. As evidenced by the scattergrams in Figures 5-1 to 5-5, the nature of the group as described using the ING metric was not diverse. Participants tended to fall within one standard deviation of both the Effective (level of use) and the Affective (confidence) Domain mean scores for the group. However, while the mean for this group closely reflected the ING mean for the Effective Domain, the Affective mean was almost one standard deviation higher (9 points), indicating that for this group of participants, confidence was a major factor that influenced how they perceived themselves and their skill levels when using the Internet. The Net Generation group in this study exhibited a high level of consistency, both in their confidence using technology and the Internet, the types of technology they used most frequently and how they used it. There were no clusters of users evident in this participant group which suggests that homogeneity may be characteristic of how most members of the Net Generation actually use technology for both personal use and information-seeking. If this is the case, then this homogeneity should also be evident in the next phase of data collection - the interviews and task analysis with follow-up participants.

The homogeneous nature of this participant group does not reflect findings by research conducted by Kennedy et al (Kennedy, Judd, Dalgarno & Waycott, 2010) who used a cluster analysis of 2000+ university students aged between 17-26. The Kennedy study found distinct types of technology users which they identified as power users, ordinary users, irregular users and basic users (p.332). Power users (14%) typically utilised a wide range of technologies and used them more often. Ordinary users (27%) regularly used the Internet and mobile technologies (mobile phones), but were not using emerging technologies or Web 2.0. Irregular users (14%) were engaging far less frequently with the Internet and mobile technologies than ordinary users, with the exception of Web

2.0 publishing. Basic users (45%) rarely used emerging technologies and the Internet, but used mobile technologies (p.339).

The differences in the findings from Kennedy's research and this study are probably due to the different metrics used to examine how students were using the Internet. Kennedy et al were examining only the Effective Domain (levels of use), whereas the ING metric used in this study is a more holistic description of the user and incorporates both the Effective (levels of use) and Affective Domains (confidence). While this study did not find distinct groups or clusters, the participants were exhibiting some of the characteristics noted by Kennedy's team, where the power users (High Use) were very small in number with basic users who used mobile technologies and the Internet sparingly, being the predominant group. This major group in Kennedy's research may reflect a finding in this study, which suggests that young people at the upper end of the Net Generation age range use technology according to need and their use may change as their lives change. When examining technology use the Kennedy team noted that:

Net Generation students are far from homogeneous. The individual technologies that any given student uses or has experience with are difficult to predict. In particular, experience with one technology cannot be reliably used to predict experience with another. There are a number of demographic variables other than age that may predict a student's technology experience; these include gender, university and cultural background (p.431).

The authors concluded:

While the evidence suggests therefore that there is a clear subset of students who might fit with Prensky's idea of 'Digital Natives', these students are the exception rather than the rule (p.341).

Kennedy's study supports the Phase One findings of this and other research studies examined in the literature review (Chapter 2) which have concluded there is no one set of attributes that can be used to describe how young people use technology. Since developments in technology have produced a shifting/evolving information landscape, publicly available, rigorous research in this area to counter the idea of a digital native and a Net Generation is warranted.

While no significant clusters were discernable in this participant group, several minor groups did emerge. These groups were using technology in distinct ways. One group centred around gaming and the use of peer-to-peer file sharing software (34%) such as eDonkey, Kazaa and Bit Torrent which require the user to have a greater knowledge of how the technology works to set up these utilities, ie. they need to be more tech-savvy. This group were more likely to be male, heavy users of the Internet for personal use (>25 hours per week), long term Internet users (>10 years), and use the Internet for entertainment and to organise and plan their lives. At the time of data gathering the emergence of free telephony services on the Web was just beginning to become popular. Initially, these services also required some technical knowledge to set up and use. The other minor group (11%) to emerge in this study centred on the use of Internet telephony. Since most participants were using the Internet for communication and there was no correlation between Internet telephony users and using the Internet to contact family and friends, these results suggest this group of users were being motivated by need when using these technologies. Both universities had a large contingent of international students and this result may indicate that these students were using Internet telephony services as a cost-effective way of keeping in touch with family and friends. This group were also more likely to be using Webcams, an indication they were using the Internet to stay in touch with family and home. They were also more likely to be subscribing to listservs and electronic newsletters, a result which also supports the notion that communicating with home and keeping abreast of news in their native country was important for these users. The fact this group were also more likely to be using PDAs perhaps indicates that these students, who are more likely to be living independently in a different country and culture, have a greater need for self-organisation and find mobile technologies such as PDAs useful tools. These results support earlier findings in Phase One of the research and other reports from the media discussed in the literature review (Chapter 2) which suggest that young people are discerning users of technology rather than ubiquitous users and their use will change according to changing lifestyles and need.

A major finding of this research is the effect of confidence on how participants used a range of technologies. Results from the correlation analysis for this particular group of Net Generation users indicate that while frequency of use did have a positive impact on how these young people felt about their ability to use the Internet successfully for a range of activities, length of time using the Internet did not affect levels of confidence or how they felt about their ability to use the Internet. So the more often participants used the Internet, the greater their confidence. Since most of the participants reported using the Internet either very frequently (72%) or often (19%) during the previous three months, confidence levels for this group were very high – nearly one standard deviation above the mean for confidence according to the ING metric. When how participants acquired their skills using the Internet was examined (Table 5.11) positive correlations with confidence was a major finding. There were strong positive correlations between how participants gained their skills and levels of confidence when using the Internet for study, communication, finding information and judging the reliability of the information found, but not for organising information or re-finding information. Since 88% of the survey group said they had acquired their Internet skills by self experimentation and high confidence levels for finding information were also reported (90%), this finding is significant and applies to most of the participants in this study. These results indicate that how participants acquired their skills (personal experimentation) was an important factor in determining their levels of confidence. There were no other positive correlations recorded for this question (Internet skills acquisition, Chapter 4, Figure 4.51). This finding suggests that how young people first learn to use the Internet is an important factor in how they use technology and which technologies they use, and the more they use technology, the higher their confidence levels. So how participants learnt to first use the technology is constantly being reinforced by their frequency of use. Experiential learning based on self-affirmation and success represent an extremely powerful learning pedagogy that results in deep learning where the learner retains the learning. When associated with a skill, such deep learning is more likely to result in the formation of a habit, since it is based on continual success (Kolb, Boyatzis & Mainemelis, 1999; Moon, 2004; Chapman, Ramondt & Smiley, 2005; Kolb, & Yeganeh, 2012). The results from the correlation

analysis in this research suggest that young people do have a culture of technology use that is based on experiential learning and frequency of use which is directly related to how confident they feel when using the Internet for a range of activities.

There were no significant indications that age and gender were factors that affected how this group of young people used the Internet, which suggests that these variables are no longer important, ie. the gap between males and females as reported in earlier studies is no longer significant, even though males and females appear to be using the technology slightly in different ways and for different purposes. Participants in this group appeared to be using the technology that best suited their needs, ie. they were discerning users rather than ubiquitous users, a finding that supports data from the Web questionnaire. However, length of time using the Internet was not a significant factor. While the connection between frequency of use and confidence appear to be significant factors in how young people use the Internet, it may be that confidence is the key factor and confidence is strongly related to how they learnt to use the Internet ie. by themselves. Since findings in the previous Chapter indicated that participants had very little exposure to formal instruction in how to use the Internet for study and most used it at home, the way these young people learnt their skills and how it affects their use and confidence is an important factor explored in the next Phase of the research.

Chapter 6 - Phase Two, Interviews - Findings

6.0. Introduction

Chapters Six and Seven will examine the results of Phase Two of this research investigation. Phase Two of the research was designed to examine more closely the information-seeking behaviours of the Net Generation and to explore critically the notion that young people have a different culture of technology use of the Internet (Investigation 2). This chapter presents the findings from the semi-structured, in-depth interviews. The interviews followed the tasks in the data collection sequence and were designed to encourage participants to discuss their information-seeking behaviour as part of a reflective exercise after they had completed the tasks (Branch, 2000; Kuusela, & Pallab, 2000). The interview questions and prompts used the information-seeking behaviours described in the academic literature (Chapter 2, Section 2.3) rather than the attributes espoused by the proponents of the Net Generation idea (Chapter 2, Section 2.2), as a starting point to further examine how young people feel about (perceptions and beliefs – Affective Domain) and use (Effective Domain) of a range of technologies in their daily lives. The interviews were approximately half an hour long, the findings were coded using the interview checklist and prompts, and results are presented as pattern graphs using Excel (Chapter 3, Section 3.3.4). The findings are presented first in this chapter followed by a discussion of this phase of the research.

6.1. Interviews and pattern graphs

Results from the interviews are presented as pattern graphs to distinguish easily any emerging patterns or trends. The legend for the pattern graphs is presented in Table 6-1 below. The ING shows a range of user types from LC/LU through to HC/HU (9 in total), a result of the homogeneity of the participant group.

Table 6-1: Legend, Index Net Gen-ness (ING), interview pattern graphs

Low confidence/Low use	(LC/LU)	Orange
Low confidence/Average use	(LC/Av)	Yellow
Low confidence/High Use	(LC/HU)	Light Yellow
Average confidence/Low use	(Av/LU)	Green
Average confidence/Average use	(Av/Av)	Light Green
Average confidence/High use	(Av/HU)	Olive Green
High confidence/Low use	(HC/LU)	Blue
High confidence/Average use	(HC/Av)	Cyan
High confidence/High use	(HC/HU)	Purple
Audio failed, no clear answer		Pink

The graphs read from left to right, Low Confidence/Low Use (LC/LU) through to High Confidence/High Use (HC/HU) participants using the ING (Index of Net Gen-ness) metric discussed in Chapter Three (Section 3.3.2), and are colour coded for easy comparative analysis. Males and females are presented as separate pattern graphs with the follow-up participants identified using their identifying numbers and their ING metric descriptors (eg. LC/LU, across the top of each graph, ranging from lowest to highest. Each time a participant mentioned a particular theme in the interview, he or she received a positive check in the pattern graph, using the colour legend above so the different ING groups could be identified easily. Where appropriate, aspects of the discussion also appear in the results after each pattern graph. All of the themes which emerged in the answers to the original question and any discussion from the prompts have been included in the pattern graphs. These are presented in the left-hand column of each graph. The inclusion of all aspects discussed in the interviews was possible, because participants tended to give similar answers or discuss similar themes. This homogeneity could be due to the use of the semi-structured interview checklist or it may also be a reflection of the findings in Phase One of the research, ie. how this group use and feel about the Internet is very similar. If homogeneity is the significant factor, then this will be evident in the observations and tasks analysis (Chapter 7). Figure 6-1 indicates how to read the pattern graphs.

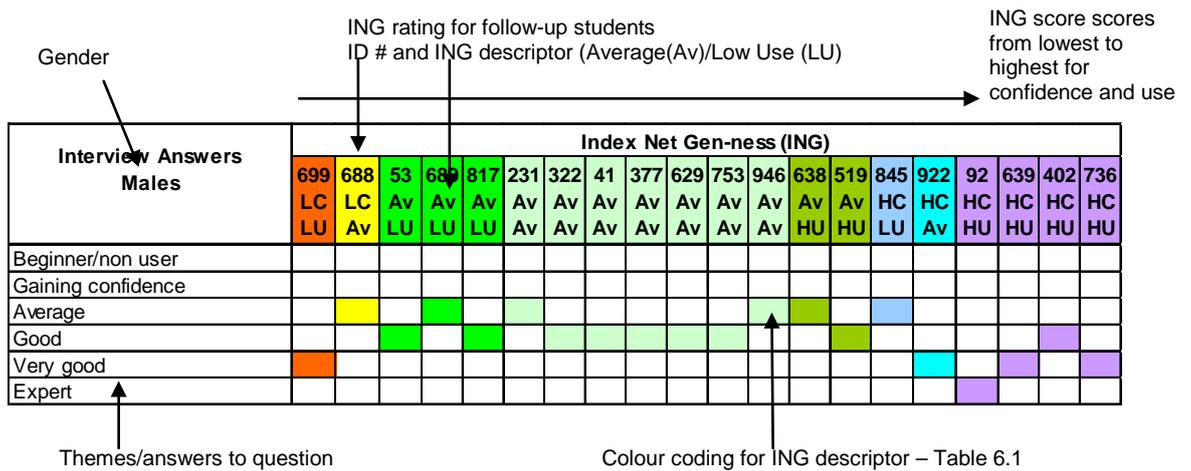


Figure 6-1: Reading the interview pattern graphs

6.1.1. Internet use - self perceptions

The first question and subsequent prompts examined participants' self perceptions and how they rated their skills as Internet users. These results are presented in Figure 6-2 below.

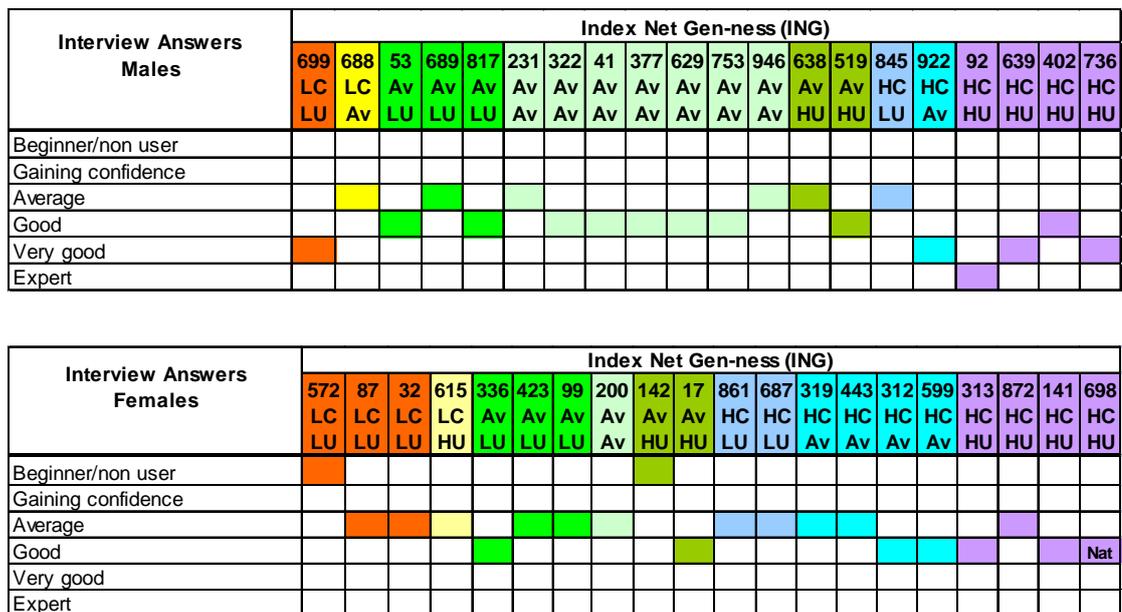


Figure 6-2: Internet use, personal rating

There is a distinct difference between males and females in these two pattern graphs. Males were definitely more confident about their skill levels than females and had high levels of confidence. None of the females gave herself a rating of very good or expert, although participant #698 (HC/HU) said she was *a natural*. Female participant #142 who scored an ING of average and high use felt she was still a beginner. Male participant #699,

who scored a LC/LU ING, rated his skill levels as very good. These results support the findings from Phase One of the research, which revealed that males in this study had very high levels of confidence when using the Internet. These results also support the findings from Phase One, which revealed that young people of both genders in this group had high levels of confidence when using the Internet. When interpreting these results, it needs to be stressed that only two of the lowest scoring females (#572, ING: LC/LU, 16:30; #87, LC/LU, 19:30) scored less than one standard deviation from the Affective Domain mean of 30.5. The mean for the female follow-up participants, however, was 39.5 and the ING metric for confidence for this group was calculated according to the mean for the group. This means that most of the participants in the follow-up group, both male and female, were confident users of technology scoring well above the mean for the metric. High levels of confidence are a major finding in Phase One, which is reiterated in Phase Two of the research. Participants were also asked about their frequency of Internet use. These results are presented in Figure 6-3 below.

Interview Answers	Index Net Gen-ness (ING)																			
	Males																			
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU
Daily																				
Daily/only at uni																				
At work																				
1-2hrs on average																				
Several hours/day																				
Frequently																				
Computer 24/7 on the Internet																				
2-3 a week, infrequently																				

Interview Answers	Index Net Gen-ness (ING)																			
	Females																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Daily																				
Daily/only at uni																				
At work																				
1-2hrs on average																				
Several hours/day																				
Frequently																				
Computer 24/7 on the Internet																				
2-3 a week, infrequently																				
Audio failed/no clear answer																				

Figure 6-3: Frequency of Internet use, personal rating

Results from this question indicate that these young people, even those with low confidence/low use ING ratings were using the Internet on a daily

basis, excluding their use at university. Only male participant #688 (ING: LC/Av) said he used it infrequently or twice a week. Male participants #231 (ING: Av/Av), #817 (ING: Av/LU) and female participant #872 (ING: HC/HU) said they had their computers connected to the Internet 24/7. Participant #817 scored a low use ING rating, while participant #231 was average for both confidence and level of use. These results indicate that perceptions of how much these participants used the Internet were not consistent. As revealed in the findings from Phase One of the research, while participants were using technology, particularly the Internet, the range of technologies they used was not diverse. Since the ING level of use score was based on frequency of use plus the use of a wide range of technologies, this apparent anomaly in the scoring may also indicate that these participants may be heavy users, but of a limited range of technologies.

6.1.2. Internet use - activities

The next probe in this section of the interviews asked participants about common activities when using the Internet. These results are presented in Figure 6-4 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU	HU
News & current affairs																				
Professional needs - work, job seeking																				
Study																				
YouTube, surfing, personal interest																				
Downloading/listening to music	Buy											Pre		Pre						Pre
Downloading movies												Pre		Pre						Pre
Online gamer	Buy								Occ				Pre							Pre

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
News & current affairs																				
Professional needs - work, job seeking																				
Study																				
YouTube, surfing, personal interest																				
Downloading/listening to music																				
Downloading movies																				
Online gamer																				
Audio failed/no clear answer																				

Figure 6-4: Frequency of Internet use, personal rating

Results from this data also support the findings from Phase One of the research, with only a few participants using the Internet for news services or for professional needs such as seeking employment, although the male with the lowest ING score (#699, LC/LU, ING 33:30) reported being an active user of Internet news sites. The lack of engagement with job seeking sites may be due to the fact that most of the participants were engaged in fulltime study, so job seeking was not something they would be actively engaged in at this point in their lives. Although most participants said they were working part time while studying at university, most were working in the hospitality industry and not in jobs that would eventually be part of a long-term career. All of the participants, except females #872 and #141 (HC/HU) and male participant #922 (HC/Av) said they were using the Internet for study. The female students were studying Forensics/Criminology and Fine Arts/Education respectively and reported a lack of online course materials as the reason for their limited engagement. The Fine Arts/Education student reported no engagement with the Internet in the course and an insistence by lecturers that students use only print materials (books and print journals) as references, with defined reference lists supplied by the lecturers. The male student, however, was studying Computer Science/Games Programming and most unit materials in this School were available online. This question asked students to quantify their use of the Internet. If the male participant associated major use of the Internet with recreation rather than study, this may account for this anomaly. The results above also indicate that recreational use is predominant, and surfing YouTube was a favourite pastime with most of the participants, with more males than females engaging in this activity. More males also downloaded music and movies, with three participants

indicating that this was no longer a current activity (pre). Only the top scoring females (#872, #141 and #698) said they were online gamers, with participant #200 (ING: Av/Av) expressing an active dislike for computer games. Amongst the males, however, the participants who identified themselves as online gamers ranged from LC/LU (#572) through to the HC/HU participants. These results support the findings from Phase One, which indicate more males were engaged in these activities than females.

The next interview question in this series explored the use of social networking sites and how participants were using these sites as part of their daily lives. The results for this question are presented in Figure 6-5 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Diarising/publishing - do not use for this purpose																				
MySpace		Dis																		
FaceBook		Dis																		
Blog		Dis									Pre									
MySpace, old/school friends	Past																			
FaceBook, old/school friends	Past														Rec					
Communication - Blog																				
Meet new people																				
Don't use																				
Entertainment/info, music																Ent				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Diarising/publishing - do not use for this purpose																				
MySpace								Dis												Pre
FaceBook								Dis												
Blog								Dis											Pre	
MySpace, old/school friends								Dis							Dis					Pre
FaceBook, old/school friends								Dis							Pre					
Communication - Blog																				
Meet new people																				
Don't use																				
Entertainment/info, music																				
Audio failed/no clear answer																				

Figure 6-5: Internet use, social networking

None of the participants in this study felt they were using social networking sites as a diarising or self publishing tool. Rather, they reported using social networking sites such as MySpace and FaceBook as a communication tool to keep in touch with specific groups such as old school friends from primary school. As one participant explained:

I use FaceBook to keep in touch with friends instead of email because the expectation of an immediate response is less. People expect you to respond to email straight away. (Participant #142, ING: Av/HU)

Two females (#200, ING: Av/Av; #312, ING: HC/Av) and one male (#688, ING: LC/Av) expressed an active dislike of these Internet utilities. Three of the HC/HU females, one HC/Av female and one male in the average ING category, had used social networking extensively previously (pre), with one male (#699, ING: LC/LU) indicating that he no longer used them at all (past). When asked why they no longer used these sites, participants cited time constraints due to study, relationships and part time work, ie. as their lives changed, so did their use of these sites. Only one male (#922, ING: HC/Av) was using social networking sites for entertainment and one (#519, ING: Av/HU) to meet new people. This participant had recently returned from a trip to Europe where he had stayed with people he had met on Facebook. Only two males (#689, ING: Av/LU; #92, ING: HC/HU) and one female (#17, ING: Av/HU) were using blogs, with one male and one female indicating previous use, and one male and one female reporting an active dislike for this type of social media tool. These results support the Phase One findings (Chapters 4 and 5) and suggest that how young people use and perceive their use of technology is based on need and context. Overall, six males and eight females did not use social networking, and a further five indicated their use had changed and was now limited. In this group 47.5% or approximately half of the interviewees were not using social networking utilities. This result is lower than the results from the Phase One findings in which 24.5% of the whole survey group said social networking sites were essential or important. This anomaly may be due to the fact that only MySpace was used as an example of social networking in the Web questionnaire, whereas a range of utilities were discussed in the interviews. Following on from the previous question, participants were asked about their use of email and other Internet communication utilities. These results are displayed in Figure 6-6 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU
Email - asynchronous					Occ								Occ							
Chat, msn - synchronous																				
Telecommunications - skype - synchronous																				
Bulletin Boards/Discussion Forums - asynchronous																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Email - asynchronous					Occ															x2
Chat, msn - synchronous	Pre		Occ		Occ	Occ		Occ							Pre				Pre	Pre
Telecommunications - skype - synchronous																				
Bulletin Boards/Discussion Forums - asynchronous						Pre														
Audio failed/no clear answer																				

Figure 6-6: Internet use, communication

Since all university communications to students were being delivered online via email, most participants were using email extensively, with one female (#141, ING: HC/HU) reporting that she had two email accounts in regular use. Nearly three quarters of the whole group were also using chat/msn utilities, with four females indicating occasional use and another four indicating previous use. Only one participant was using Skype (Internet telephony). When these interviews were conducted, Skype was a relatively new utility. In Phase One of the research, findings indicated that a certain group of students were using this utility. The lone female participant using Skype (#17, ING: Av/HU) in the above dataset was an international student with family living overseas. Only eight students were using bulletin/discussion boards, with one student indicating previous use. Discussion boards were being used extensively for online group work by both universities. When asked why they didn't use discussion boards, participants said they disliked using them due to time constraints and the length of reading time involved to remain engaged in online discussions.

A major attribute of young people according to the proponents of the Net Generation idea is their willingness to use the Internet for exclusive activities which connect to the rest of the world (Tapscott, 1998, Dorman, 2000; Howe & Strauss, 2000; Palfrey & Gasser, 2008). Results presented in Figure 6-7 indicate that this is not the case for this group. Only one male (#402, ING: HC/HU) was

politically active online and admitted that this was not a common activity. He had entered some feedback on an environmental site twice previously. Similarly, two males and two females indicated they lurked on some sites, but this was not a regular activity.

Interview Answers	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
Males	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
No																				
Yes																				
Limited - lurk only																				
Audio failed/no clear answer																				

Interview Answers	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
Females	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
No																				
Yes																				
Limited - lurk only																				
Audio failed/no clear answer																				

Figure 6-7: Internet use, political activities

Nor do these participants use the Internet extensively for retail and financial transactions (Figure 6-8). Overall, eight males and ten females (45%) reported they did not use the Internet for retail or financial transactions. When asked why, participants cited lack of security as a major issue. Three males and one female indicated they shopped regularly online and one male occasionally. While the female fell in the ING HC/HU category, the males ranged from Av/LU through to HC/HU. These findings further support Phase One findings which indicate that Internet use by this group is based on context and perceived need, rather than the ubiquitous use of many technologies.

Interview Answers	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
Males	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Shopping																				Occ
Net banking/finances																				Occ
Don't use																				

Interview Answers	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
Females	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Shopping																				
Net banking/finances																				
Don't use																				
Audio failed/no clear answer																				

Figure 6-8: Internet use, retail and finance

The last question in this series dealt with bad experiences when using the Internet. These results are reported in Figure 6-9 below.

Interview Answers	Index Net Gen-ness (ING)																			
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU
Relationships																				
Illegal activities																				
None																				

Interview Answers	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Relationships																				
Illegal activities																				
None																				
Audio failed/no clear answer																				

Figure 6-9: Internet use, bad experiences

Only 3 participants reported having bad experiences while using the Internet. The male participant (#638, ING: Av/HU) had just completed a court ordered five-year ban from using the Internet. At fifteen years of age, he had become involved in creating false credit cards with a group of people he met while surfing the Internet. As he explained:

I got in with the wrong crowd. We got caught, but I'm back on track and studying at uni now. (Participant #638, ING: Av/HU)

Both of the female participants who reported bad experiences were in the ING HC/HU category. One female (#698, ING: HC/HU) had stopped using MySpace and chat after becoming involved in a 'flame war' between two friends. The other female (#141, ING: HC/HU) had a bad relationship experience with an older male online. This participant explained that since two of her close relatives had met their life partners online, establishing an online relationship wasn't something she considered out of the ordinary. However, the relationship experienced difficulties when she discovered he had lied and was considerably older. The participant elected not to meet her online 'friend', now felt that online relationships were not 'real' and said she would not engage in one again. Overall, 7.5% of the total interviewees reported bad experiences with 5% indicating experiences of a more serious nature. The fact that most of the participants in this sample group did not

behave in an exclusive manner and move outside their known friendship groups when using the Internet, is probably the reason for this result.

6.1.3. Internet use – attitudes and study

The next set of questions in the interviews asked participants about their attitudes, likes and dislikes when using the Internet, particularly for study. How the participants felt about using the Internet for study purposes is presented in Figure 6-10 below.

Interview Answers	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
Males	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Like it/expectation at uni																				
Don't use much @ uni, no course materials online																				
Dislike online, lack of f-t-f & feedback																				
Don't really like it																				
Difficult at first, not very good																				
Audio failed/no clear answer																				

Interview Answers	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
Females	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Like it/expectation at uni																				
Don't use it much @ uni, no course materials online																				
Dislike online, lack of f-t-f, feedback																				
Don't really like it																				
Difficult at first - not very good																				
Audio failed/no clear answer																				

Figure 6-10: Internet use, attitude

All of the males except two (audio failed) liked using or expected to use the Internet at university for study purposes. One male and four females reported low use at university due to a lack of online study materials. However, three females (7.5%) said they disliked using the Internet, a further two (5%) found the online study materials difficult to use, while one male and 3 females (10%) disliked online study because there is a lack of face-to-face feedback. Overall, 22.5% of the interviewees expressed a dislike or had issues when using the Internet for study purposes. This result is slightly higher than findings from Phase One of the research, in which 19.5% of participants in the Web survey said they disliked using the Internet in educational settings. The next set of pattern graphs examine participants'

access and attitudes in more depth and appear in Figures 6-11 and 6-12 below.

Interview Answers Males	Index Net Gen-ness (ING)																				
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736	
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Some/access, convenient, revisit & review																					
Uni materials, library from home																					
LMS - not associated with Internet use																					
Audio failed/no clear answer																					
Comments																					
Uni/Library lessons to search databases																					
Lack of authority on Internet																					
Can't always find what I need																					
Prefer Internet over books, more info, convenient, easier																					
Availability & reliability of technology, frustrating																					
Prefer books, distrust e-journals																					
Distracting																					

Figure 6-11: Internet use, study materials - access and attitude, males

In this part of the interview, four of the male participants either gave yes/no answers or the audio was indistinct. Of the remaining males, all said that a major positive of using the Internet for study was access to online course materials and the library 24/7 from home, which allowed them to revisit and review course content. ‘Convenience’ was a term used frequently in this discussion. Five of the males (25%) felt that previous instruction on how to use the library databases to find information was extremely important and one distrusted information found on the Internet. A further four were experiencing issues with the availability and reliability of the technology at their universities, citing outages as a major problem. Only one male found the Internet a distracting environment. All of the males realised that the Learning Management System (LMS) was actually utilising the Web as a delivery platform.

Interview Answers Females	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Some/access - convenient, revisit/review																				
Uni materials, library from home																				
LMS - not associated with Internet use																				
Audio failed/no clear answer																				
Comments																				
Uni/Library lessons to search databases																				
Lack of authority on Internet																				
Can't always find what I need																				
Prefer Internet over books, more info, convenient, easier																				
Availability & reliability of technology, frustrating																				
Prefer books, distrust e-journals																				
Distracting																				

Figure 6-12: Internet use, study materials - access and attitude, females

Similar to the males, all except one of the females (three recordings were unclear)⁵ felt that using online study materials was useful, while four mentioned online access to the library as a major positive. Across the ING categories, seven of the interviewees commented on the usefulness of university preparation and information literacy classes run by the library to help them search the databases and electronic resources for information. Overall, 30% of the interviewees mentioned they had attended such classes as part of their orientation to university. Discussion with two of the females (#87, ING: LC/LU; #423, ING: Av/LU) clearly revealed they did not realise they were using the Internet when using the LMS to access their course materials. Both of these participants scored low ING categories for use. The ability to distinguish between the closed systems of the university and the open system of the Internet/ Web is further explored in the task analysis in Chapter 7. Female participants from across a range of ING categories mentioned issues with the authority/reliability of information on the Internet, two felt they couldn't find the information required, and three cited the availability and robustness of technology as issues. One preferred books over the Internet and a further six said they 'distrusted' e-journals. Overall, 20% of the interviewees distrusted information found in e-journals or had a preference

⁵ Recordings designated unclear were due to yes/no answers and where the answers could not be distinguished due to outside noise factors – heavy rain on a tin roof during the interviews.

for hardcopy print sources. While this result may be due to lecturer preferences mentioned earlier in this chapter (Figure 6-4), it is interesting that these participants distinguish between print journals and e-journals. They do not seem to realise they are the same thing, and only the delivery mode is different (print versus electronic). None of the females indicated they found the Internet distracting.

6.1.4. Electronic resources and use of the library

Tertiary education institutions, particularly universities, place great importance on students' ability to research and access up-to-date information across all levels of their courses as part of the learning experience. Utilisation of the library and information is therefore, an important component of the educational agenda. As noted in the previous section (Figure 6-12), 30% of these participants mentioned the importance of information sessions on how to access electronic resources provided by the library. Results presented in Figure 6-13 explore the frequency of library use by the participants in this research.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC LU	LC Av	LC LU	Av LU	Av LU	Av Av														
Every day																				
Once/twice a week																				
Sometimes (3-6 times/sem)																				
Rarely (1-2 times/sem), never																				
Audio failed/no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC LU	LC LU	LC LU	LC HU	Av LU	Av LU	Av LU	Av Av												
Every day																				
Once/twice a week																				
Sometimes (3-6 times/sem)																				
Rarely (1-2 times/sem), Never																				
Audio failed/no clear answer																				

Figure 6-13: Internet use, frequency of use - library

Results from this dataset are of major concern, as 50% (10) of the male and 35% (7) of the female interviewees were making limited use of the library facilities at their universities. Only three of the males and seven females (25%) reported daily use. One female reported previous use of once or twice a week. This participant (#313, ING: HC/HU) was a fourth year

honours student who had just completed her studies at the time of interview. She also mentioned during the interview that her use of the library and the skills required to find information did not become an issue until her honours year, when she participated in library courses dealing with research and how to use electronic resources. The lack of library use and the electronic information resources provided by the universities reported by the interviewees (45%) is slightly lower than the findings reported in Phase One of the research, in which 51% of participants said the library was either not important or of minor importance in their study at university. To examine the use of the library further, participants were asked about their activities when using the library. These results are reported in Figure 6-14 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Look for books/journals										Occ										
Use the computers																				
Socialise																				
Study																				
Don't use/much																				
Audio failed/no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Look for books/journals																				
Use the computers																				
Socialise																				
Study																				
Don't use/much																				
Audio failed/no clear answer																				

Figure 6-14: Internet use – library, activities

The results for this question are interesting. There appears to be a distinct difference between how the males and females perceive their activities and use of the library at university. While 65% (13) of the females used it to look for hardcopy books and journals, only 37% (7) of the males (one reporting occasional use) used it for this purpose. Overall, 30% (12) of the participants used the library to access the computers and a small number go there to socialise (3). A quarter of the participants used the library as a place to study, with more males (7) than females (3) using it for this purpose. While none of the females said they didn't use the library, eight of the males said their use was sporadic or very limited. To further examine

participants' use of electronic information sources, the following question in this series looked at frequency of use. These results are presented in Figure 6-15 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC LU	LC Av	Av LU	Av LU	Av LU	Av Av	Av HU	Av HU	HC LU	HC Av	HC HU	HC HU	HC HU							
Use them/only since 3rd yr			3rd																	
Regularly																				
Sometimes																				
Rarely/Never																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC LU	LC LU	LC LU	LC HU	Av LU	Av LU	Av LU	Av Av	Av Av	Av HU	Av HU	HC LU	HC LU	HC Av	HC Av	HC Av	HC Av	HC HU	HC HU	HC HU
Use them/only since 3rd year	Diff					3rd	3rd			3rd			3rd			3rd	3rd			3rd
Regularly																				
Sometimes																				
Rarely/Never																				
Audio failed/no clear answer																				

Figure 6-15: Internet use – library, electronic resources, frequency of use

Results from this question revealed that 41% (16) of the participants either sometimes or rarely use the electronic resources provided by the library at their respective universities, with more males reporting limited use than females. One female (#572, ING LC/LU) said they were difficult to use. This participant scored an ING of 16:30, with the lowest score for confidence over the whole interview group. During the interview she continually made self-deprecating comments about her lack of technology skills and engagement with technology at university and in her daily life. She also reported an active dislike for using technology for study purposes. A number of participants (3 females) reported they had been using the databases and electronic resources only since entering the final stages of their undergraduate degrees (3rd year of study). Overall, 35% (14) of the participants said they used electronic information sources on a regular basis as part of their study, with more males (50%) than females (20%) in this category. These results are lower than the results from the Web questionnaire (Chapter 4, Figure 4-19) in which 62% of participants said the library databases were essential or of major importance to their study, with females scoring higher than males. The sequence of the research method may explain this difference between the Phase One and Phase Two findings,

since most of the follow-up participants were reflecting on this question after they had completed the tasks, where only a few students used the library databases extensively.

To further examine how participants were using the library facilities at university, the next question in this series examined their understanding of how library personnel could assist them to find information. These results are displayed in Figure 6-16 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Used a reference librarian																				
No																				
Understands term																				
No																				
Audio failed/no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Used a reference librarian																				
No																				
Understands term																				
No																				
Audio failed/no clear answer																				

Figure 6-16: Internet use – accessing library specialist staff

Only a few of the participants had ever used the services provided by specialist reference staff in their libraries (2 males and 5 females or 17.5% overall). The rest of the participants did not understand the term reference librarian and discussions held after the interviews had been completed, mentioned they did not know what specialist services were available at their library to assist in research and information gathering. These results would appear to indicate a lack of engagement and understanding of the library and its place in the university as a specialist information service even though 30% (12) of the total interview group reported participation in library orientation classes (Figures 6-11 and 6-12).

6.1.5. Skill levels – self perception and my generation

The following series of questions asked participants to reflect on the tasks they had just completed and how they perceived their skill levels in

relation to their peers and others in their generation. On four occasions the tasks were held after the interviews due to scheduling and time constraints. The first question deals with the tasks and how participants felt about their performance. As explained in Chapter Three, the tasks represented two types: a multi level data gathering task and an interpretive, academic task (Chapter 3, section 3.3.3). These results are displayed in Figure 6-17 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU	HU
Easy/Relatively easy																				
Not enough time																				
Task after interview																				
1st Task - comments																				
Difficult to find specific info																				
Had to look in several places																				
Easier if I have background knowledge																				
First task easy																				
2nd task - comments																				
Too much info, difficult to find journal article																				
Second task easier																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Easy/Relatively easy																				
Not enough time																				
Audio failed, task after interview																				
1st task - comments																				
Difficult to find specific/info																				
Had to look in several places																				
Easier if I have background knowledge																				
First task easy																				
2nd task - comments																				
Too much info, difficult to find journal article																				
Second task easier																				

Figure 6-17: Skill levels – self perception, tasks

Overall, 70% of the participants felt the tasks were easy or relatively easy, even though only a few managed to complete the tasks in the given timeframe (15 minutes were allowed for each task). Half of the males (10) and six of the females reported lack of time as a major issue for task completion. In Task One three males and three females said it was difficult to find specific information. Two males and two females also disliked the fact that they had to look in different places for the information and felt there

should be a single website that contained all the information required to complete the task. Two females felt they needed more background knowledge to complete Task One and one male and two females said it was easy. Only two of the males felt that Task Two was easier and two males felt the information was too difficult to find. These results support previous findings in Phase One of the research that indicate high levels of confidence when using the Internet to find information amongst this age group, despite the fact that only a few of the participants completed the tasks. There are no patterns emerging from this question, and comments from the interviews were spread across the ING categories.

The next series of questions examined how participants perceived their information-seeking skill levels when using the Internet, and their skills as compared to their peers at university, their peers outside university and their generation. These results are presented in Figures 6-18 – 6-20.

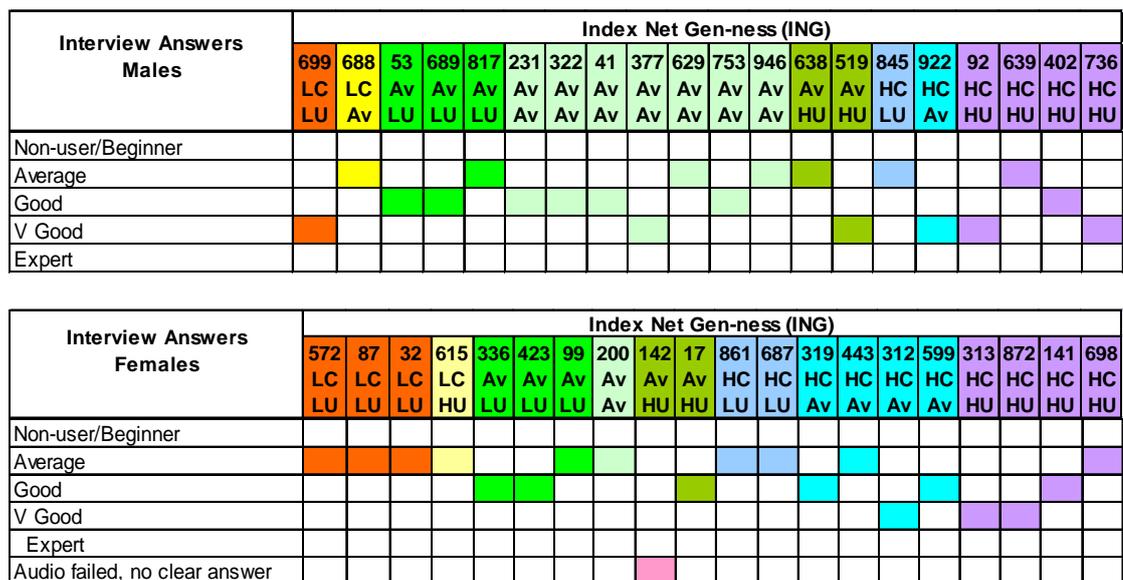


Figure 6-18: Information-seeking skills – self perception, personal rating

The results for this question are different to the first interview question that asked students to provide a personal rating of their overall skill levels when using the Internet (Figure 6-2), which were generally lower. This group are very confident about their ability to find information using the Internet. Unlike the first question, no one rated themselves in the beginner category and seven males and nine females felt their information-

seeking skills were average. While all of the lowest scoring females (ING: LC/LU) rated their skills as average, this personal rating was spread across the ING categories and included one of the HC/HU females. A further seven males and six females rated their information-seeking skills as good, while six males and three females said they were very good. While the females who ranked themselves in the very good category were also in the high scoring ING categories, the males exhibited a spread, with the lowest scoring male reporting very good information-seeking skills. None of the participants felt they were an expert. This result supports findings from Phase One of this research that indicated a higher confidence level amongst males than females. These results also confirm Phase One findings which suggest that students perceive information-seeking skills to be different to ‘surfing’ or using the Internet for recreational purposes. The next question asked participants to rate their information-seeking skills compared to their peers at university. Results for this question are presented in Figure 6-19 below.

Interview Answers Males	Index Net Gen-ness (ING)																				
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU	
Less than me																					
Same as me																					
Better than me																					
Much better than me																					

Interview Answers Females	Index Net Gen-ness (ING)																				
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU	
Less than me																					
Same as me																					
Better than me																					
Much better than me																					
Audio failed, no clear answer																					

Figure 6-19: Information-seeking skills – self perception compared to peers at university

These results also indicate high levels of confidence amongst the interview group, with 50% (10) of the males and 30% (6) of the females saying they felt their skill levels were better than their peers at university. Overall, nine males and nine females (45%) said their skill levels were the same, while one male and four females felt their peers had better information-seeking skills. In this case two of the females were in the ING

LC/LU category. The next question in this series asked participants to rate their information-seeking skills compared to their peers outside university. These results appear in Figure 6-20.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Less than me																				
Same as me																				
Better than me																				
Much better than me																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Less than me																				
Same as me																				
Better than me																				
Much better than me																				
Audio failed, no clear answer																				

Figure 6-20: Information-seeking skills – self perception compared to peers outside university

Results for this question show a different range of answers between males and females. Seventy percent of the males (14) felt their information-seeking skills were better than their friends outside university, with a further 20% (4) saying they were the same. Only two males felt their friends outside university had higher skill levels. Nine of the females (47%) indicated their friends had lower information-seeking skill levels, while four (21%) said they were the same. Four females said their friends had higher skill levels, with two saying their friends were much better. These results again indicate high levels of confidence, especially amongst the males. When asked why they felt their friends outside university had lower skill levels, participants said their experiences at university required more in-depth research for information which had helped them improve their information-seeking skills. The females who felt their friends had higher skill levels all referred to male friends who used the Internet extensively for gaming and entertainment. These participants felt their friends would be better at information-seeking as a result of their high engagement with the Internet for recreational purposes. The last question in this series asked

participants to rate their information-seeking skills compared to their generation. These results appear in Figure 6-21.

Interview Answers Males	Index Net Gen-ness (ING)																				
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736	
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Less than me																					
Same as me																					
Better than me																					
Much better than me																					
Younger members much better than my age group																					

Interview Answers Females	Index Net Gen-ness (ING)																				
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698	
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	LU	LU	LU	LU	Av	HU	HU	LC	LC									
Less than me																					
Same as me																					
Better than me																					
Much better than me																					
Younger members much better than my age group																					
Audio failed, no clear answer																					

Figure 6-21: Information-seeking skills – self perception compared to Net Generation

In this question more than half of the males felt their information-seeking skills were better than the rest of their generation, citing constant use at university as a major reason for this belief. Only two of the males felt the members of their generation had better information-seeking skills, with two believing that younger members were much better than their age group. Amongst the females, three participants felt the younger members of the Net Generation have much better information-seeking skills. When questioned further, participants cited longevity of use as a major factor to account for this belief, ie. the longer you use the technology the better your information-seeking skills. Again the confidence levels of the females is lower than the males in this group, with eight females reporting the belief that members of the Net Generation have better information-seeking skills, with the three lowest ranked ING females indicating low levels of confidence. Overall, the interview group felt confident about their information-seeking skills as compared to the rest of their generation, with just over half of the participants saying they had better or similar skill levels. Five participants (12.5%) felt the younger members of the Net generation had better information-seeking skills citing greater exposure to technology as an explanation for this belief.

6.1.6. Internet use – exposure and skills acquisition

This part of the interviews examined the length of time these participants had been using the Internet and how they acquired their skills. These results are available in Figures 6-22 – 6-23 below.

Interview Answers	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Males	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
<1 year																				
1 - 3 years																				
3 - 5 years																				
6 - 7 years																				
8 - 9 years																				
10 - 10+ years																				

Interview Answers	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Females	LU	LU	LU	LU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
<1 year																				
1 - 3 years																				
3 - 5 years																				
6 - 7 years																				
8 - 9 years																				
10 - 10+ years																				

Figure 6-22: Interview participants - length of time using the Internet

This is an interesting dataset. The lowest ING ranked females had been using the Internet for less than five years, as had the highest ranked male (#736, ING: HC/HU). This participant was an international student from Russia who indicated that access to the Internet had been a problem in his native country. The two lowest ING ranked males had been using the Internet for more than ten years and the LC/HU females had been using it for 8 - 9 years. These results support Phase One findings (Chapter 5, Table 5-9) which indicate that length of time using the Internet does not necessarily affect how these participants feel about their ability (confidence) to use it to find information. The ING metric measured use according to frequency and the range of technologies being used by participants according to the Net Generation attributes discussed in Chapter 2. While the two lowest ING ranked females scored low levels of confidence in comparison to the rest of the survey group, confidence across the whole survey group was an average of 8 points higher than the mean (30.5) for the Affective Domain. Overall, participants who had been using the Internet for six years or more accounted for half of the ING scores ranked Av/Av and above. While

some of the participants appear to believe that length of time using the Internet influences both their level of use and information-seeking skill levels, this belief is not supported by either phase of this research.

The next question asked participants about how they acquired their Internet skills. The results are depicted in Figure 6-23 below.

Interview Answers	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
Males	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Mainly taught myself																				
Friends																				
Parents/guardians																				
Sibling/s																				
Books/magazines																				
Teachers/school																				
Uni Prep course helped a lot																				
TAFE/Short courses																				

Interview Answers	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
Females	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Mainly taught myself																				
Friends																				
Parents/guardians																				
Sibling/s																				
Books/magazines																				
Teachers/school																				
Uni Prep course helped a lot																				
Audio failed, no clear answer																				

Figure 6-23: Interview participants – Internet skills acquisition

The results from this question strongly support findings from the Web questionnaire in Phase One of the research. This generation of young people are self-taught Internet users. Three participants felt the six month university preparation courses they attended had been worthwhile, while five males and five females recognised assistance from teachers at school. Only one male and none of the females used books or magazines for assistance, and parental guidance was recognised by one female and six males. Friends also assisted ten of the participants. However, all but one of the participants said they taught themselves how to use the Internet.

6.1.7. Internet use – printing and reading

One of the surprise findings from the first phase of the research was the importance of printers reported by 85.5% of the survey group (Chapter 4, Figure

4-39). This factor was further explored in the interviews and the results appear in Figure 6-24 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
Rarely/No																				
Sometimes/cost a factor																				
Everything/most																				
Comments																				
Easier to read/prefer hardcopy																				
Easier to understand the info																				
Less distracting																				
Assignments in hardcopy																				
Verification - email																				
Technology - not robust																				
Mobile/convenience, review																				
Always write things down																				
Audio failed/no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
Rarely/No																				
Sometimes/cost a factor																				
Everything/most																				
Audio failed, no clear answer																				
Comments																				
Easier to read/prefer hardcopy																				
Easier to understand info																				
Less distracting																				
Assignments in hardcopy																				
Verification - email																				
Technology - not robust																				
Mobile/convenience, review																				
Always write things down																				

Figure 6-24: Printing information found on the Internet

Most of the participants in the interview group (65%) were printing information they found on the Internet most of the time, with five males and five females citing cost as an issue. When asked why they printed so much, thirteen of the males and sixteen of the females (72.5% overall) said they preferred hard copy because it was easier to read and/or easier to understand (comprehend) information. Five participants said they had to provide assignments in hard copy, and six males mentioned the convenience of having a hard copy which they felt was more mobile. One male (#922, ING: HC/Av) mentioned that he wrote everything down. This participant was studying Computer Science/Games programming, strongly identified himself as an online gamer who regularly participated in multi-player online

games, and used the Internet extensively for recreation and entertainment, but not for study. He also carried all his favourite URLs with him at all times in a ‘little black book’, because he did not ‘trust’ the Internet or the robustness of the technology. Reading and comprehending text on screen is further explored in Chapter 7, which looks at what the participants were actually doing when using the Internet to find information.

6.1.8. The Internet – perceptions, information use and management

This series of questions asked participants what they considered to be the positive and negative aspects of using the Internet as an information-seeking tool. These results are displayed in Figures 6-25 (positive aspects) and 6-26 (negative aspects) below.



Figure 6-25: Positive aspects of using the Internet to find information

Convenience was a term used by nearly half (45%) of the participants when discussing positive aspects of using the Internet to find

information, with more males (12) than females (6) using this descriptor. Five females and twelve of the males said it was easy to use. This difference between the genders again indicates that males have a higher level of confidence than the females. Six males and three females said they always found some information eventually. Speed of access to information was also considered to be a positive aspect, with five males and seven females mentioning this feature. However, the most recognised positive about using the Internet to find information was the availability of search engines, especially Google, to assist with information-seeking. Overall, 62.5% of the interviewees mentioned search engines and Google in particular as a major positive for using the Internet to find information. Only two students (one male and one female, both in the ING: Av/HU category) said they did not find the Internet easy to use.

The next question asked participants to consider the negative aspects of using the Internet as an information-seeking tool. These results are presented in Figure 6-26 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
Too much info	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU
Authority difficult																				
Time consuming																				
Frustrating																				
Re-finding info																				
Keeping up with new technologies																				
Paying for good info																				
Dead links																				
Using wrong keywords, finding info that's relevant																				
Scanning lots of info																				
Finding older info																				
Getting around protected info																				
Distracting environment																				
Don't find anything difficult																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Too much info					Pre															Pre
Authority difficult																				
Time consuming																				
Frustrating																				
Re-finding info																				
Keeping up with new technologies																				
Paying for good info																				
Dead links																				
Using wrong keywords, finding info that's relevant																				
Scanning lots of info																				
Finding older info																				
Getting around protected info																				
Distracting environment																				
Don't find anything difficult																				
Audio failed, no clear answer																				

Figure 6-26: Negative aspects of using the Internet to find information

These results indicate that this group of users are aware of issues when searching the Internet for information. Overall, 70% of the interviewees identified information overload as a negative aspect when using the Internet for research. Establishing the authority of information was another negative aspect identified by more than half of the interviewees (57.5%), 35% also mentioned the time it takes to find information and a further 30% reported feelings of frustration. 67.5% of the participants also mentioned the issue of using the wrong keywords in search engines which leads to irrelevant search results as a major negative of using the Internet to find information. These issues were identified by participants from across the ING categories from LC/LU to HC/HU and by both genders.

The next question in this series explored more closely how the participants perceived their ability to find information when using the Internet. These results are presented in Figure 6-27 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU	HU
Always																				
Usually																				
No																				
Problems finding really specific info																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Always																				
Usually																				
No																				
Problems finding really specific info																				

Figure 6-27: Ability to find information on the Internet

The results for this question differ from the results in Phase One of the findings in which 89% of the whole survey group said they were confident or very confident in their ability to find information on the Internet. When examining these results, it is important to consider the context and sequence of the research method, ie. all except four of the participants had just completed their two tasks. Since very few of the participants managed to complete the tasks in the given time frame, these results are perhaps a more ‘truthful’ reflection of how these young people actually feel about their ability to find the information they need when using the Internet. 40% of the interviewees (16) said they did not always find the information they needed. Nearly half (18) felt they usually found something, while only six participants (15%) said they always found what they were looking for. More than half (21) of the participants mentioned they had problems finding really specific information on the Internet. These results were also spread across the ING categories and are similar for both males and females.

Re-finding information on the Internet was identified in Phase One of the research as an issue with 22.5% of the whole survey group indicating a lack of confidence. The next question asked interviewees to consider their ability to re-find information again when information-seeking on the Internet. These results are presented in Figure 6-28 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU	HU
Always																				
Usually																				
Yes - If I have saved info																				
Yes - personal use only																				
No/not always																				
Audio failed, no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Always																				
Usually																				
Yes - If I have saved info																				
Yes - personal use only																				
No/not always																				
Audio failed, no clear answer																				

Figure 6-28: Re-finding information on the Internet

Only one male and three females (10%) said they could always re-find information on the Internet. A further twelve participants said they could usually re-find information with seven saying they could only re-find it if they had saved information about the sites in their browser. Nearly half of the participants (47.5%) admitted that they did not always re-find information on the Internet. These results differ substantially from the Phase One findings (Chapter 4, Figure 4-65) where 77.5% of the whole survey group were confident or very confident about finding information again for later use. The differences between the Phase One and Phase two findings may also represent a more accurate picture of participants' information-seeking behaviour due to the sequence of the research method.

The next question in this series examined how participants' rated their information management skills. They were asked to explain how they used tools such as bookmarks and history functions available in Internet browsers. The results for this question are presented below in Figure 6-29.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU
Do not use																				
Write it down in notebook																				
Sometimes																				
Usually																				
Always																				
Audio failed, no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Do not use																				
Write it down in notebook																				
Sometimes																				
Usually																				
Always																				
Audio failed, no clear answer																				

Figure 6-29: Personal rating – use of Internet browser tools

Seven of the audio recordings failed, were indistinct or participants provided no clear answer. Only twelve participants of the total group (30%) said they always or usually (eight males and four females) used their Browser to manage information they had found on the Internet. A further twelve said they sometimes used these facilities, with one male mentioning that this was only a recently acquired skill. This participant was the online gamer mentioned previously who also reiterated his preference for writing everything down in a notebook during this part of the interview. Nine participants (22.5%) said they do not use the browser facilities at all. When asked how they managed and revisited information they had found previously on the Internet, most of the participants said they relied on memory and their ability to use keywords for searching, even though they recognised in a previous question that keyword searching posed difficulties (Figure 6-26). This result perhaps explains why participants had difficulty re-finding information. These results were also spread across the ING categories and suggest a lack of understanding about browser technology and how it can be used to assist, streamline and manage information found on the Internet. The lack of use of browser facilities may also be a result of how these young people learnt to use the Internet, ie. they are self-taught and learn by experimentation. How participants use their browsers when seeking information is further examined in the task analysis (Chapter 7).

The last question in this series asked participants to rate their ability to use information effectively. These results are presented in Figure 6-30 below.

Interview Answers Males	Index Net Gen-ness (ING)																				
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736	
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Beginner/Gaining confidence																					
Average																					
Good																					
V Good																					
Expert																					
Audio failed, no clear answer																					

Interview Answers Females	Index Net Gen-ness (ING)																				
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698	
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU	HU
Beginner/gaining confidence																					
Average																					
Good																					
V Good																					
Expert																					
Audio failed, no clear answer																					

Figure 6-30: Personal rating – being able to use information effectively

Confidence levels are high in this dataset with more than half the participants (21) rating their ability to use information as good. A further eleven participants (four males and seven females) rated their ability to use information effectively as average. Only two (both HC/HU) participants said they were very good, while three classed their skill levels as beginner status. No one rated their skill level as expert. When participants were asked why they felt their ability to use information effectively was high, most participants felt that study at university level had increased their skill levels. Again, responses were across the ING categories with three of the four lowest scoring males and females reporting average or good, indicating that these young people are very confident about their ability to use information effectively.

6.1.9. Information-seeking behaviours

The next series of questions examined how these young people perceived their information-seeking behaviour when using the Internet and electronic resources. The first question asked them about planning and these results are displayed in Figure 6-31 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
No/not really																				
Sometimes																				
Usually																				
Always																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
No/not really																				
Sometimes																				
Usually																				
Always																				
Audio failed, no clear answer																				

Figure 6-31: Personal rating – being able to use information effectively

These results indicate that participants do not plan their searches when seeking information on the Internet. One male and three females indicated they sometimes plan and three males said they usually undertook a planning process before launching into a search. Again, these results were spread across the ING categories and suggest that participants do not utilise a planning/thinking process when involved in searching for information on the Internet. This aspect of information-seeking behaviour is further examined in the task analysis in Chapter 7.

The second investigation of this research considers the notion that young people from the Net Generation have a different culture of technology use of the Internet. The following interview questions asked participants to describe their Internet search methodology. These results are presented in Figure 6-32 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Always use Google/first																				
Use keywords - Google																				
Google adv search - Occ																				
Sometimes use Google																				
Sometimes use other search engines	Of																	Pre		
Use landmark site, eg. Wikipedia																				
Use keywords - Wikipedia																				
Go to journal databases - library & Web																				
Use Keywords - library databases																				
Use Boolean search methods																				
Use a sentence/phrase search																				
Not encouraged to use websites for uni																				
Relevance = authority																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	HC								
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Always use Google/first																		Rec		
Use keywords - Google																				
Google adv search - Occ																				
Sometimes use Google																				
Sometimes use other search engines				Pre																
Use landmark site, eg. Wikipedia																				
Use keywords - Wikipedia																				
Go to journal databases - library & Web																				
Use Keywords - library databases																				
Use Boolean search methods																				
Use sentence/phrase search																				
Not encouraged to use websites for uni																				
Relevance = authority																				

Figure 6-32: Search method – personal descriptions

These results suggest an emerging culture of technology use amongst these participants. All except one of the female participants (#572, ING: LC/LU) were using simple keyword searching in Google. This participant sometimes used Google, but mentioned that she was not encouraged to use websites for university. Only one female used the advanced search options in Google (#423, ING: Av/LU) occasionally. Four males and one female used other search engines, with two participants saying they had used other search engines in the past. The lowest scoring male was the only participant who said he used other search

engines on a regular basis. Two males (#41, ING: Av/Av, #402, ING: HC/HU) were using Wikipedia as a landmark site, ie. they began their search using Wikipedia. Nine males and four females admitted to using keyword searches in Wikipedia. Half of the males and half of the females also said they used journal databases from the library and on the Web. When asked how they searched using the library databases, 55% (22) of the respondents said they used simple keyword searching. When asked about search methodology, no one in this group understood or used Boolean search methods when looking for information on the Internet or in electronic databases. One male and one female said they sometimes used phrases or sentences when searching.

An interesting finding from the discussion from this interview question was the number of participants (16 or 40%) who used the term ‘relevant’ in conjunction with authority, ie. if the result appears in the search engine results page and is relevant to my search, then it must be authoritative or good information. This result suggests that these young people trust the search engine results will deliver good/authoritative information. One male participant (#402, ING: HC/HU) prefaced the discussion about search engines and information-seeking behaviour by commenting that ‘Google knows everything’ and later added ‘Google is king’. This anthropomorphisation of a search engine is an extreme example of this trust, where the participant appeared to be attributing intelligence to the search engine. Search behaviour using search engines is further explored in the task analysis in Chapter 7.

A deeper examination of what participants do when they use search engines was the focus of the next question. Participants were asked if they ventured further than the first results page when conducting a search. These results are available in Figure 6-33 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
Never																				
Rarely																				
Sometimes																				
Always																				
Audio failed/no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Never																				
Rarely																				
Sometimes																				
Usually/Always																				
Audio failed, no clear answer																				

Figure 6-33: Search method – moving beyond the first results page

Only two of the male participants (#377, ING Av/Av, #922, ING HC/Av) said they always looked beyond the first results page during a search, with another nine saying this was an occasional occurrence. This result supports the notion that these young people are easily satisfied with their search results, which may be related to their tendency to equate relevance with authority (Figure 6-31).

The next question in this series asked participants if they always used the same search method when using the Internet and electronic resources to find information. These results are displayed in Figure 6-34 below

Interview Answers Males	Index Net Gen-ness (ING)																			
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU
Always use same method																				
Works for me - habit																				
Easy - one method																				
Reliable, esp Google																				
Google - simple interface																				
No																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Always use same method																				
Works for me - habit																				
Easy - one method																				
Reliable, esp Google																				
Google - simple interface																				
No																				
Audio failed, no clear answer																				

Figure 6-34: Search method – consistency

These results also suggest there is a culture of technology use amongst the participants which may be related to how they learnt to use the Internet (self-taught). All of the interviewees said they always used the same method/approach when searching for information on the Internet. When asked why they used the same approach, seventeen (85%) of the males and fifteen

(80%) of the females used the phrase ‘it works for me’, indicating there is a strong habit or culture of technology use. Ten of the participants elaborated and mentioned ease of use, especially Google as a major reason for their consistent behaviour; five felt that information retrieved from Google was very reliable and one mentioned the simple interface provided by Google. A number of participants also used the phrase ‘if it ain’t broke, why fix it’ during this discussion.

University students are expected to use authoritative information such as refereed journals and web sites for their research. Therefore, the use of Wikipedia, a publicly compiled encyclopaedia, as an information source has caused some concern amongst educators. This aspect of information-seeking behaviour was explored in the last question in this series. The results are presented in Figure 6-35 below.

Interview Answers	Index Net Gen-ness (ING)																			
	Males																			
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU
Yes																				
Sometimes																				
Don't cite it																				
Starting point/general refe																				
Find and use links to infon																				
Academic use, reliable info																				
Personal use																				
Wikipedia editor																				
No/Not allowed to use for uni																				
Unreliable for uni																				

Interview Answers	Index Net Gen-ness (ING)																			
	Females																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Yes																				
Sometimes																				
Don't cite it																				
Starting point/general ref																				
Find and use links to info																				
Academic use, reliable info																				
Personal use																				
Wikipedia editor																				
No/Not allowed to use for uni																				
Unreliable for uni																				
Audio failed, no clear answer																				

Figure 6-35: Search method – using Wikipedia

All except two of the males were using Wikipedia regularly as an information source for their studies at university. Seven said they used it, but

did not cite Wikipedia as an information source. Sixteen males (one occasionally) said they used Wikipedia as a general reference or starting point, nine used the references in Wikipedia articles to find information, and one thought it was a reliable academic information source. Thirteen males (one occasionally) stated they used it for personal use and one was a Wikipedia editor. Although they used it, four of the males knew they were not supposed to use it for university and six felt Wikipedia was an unreliable information resource. In this group, males were using Wikipedia far more than females. Nine of the females used, or sometimes used, Wikipedia with one citing previous use. Five females used it, but didn't cite Wikipedia as an academic information source; eight used it as a general reference/starting point and four were using article links to find information. None of the females said Wikipedia was a reliable information source. Females appeared to be more aware of university policy on Wikipedia, with five saying they were not allowed to use it and half saying it was an unreliable information source for university. Overall, this group do use Wikipedia, even though they know it is not considered a reliable or quality information source for university studies.

6.1.10. The Internet – social importance

The next interview question and probes explored participants' feelings about the importance of the Internet in their daily lives and examined a number of aspects such as life without the Internet, financial constraints, use and social importance of a range of technologies and the concept of multi-tasking. How participants felt about the Internet as a part of their daily lives is displayed in Figure 6-36 below.

Interview Answers Males	Index Net Gen-ness (ING)																				
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736	
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Major part of my life																					
Major part because I'm at uni																					
Use a lot/important to me																					
Becoming more important																					
Keeps me connected																					
Not as much now																					
No																					

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
Major part of my life																				
Major part because I'm at uni																				
Use a lot/important to me																				
Becoming more important																				
Keeps me connected																				
Not as much now																				
No																				
Audio failed, no clear answer																				

Figure 6-36: Social importance of the Internet

More male participants (14) than female (11) (62.5% overall) said the Internet was a major part of their lives, with three males and six females saying it was a major part only because they were using it extensively at university. One female participant (#443, ING: HC/Av) mentioned that while she used the Internet, she didn't like it. All of the HC/HU females said they used the Internet a lot and it was an important part of their lives. This was not the case with the males. Seven of the males and only two of the females said the Internet was important because it kept them connected. When discussing the importance of the Internet in their daily lives, four of the males said it wasn't important. One of these was the highest ING scoring participant who said that while he used it a lot, he didn't think it rated high in social importance as part of his daily life. Overall, seven participants felt the Internet was not an important part of their daily lives. Results for this question ranged across the ING categories from LC/LU to HC/HU and suggest that while these young people used the Internet extensively, they were discriminating/thinking users. Or these results may indicate that the Internet is such an ingrained part of their lives, that they don't recognise just how much they use it. This notion is further explored in the next question which asked the interviewees if they could live without the Internet. These results are presented in Figure 6-37 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
Yes - could live without it																				
Miss it a lot/part of daily life																				
No																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
Yes - could live without it																				
Miss it a lot/part of daily life																				
No																				
Audio failed, no clear answer																				

Figure 6-37: Living without the Internet

Six males and six females (30%) said they could not live without the Internet, while half of the males and a quarter of the females (37.5% whole group) said they would miss it a lot. These respondents all scored in the Average and above ING categories (except one LC/LU). Eleven of the females and fourteen of the males (62.5% whole group) said they could live without the Internet. The follow-on question asked participants to consider how their lives might be different without access to the Internet. These results and commentary are presented in Figure 6-38 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC
Be more active socially/do other things																				
Uni/study/work much harder																				
Less connected																				
Less time on computer																				
Wait for things																				
Not as convenient																				
Lack of resources/info																				
More relaxed																				
Spend more money going out																				
Can't imagine life without it																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
Be more active socially/do other things																				Pre
Uni/study/work much harder																				
Less connected																				
Less time on computer																				
Wait for things																				
Not as convenient																				
Lack of resources/info																				
More relaxed																				
Spend more money going out																				
Can't imagine life without it																				
Audio failed, no clear answer																				

Figure 6-38: Living without the Internet – how daily life would be different

Half of the participants felt they would be more socially active and participate in other activities such as sport, with the highest scoring male (#736, ING: HC/HU) reporting that this had been the case in the past. More than half also felt that study at university would be much harder, citing time, flexibility and access to online information as major bonuses of having the Internet. Nearly half of this group also felt they would be less connected. Waiting for things, convenience, less access to information, feeling more relaxed and spending more money socialising physically instead of virtually, were other aspects noted by participants. One male and one female couldn't imagine life without the Internet. These participants were both in the ING: Av/HU category and heavy users of the Internet across a range of areas.

The next question explored the issue of financial constraints and how this may affect Internet use. At the time of the data collection, accessing Internet-based technologies and services in Australia had a high cost factor. This question sought to find out if cost was a factor for these participants. Results are displayed in Figure 6-39 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU
None/not really																				
None - paid for by parents																				
Sometimes																				
Yes - paid for by my parents																				
Yes - I pay for myself																				
Yes - no Internet at home																				
Audio failed, no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
None/not really																				
None - paid for by parents																				
Sometimes																				
Yes - paid for by my parents																				
Yes - pay for myself																				
Yes - no Internet at home																				
Audio failed, no clear answer																				

Figure 6-39: Using the Internet – financial constraints

Sixty percent of the group said there were no financial constraints or their parents paid for Internet access. A further thirty percent said they paid for Internet access themselves. The lowest scoring female did not have the Internet

at home. All of the participants had Internet access through their universities. Of course it could be argued that since the participants in this research were studying at university, they would come from higher socioeconomic backgrounds which would probably preclude issues with Internet access. However, the participants were drawn from middle tier universities which have high numbers of international students and students from a wide range of socioeconomic backgrounds. This question was included to see if financial constraints were a factor that affected how students used the Internet in their daily lives. For this group, financial constraints did not affect Internet access.

The next three questions examined participants' use of a range of other technologies, particularly those which rated high use/importance in Phase One of the research. In the Web questionnaire 87.5% (Chapter 4, Figure 4-32) of students rated the mobile phone as essential or very important. In the interviews, participants were asked how they used their mobile phones. These results are displayed in Figure 6-40 below.

Interview Answers	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Males	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Calls and text mainly																				
Camera sometimes																				
Email																				
Organiser/music/podcasts																				

Interview Answers	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Females	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Calls and text mainly																				
Camera sometimes																				
Email																				
Organiser/music/podcasts																				
Audio failed, no clear answer																				

Figure 6-40: Other technologies – mobile phone use

These participants were not using their phones as multi-functional devices. All participants said they used their mobiles for calls and text mainly, with one female noting that her mobile was a recent acquisition. A few of the participants used the camera function (eight males and two females) sometimes and only one male and four females were using their mobiles for email (one female only recently). Three of the males said they were using their mobiles as

organisers or for music. No one was using their mobile for podcasts. It would appear that participants were using their mobile phones in a traditional manner, ie. for phone calls and text. This result may be due to the high cost of mobile phone use in Australia. To see whether participants were using other technologies in a traditional manner, the next question asked about their use of iPods/mp3 players. These results are presented in Figure 6-41 below.

Interview Answers	Index Net Gen-ness (ING)																			
	Males																			
	699 LC LU	688 LC Av	53 Av LU	689 Av LU	817 Av LU	231 Av Av	322 Av Av	41 Av Av	377 Av Av	629 Av Av	753 Av Av	946 Av Av	638 Av HU	519 Av HU	845 HC LU	922 HC Av	92 HC HU	639 HC HU	402 HC HU	736 HC HU
Music																				
Data storage											Pre									
Podcasts/would use																				
Do not own																				

Interview Answers	Index Net Gen-ness (ING)																			
	Females																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Music																				
Data storage																				
Podcasts/would use																				
Audio failed, no clear answer																				
Do not own																				

Figure 6-41: Other technologies – iPod/mp3 use

Nearly half of this group (17) did not own an iPod or mp3 player. Nine males and eleven females used these devices for music mainly, with two females saying they no longer used them. Four females and three males (one previous use) reported they used these devices for data storage. No one was using their iPod for podcasts, even though both universities had initiated programs to make course materials available in this format. Only three males and one female indicated they would consider using their iPods for podcasts. The overwhelming response from participants when questioned about their use of these devices pointed to traditional use, ie. these devices are for my music. Participants associated these technologies with recreational activities and appeared to prefer to keep them separate from their university studies. Following on from this question, participants were then asked about their use of a range of other technologies. These results are available on Figure 6-42 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Laptop																				
Computer - desktop																				
Digital camera																				
Digital camera - sometimes																				
Camera																				
TV/VCR/DVD																				
Radio																				
PDA																				
CD player																				
GameBoy/playstation																				
USB																				
Scanner																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Laptop																				
Computer - desktop																				
Digital camera																				
Digital camera - sometimes																				
Camera																				
TV/VCR/DVD																				
Radio																				
PDA																				
CD player																				
GameBoy																				
USB																				
Scanner																				
Audio failed, no clear answer																				

Figure 6-42: Other technologies – mobile phone use

As reported in Phase One of the research, a high proportion of this group (82.5%) owned either a laptop or desktop computer, with 35% (14) owning both. Overall, 57.5% of the follow-up group owned a laptop computer, 30% (12) owned a digital camera and a further twelve participants reported they used these sometimes (one previously). One student (#141, ING: HC/HU), studying Fine Arts/Education owned two digital cameras and was a photography enthusiast. Only three students owned a traditional camera, including the enthusiast who felt that some photography was still better suited to a traditional camera. She also switched lenses between her cameras. When examined alongside the pattern graph for mobile phone and iPod/mp3 use (Figures 6-39 and 6-40 respectively), these results suggest that these participants use particular technologies for specific purposes.

Other results support the Phase One findings, including the limited use of PDAs, scanners and CD players. A surprisingly low number of participants were using USB devices (3 males and four females). This result does not support Phase One findings where 72% of the whole survey group said USB devices were either essential or important (Chapter 4, Figure 4-31). The interview question asked participants to list other technologies that were important in their daily lives, rather than giving them a list of a range of technologies. If participants considered a USB stick to be a storage device, rather than associating it with a technology that produces something, then such a perception of technology may explain this anomaly. Participants were also asked about the importance of technology, particularly mobile phones, in their daily lives. These results are presented in Figure 6-43 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
Important	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Mobile ph, being connected																				
Mobile ph, safety																				
Not important																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
Important	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Mobile ph, being connected																				
Mobile ph, safety																				
Not important																				
Audio failed, no clear answer																				

Figure 6-43: Mobile phones – importance in daily life

Seventeen of the males and seven of the females (60% overall) indicated their mobile phones were important in their daily lives, with four males and eleven females stressing they needed their mobile phones to keep connected. One female also cited safety and her mobile as important. Overall seven participants felt that mobile phones were not important (17.5%). Commentary for this question was spread across the ING categories, with low use females predominant. To explore this theme further, participants were asked if they could live without technology. These results are presented in Figure 6-44 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Yes/maybe live without them																				
Not the mobile ph																				
Cannot live without them																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Yes/maybe live without them																				
Not the mobile ph																				
Cannot live without them																				
Audio failed, no clear answer																				

Figure 6-44: Living without other technologies

While eight males and two females said they could not live without technology, nine males and thirteen females (55% overall) said they could live without technology, but not the mobile phone. These results support Phase One findings and indicate the importance young people place on their mobile phones and being ‘connected’. Participants were also asked how life would be different without technology. These results are displayed in Figure 6-45 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	LU	Av	HU	HU	HU	HU
Can't imagine life without a mobile ph																				
Less safe																				
Less connected																				
Like it used to be																				
Not much different																				
Less organised																				
Couldn't do uni																				
Spend more money/time doing other things																				
More relaxed																				
Another profession																				
Audio failed, no clear answer																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Can't imagine life without a mobile ph																				
Less safe																				
Less connected																				
Like it used to be																				
Not much different																				
Less organised																				
Couldn't do uni																				
Spend more money/time doing other things																				
More relaxed																				
Another profession																				
Audio failed, no clear answer																				

Figure 6-45: Living without other technologies

Five of the male participants and eight of the females couldn't imagine life without their mobile phones and three females said they would feel less safe. Overall, 65% of this group said they would be less connected without access to technology, seven participants felt they would be less organised and two said they wouldn't be able to study at university. However, seven of the participants felt that life wouldn't be that much different. As with results in the previous questions in this series, responses were across the ING categories and gender.

The last question in the interview asked participants if they considered themselves to be multi-taskers. They were then asked to clarify their understanding of this term. Multi-tasking is one of the Net Generation attributes (Chapter 2, Section 2.3.2) and is further explored in Chapter 7 of this thesis. The results for this question are presented in Figure 6-46 below.

Interview Answers Males	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	HC	HC	HC	HC	HC
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU	HU
Yes - I multi-task																				
Practise task switching																				
Do several related tasks at once																				
Several technologies operating at once																				
Several programs, windows open at once																				
Do different tasks at once																				

Interview Answers Females	Index Net Gen-ness (ING)																			
	572 LC LU	87 LC LU	32 LC LU	615 LC HU	336 Av LU	423 Av LU	99 Av LU	200 Av Av	142 Av HU	17 Av HU	861 HC LU	687 HC LU	319 HC Av	443 HC Av	312 HC Av	599 HC Av	313 HC HU	872 HC HU	141 HC HU	698 HC HU
Yes - I multi-task																				
Practise task switching																				
Do several related tasks at once																				
Several technologies operating at once																				
Several programs, windows open at once																				
Do different tasks at once																				
Audio failed, no clear answer																				

Figure 6-46: Multi-tasking – understandings

Only four male and three female participants (17.5% overall) across the ING categories said they were multi-taskers. A range of activities were mentioned when participants were asked to explain their understanding of the term multi-tasking. Eleven males and six females (42.5% overall) said they were task switching rather than multi-tasking; four males and six females (25%) said they do several related tasks at one time and four males and six females (25%) said they engage in different tasks at the same time. Six males and two females associated having a number of technologies operating at the same time as multi-tasking, and nearly half of the whole group felt that having several programs open at once meant they were multi-tasking. However, when asked to provide an example of multi-tasking, only one of the female participants provided a definitive answer.

Multi-tasking is when I'm breastfeeding the baby, answering a phone call and writing an email, all at the same time (Participant #861, ING: HC/LU).

These results indicate that most of the participants associate the operation of a number of technologies or programs and switching between these as multi-tasking rather than task switching. An examination of this behaviour is explored in the task analysis in Chapter 7 of this thesis.

6.2. Findings and Discussion - Interviews

The interviews further confirmed Phase One findings which indicated this group of young people had high levels of confidence when using the Internet for both recreational and educational information-seeking purposes. While females tended to be more reticent about their abilities than males, they were still very confident. Using the ING metric, only the two lowest scoring females

actually fell well below the mean for the Affective Domain (30.5). The ING confidence descriptors for individual participants were calculated according to the mean results for this follow-up group: 43.8 for the males and 39.5 for the females. While the males in both the survey group and the follow-up group were more confident overall, this level of confidence was not statistically significant as reported in the correlation analysis in Chapter 5 (Section 5.2.2).

Confidence was also unrelated to length of time using the Internet, as reported in the Phase One findings (Chapter 5, Section 5.2.3). While a range of follow-up participants across the ING categories (Chapter 3, Table 3-8) participated in this study, there were no patterns emerging that suggested confidence was related to the length of time participants had been using the Internet even though there was evidence that some of the interviewees believe this is the case. While participants were generally very confident about their information-seeking skills, over a third still felt their skills were less compared to others of the Net Generation, with a small number believing that younger members were even more skilled because they had been exposed to technology longer. A major inference of the Net Generation theory, that the length of exposure to technology equates with greater skill levels (tech-savvy), has not been supported by the findings of either phase of this research.

When asked to rate their skill levels, this group were more confident about their information-seeking skills than their ability to use the Internet. These results are also supported by Phase One of the research where participants rated their information-seeking skills higher (Chapter 4, Figure 4-53) than their personal rating for using the Internet (Chapter 4, Figure 4-5). Similar to Phase One findings, data from the interviews also suggests that participants perceive information-seeking skills differently to 'surfing' the Internet. These participants were confident in their ability to find information using the Internet and electronic resources, even though the majority were not using the university library or electronic resources on a regular basis. A lack of engagement with electronic resources by both students and their lecturers at university has also been reported in the literature (Banwell, & Gannon-Leary, 2000; Armstrong, Fenton, Lonsdale, Stoker, Thomas & and Urquhart, 2001; Griffiths & Brophy,

2002; Coulson, Ray & Banwell, 2003; Griffiths, 2003; Margaryan, Littlejohn & Vojt, 2011; Dawson, 2012). Two participants said they were not encouraged to use websites at university and 20% distrusted e-journals and information delivered electronically. These findings support earlier research and suggest that many lecturers/teachers and young people do not understand the nature of electronic resources and have not fully engaged with electronic delivery modes (ETS, 2006; Jones & Cross, 2009; Hargittai, 2010; Corrin, Bennett and Lockyer, 2010; Margaryan, Littlejohn & Vojt, 2011; Dawson 2012). This finding is further supported by feedback from a number of participants who reported limited or no engagement with electronic course delivery and a number who did not realise the LMS was in fact delivered via the Web. Although these young people appear to be tech-savvy, they lack fundamental understandings of how the technology works. These poor understandings and how they may affect information-seeking when using the Internet are examined further in the tasks in Chapter 7 of this thesis.

An interesting finding from Phase One of the research was the low number of participants using social networking sites (25%). Although this result has been reiterated in other research (Kennedy, 2007; Roberts, 2010), it may also be due to the changing lifestyles of this age group (upper end of the Net Generation). Feedback from participants during the interviews certainly suggests this is the case. While a higher number of the follow-up participants reported using social networking sites than the whole survey group, most indicated they were not using them for diaries or self-publishing purposes. Follow-up participants who were social network users belonged to two groups; those who used the sites as an alternative to email which they felt required an immediate response, and those who used the sites for very specific activities such as keeping in touch with particular groups of people. This feedback from the interviewees supports Phase One findings and other research studies which suggest that these young people use technology based on context and perceived need (Corrin, Bennett and Lockyer, 2010; Roberts, 2010; Bullen, Mayan and Qayyum, 2011; Margaryan, Littlejohn & Vojt, 2011), rather than the ubiquitous use attributed by proponents of the Net Generation idea. The fact these participants had adapted social networking sites to suit their needs, is an

indication that this group are tech-savvy, if this term is interpreted to mean being able or willing to adapt technology.

While this group of young people were adapting how they used social networking sites (free Web based utilities), findings from the interviews suggest they were using a range of technologies (personal hardware) such as their mobile phones, iPods and digital cameras in a very conservative manner. They were not using their mobile phones or iPods as multi-functional devices. While this may be due to the prohibitive cost of Internet and mobile phone services in Australia, the traditional use of their iPods and digital cameras suggests that this behaviour may be the result of other influences. This conservative attitude is a feature of how these young people use certain types of technology and may again point to a culture of technology use based on the fact that they appear to be teaching themselves how to use these technologies, often by trial and error. These results may also indicate an attempt by this group of young people to compartmentalise their lives. This idea is particularly relevant when social networking and the use of connective devices introduces a time factor that busy students can ill afford. Reports in the media suggest that social networking burnout is now becoming more common, with more young people opting to turn off and tune out (Lee, 2006; Laidlaw, 2010; Damle, 2012; Tugend, 2012). These results have also been reported in other studies which indicate that young people are not exclusive users, but tend to remain within their immediate social networks (Lenhart, Madden, & Hitlin, 2005; Livingstone, 2006).

Almost all of the participants in this group said they taught themselves how to use the Internet. Results from the interviews indicated they were all using the same search method when information-seeking on the Internet: Google plus simple keywords. A number were also using Wikipedia or links to information found in Wikipedia. Since they knew Wikipedia was not recognised as an academic resource, most of these users were not citing it as a reference. When asked to explain why they always used the same method, the homogeneity of the responses was overwhelming with many participants using the phrases: *'it works for me'* and *'if it ain't broke why fix it'*. This result also points to an entrenched culture of technology use, predicated to some extent on the

technology and Google search engine technology in particular. Everyone was using Google, indicating the popularity of this search engine, because as some participants pointed out, '*you always get some information*'. Ease of use was also a common response which may explain why Goggle is so popular. Participants also indicated they transferred this simple search method when using electronic resources. The transfer of this simple search method suggests they did not realise that the skills required to search a database are often specific to particular databases, and different to conducting a search using Google. The lack of sophistication in search methodology evidenced by this group also supports the notion of a culture of technology use and has been reported in other research studies (Everhart, & Valenza, 2004; Fallows, 2005; Livingstone, 2006; Shenton, 2007; Nicholas, Rowlands & Huntington, 2008; Kolikant, 2010). Feedback from these participants suggests they did not plan, appear to be using a 'thinking process' or line of inquiry when conducting their searches for information on The Internet. This lack of sophistication extended to their use of browser tools, which by their own admission was very limited. The use of search engines and information-seeking behaviour is further examined in the task analysis in Chapter 6 of this thesis.

Data from the interviews also indicated that young people trust search engine results, with a number of participants equating relevance with authority, ie if the result appears to be relevant to my search then it must be authoritative or good information. One participant attributed intelligence to the search engine Google, an example of a high degree of trust. Trust in search engine results and the high levels of confidence reported by the whole group in the Web survey may explain why participants felt they had such high skill levels when seeking information on the Internet. Implicit trust in search engines has also been reported extensively in the academic research literature (Nicholas, Dobrowolski, Russell & Whitney, 2003; Fallows, 2005; Lenhart, Madden, & Hitlin, 2005; Livingstone, Bober & Helsper, 2005; Pan et al., 2007; Nicholas, Rowlands & Huntington, 2008; Head & Eisenberg, 2010). In the interviews, participants were less confident and indicated that they could not always find or re-find information using the Internet. The difference in these results from the Web survey, may reflect a more honest assessment of their skills, since the interview

was a reflective exercise and followed the tasks (in all but four interviews). Even though interviewees said that using incorrect keywords and finding very specific information for university was an issue, they still had very high levels of confidence.

The interviewees gave mixed responses when asked about the importance of the Internet and a range of technologies in their daily lives. While some said they couldn't imagine life without the Internet, more than half of the group said they could live without it. They also recognised that life would be different, university would be harder and they would be less connected. The issue of being less connected was a major one for this group, with more than half of the participants saying they could not live without their mobile phone. The importance of being connected and mobile phones was also evident in Phase One of the research (Chapter 4, Figure 4-12). These young people are indeed the '*connected generation*' and place great importance on certain communication technologies such as mobile phones.

Reports about the Net Generation in the literature and general media often mention the ability of young people to multi-task when using technology. Multi-tasking is presented as a major attribute of this generation in the Net Generation literature (Chapter 2, Section 2.2.2) even though other research studies indicate that multi-tasking is a complex activity and the more you multi-task the less effective the final product (Dzubak, 2008; Ellis, Daniels & Jauregui, 2010; Kraushaar & Novak, 2010; Barak, 2012; Junco, 2012). Only a few of the participants felt they were true multi-taskers. During the discussion, the majority of the interviewees recognised that they were task switching and equated the term multi-tasking with the operation of several technologies and/or programs running at any one time, eg. listening to music, whilst switching between email, chat, multiple pages on the Web and a word processing program. Task switching is further explored in the final phase of the research.

Interviews with the follow-up participants also supported findings from Phase One of the research which indicated that approximately one fifth of these young people do not like using technology. While they all use it, they don't necessarily enjoy using it. The low participation in online retail and limited use

of online financial services may indicate that when choice is available, approximately 20% of young people will not choose the technological option. This finding across both phases of the research is supported by other studies (Aldridge et al, 2002; Dutton & Helsper, 2007; Dutton, Helsper & Gerber, 2009; Nicholas, Rowlands & Huntington, 2008) with the 20% figure representing a consistent finding. If this is true, then government, education and business initiatives to place all information and service provision online may not only affect those in the community who do not have access to technology which includes physical and cognitive ability, but also those who choose not to use it. One way of preparing the community for online service provision is via education programs. However, evidence from both phases of this research strongly indicates that young people are teaching themselves how to use technology with little input from schools and formal educational settings.

Another result from the interviews pertained to participants' use of printers and being able to make meaning from text on the screen. A surprise finding from the Web survey indicated that printers were very important to the majority of participants. Interviewees indicated that issues with reading and understanding text directly from the screen were the main reasons to explain why they printed almost everything. Current research indicates that reading and making meaning from text on the screen requires a different set of literacy skills as well as very good traditional literacy skills (Coiro, Dobler & Dobler, 2007; Aamodt, 2009; Bauerlein, 2009; Castek, Zawilinski, McVerry, O'Byrne, & Leu, 2011; Hanho, 2012). How participants were interacting with information presented on the screen is also explored in Chapter 7.

Findings from the interviews, which form one part of the second phase of the research, were designed to obtain a clearer or more honest picture of how young people perceive their information-seeking skills and use of the Internet and electronic resources. These findings further support Phase One findings and suggest that this age group are indeed tech-savvy users if the term tech-savvy is interpreted as the confidence to use technology. Participants in this research study were very confident, not afraid to use and adapt Web based utilities to meet their needs and appeared to move on to new technologies as their lifestyles

changed. Conversely, technology they owned appeared to be used very conservatively and for specific purposes. Being connected was extremely important to these young people and they had a very strong self-belief in their ability to use the technology and information effectively. However, they did not appear to use planning/thinking strategies when searching for information, nor did they use sophisticated search methods. The notion that young people from the Net Generation may have a culture of technology use when using the Internet to find information, was strongly supported by the homogeneity exhibited by the follow-up group. This culture of technology use also appears to be based on simple or 'superficial' use. The last phase of the research (Chapter 7) was designed to find out exactly what these young people were doing when using the Internet to find information, and to explore how well their actions matched their perceptions as recorded in the interviews (face-to-face) and the Web questionnaire (anonymous).

Chapter 7 - Phase Two Findings, Participant Observation and Tasks

7.0. Introduction

This chapter examines the results of the final part of Phase Two of the research, the participant observation and task analysis. The tasks provided an opportunity to study the actual information-seeking behaviour of members of the Net Generation in situ at a micro level, to ascertain if there were any common behaviours being exhibited by the follow-up participants.

The second part of Phase Two explored several themes that emerged from Phase One (Web survey) and the Phase Two (interviews) segment of the research, and include the following:

- length of exposure and use of the Internet/technology equates with greater skill levels (tech savvy);
- engagement with the Internet and electronic resources at university;
- how fundamental understandings of how technology works may affect information-seeking behaviour;
- search method, task switching/multi-tasking, and information-seeking behaviour;
- participants' emotional responses;
- reading and interaction with information presented on the screen; and
- how participants' perceptions and beliefs match the reality of their information-seeking behaviour.

7.1. Participant observation and Task Analysis

7.1.1. Data collection and presentation

The data collection method employed the usability software *Morae* as described in Chapter 3 (Section 3.3.3) for the participant observation and task analysis. Using technology for participant observation lessened the amount of intrusion, provided a tool to track and map information-seeking activity at a

micro level, and the opportunity for the researcher to revisit and review the tasks. The software also allowed for a multi-dimensional recording that included video recording with audio as well as a visual record (screen tracker) of how participants were using the Internet and electronic resources to find specific information. Use of the software program certainly appeared to create a certain *distance* between the researcher, the simulated nature of the task, and the participants. Participants appeared to be very focused and comfortable (male participant #736 waved to the camera on completion of Task Two), with several swearing or cursing when frustrated. To track how participants were feeling and reacting to the environment, a brief questionnaire (ten questions) was included during and after the tasks were completed and were embedded in the Morae software, ie. participants were checked by the software to complete the questionnaire before moving on to the second task and at the end of the second task.

The amount of detailed data collected during this Phase of the research was overwhelming. Detailed notes were transcribed from the Morae recordings and examples are available in Appendix 4. To further distil the data down into a manageable form that could be used to describe emerging patterns of behaviour, pattern graphs similar to those used for the interviews were developed (Chapter 3, Section 3.3.4). The colour coding and order of participants is consistent with the interview pattern graphs. The criteria in the *Evidence of behaviours* column were developed from the tagging markers used in the recordings in *Morae* (Chapter 3, Table 3-7) and emerging themes mentioned in the previous findings chapters of this research.

Figure 7-1 below provides a visual summary of the forty follow-up participants (20 of each gender) who took part in the tasks and interviews. The legends used to describe participants' personal ratings for frequency of use and status/ability levels are those used in the Web questionnaire (Phase One) and the interviews (Phase Two) of the research. These legends are presented in Table 7-1 below. Years of study at university are numbered, with 'G' denoting 'graduated'. The completion of the two tasks is also noted, with *Pt* denoting >80% completion or where participants completed the task to their satisfaction,

even if they misinterpreted the task and found the wrong information or only completed various parts of the task.

Table 7-1: Legends, Task Analysis pattern graphs

Frequency of use (personal rating)	N Never	Occ Occasionally	S Sometimes	O Often	VF Very Frequently	
User Status (personal rating - ability)	NU Non-user	B Beginner	Av Average	G Good	VG Very Good	Ex Expert

Males - Task Analysis	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Completed Task 1		Pt			Pt			Pt				Pt	Pt	Pt			Pt			
Completed Task 2								Pt		Pt	Pt			Pt	Pt					
Frequency of use (personal rating)	VF	O	S	VF	O	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
User status (personal rating - ability)																				
Web Questionnaire	Ex	Av	NU	B	Ex	B	G	G	G	G	B	B	Ex	Ex	G	Av	Ex	G	Ex	B
Interview - using the Internet	VG	Av	G	Av	G	Av	G	G	G	G	G	Av	Av	G	Av	VG	Ex	VG	G	VG
Interview - finding information	VG	Av	G	G	Av	G	G	G	VG	Av	G	Av	Av	VG	Av	VG	VG	Av	G	VG
Length of use (yrs)	>10	7	8	1	9	6	7	7	>10	>10	6	8	7	8	>10	5	7	>10	>10	5
Year of study	1	2	4	1	1	1	3	1	1	1	2	3	1	1	2	3	1	2	1	2

Females - Task Analysis	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	LU	LU	LU	LU	Av	HU	HU	HU	LU	LU	LU	LU	Av	Av	Av	Av	Av
Completed Task 1							Pt		Pt	Pt						Pt			Pt	Pt
Completed Task 2																				
Frequency of use (personal rating)	O	O	O	VF	VF	O	VF	O	O	VF	VF	VF	O	VF	VF	O	VF	VF	O	VF
User status (personal rating - ability)																				
Web Questionnaire	B	B	B	G	B	Av	B	Av	G	B	G	Ex	B	Ex	Av	Av	B	G	Av	Ex
Interview - using the Internet	B	Av	Av	Av	G	Av	Av	Av	B	G	Av	Av	Av	Av	G	G	G	Av	G	G
Interview - finding information	Av	Av	Av	Av	G	G	Av	Av		G	Av	Av	G	Av	VG	G	VG	VG	G	Av
Length of use (yrs)	1	6	4	9	5	7	8	5	8	7	9	9	9	7	9	>10	8	>10	7	8
Year of study	1	1	2	1	3	3	2	2	3	3	2	3	4	1	3	2	4	1	G	3

Figure 7-1: Summary of participants who completed tasks and interviews

The summary information for the follow-up group above confirms the previous findings from Phase One of the research. This group saw themselves as confident and skilled users of the Internet. These results also indicate that responses from young people may vary widely according to how the question about their ability is asked. Overall, participants who rated their Internet use skills highly in the anonymous Web questionnaire (Phase One) rated their skills lower when asked face-to-face in the interviews and vice versa. However, when asked to rate their information seeking skills, participants' answers in the Web survey (anonymous) more closely mirrored their interview rating (same) or were higher (with three exceptions). Participants who rated themselves as experts in

the Web questionnaire lowered their rating when asked in the interviews. None of the participants rated their finding information skills as beginner in the interviews. This observation was the same for both genders. The ING metric used the self-evaluation skill level rating as only one aspect of participants' confidence levels and self-perception. Overall, the whole group, including the follow-up group were very confident users.

This summary also confirms that frequency of use is not an indication of how these young people felt about their skill levels. Of the eight participants who scored HC/HU, one female (Participant #313) said she was a beginner when using the Internet in the Web questionnaire, good in the interview and very good at finding information. Another (Participant #141) said she had average skills in the Web questionnaire, but rated her skill levels in the interview as good. Both had been using the Internet for over seven years. The highest ranking male (Participant #736) had been using the Internet for only five years and rated himself as a beginner in the Web questionnaire, but very good in the interview; while the lowest ranked male (Participant #699) had been using the Internet for more than ten years and rated himself as an expert in the Web questionnaire and very good in the interviews. There do not appear to be any patterns emerging in this dataset, with seventeen of the males and eleven of the females (67.5% overall) reporting very frequent use of the Internet. In the Web questionnaire in Phase One of the research, no one across the whole survey group reported no Internet use in the previous three months (Chapter 4, Section 4.1.2). The length of time studying is also not a significant factor in how these participants viewed their Internet skill levels, even though many of the participants in the follow-up group felt that studying at university had improved their information-seeking skills (Chapter 6, Section 6.1.5) in the interviews.

7.1.2. Engagement with the Internet and electronic resources

A major issue reported in the research literature and evident in the findings from both phases of this research is the lack of engagement with electronic resources at university by students. Several participants reported in the interviews that they had few course materials online, and a number of their lecturers insisted that students use only print books and journal articles as

references, with some lecturers providing prescribed reading lists (Chapter 6, section 6.1.2). The second task required participants to complete a search for specific, quality academic resources including a journal article, a book and a website. The task was interpretive and designed to observe how participants might plan their search strategies and their use of the electronic databases provided by their university libraries. The graph indicating engagement with the universities' electronic resources is presented in Figure 7-2 below.

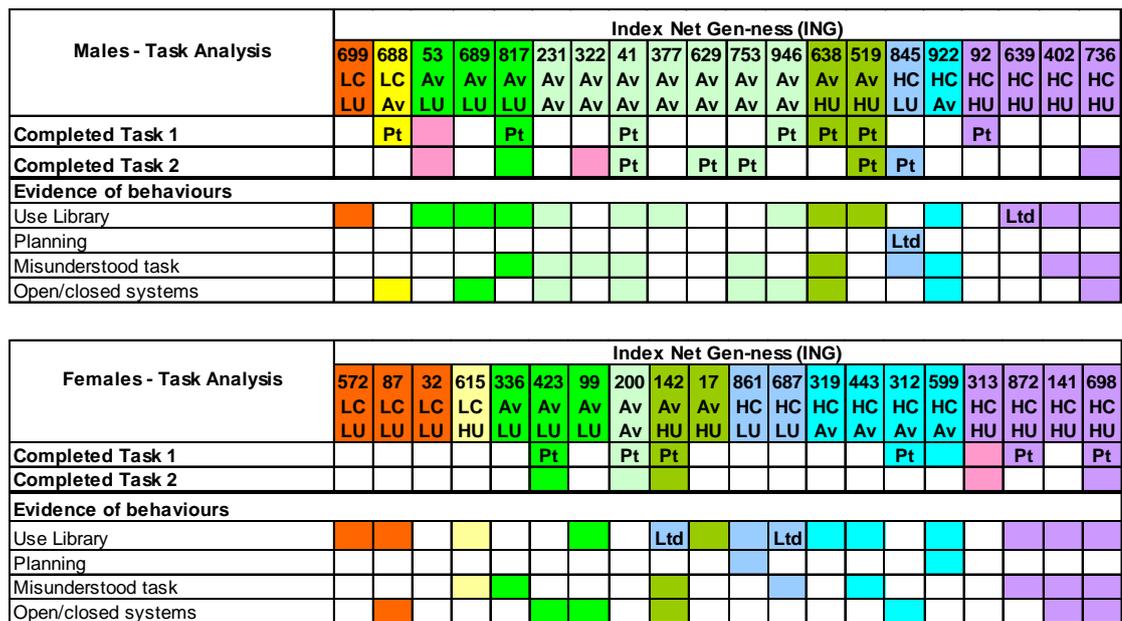


Figure 7-2: Use of the library and electronic resources

Six males and six females (30%) did not use the university library at all during their search for a journal article. In several cases the length of time searching in the library was very brief (less than three minutes). Overall, this accounted for 37.5% of the participants. Some participants typed in the library URL indicating the site was well known, with one student mentioning the name of a particular search service.

Others had some difficulty finding the link to the library and took a variety of routes to get there, even though there was a link to the library on the homepages of both universities and the school homepage (default for the laptop used in the tasks) for one university. The difficulties experienced by these participants may be due to the fact that using the library is an infrequent activity. In the interviews, 45% of the participants reported no or limited library use (Chapter 6, Section 6.1.4) and 38% of the whole survey group said that the

library was of minor importance or not important (Chapter 4, Section 4.1.4). Obvious page links to the library were ignored, indicating that participants just didn't see the links or failed to associate them with access to the library, perhaps because this was not an activity they do frequently. Habitual library use may be even less than evidenced in this part of the research, since the participants may have felt participation in the research required them to at least try to search the databases provided by the library. One female student who spent some time trying to search the library databases verbalised:

You can tell I've never done a library. (Female participant #87, ING: LC/LU)

This particular student was accessing a subject specific (nursing) library database via her school web page, but did not associate the database as a resource provided by the library.

To access the library, participants often went to the university homepage, then to *Current Students*, followed by *Quicklinks* and finally the library homepage. Since their method appeared to be habitual, it is likely that this is how they were first taught to access the library or discovered it for themselves. Such habitual behaviour also indicates a culture of technology use based on previous success. Three (#687, ING: HC/LU; #99, ING: Av/LU; #231, ING: Av/Av) of the four participants studying at the rural campus moved out of the main university homepage and went to their campus homepage to find the library link, not realising that the library was common for all four campuses and available on the main university homepage. The failure to recognise both obvious and hidden links on the screen is discussed later in this chapter.

Two female (#861, ING: HC/LU; #599, ING: HC/Av) and one male (#845, ING: HC/LU) participant demonstrated some planning during their initial reading of the first task, but only the females spent some time working out their keywords. No one demonstrated any planning when searching for the second task, even though this task required more interpretation and involved finding information about a concept (lifelong learning) as opposed to a specific subject (university assignment writing). Success was heavily dependent on using the right terminology during the search and the realisation that the term (lifelong learning) required some definition first. Participants who used Wikipedia to gather

information about lifelong learning searched for information about adult learning, since this was the definition in Wikipedia and on an Australian Government web site that appeared high on the Google results list (within the first 3 results). Three females (#336, ING: Av/LU; #142, ING: Av/HU; #687, ING: HC/LU) and four males (#231, ING: Av/Av; #41, ING: Av/AV; #922, ING: HC/Av; #402, ING: HC/HU) demonstrated a poor interpretation of the term lifelong learning. One female (#872, ING: HC/HU) and four males (#817, ING: Av/LU; #753, ING: Av/Av; #638, ING: Av/HU; #763, ING: HC/HU) used databases that were familiar rather than those which were appropriate to the search. In a conversation recorded as anecdotal notes after the interview, one male participant (#638, ING: Av/HU) explained that he used only the Scirus database (Elsevier, 2012) as this had been recommended by a friend of the family and mentor who was a university lecturer in Tasmania. This database did not provide the information required for the task, and the way he used it indicated both habitual behaviour and use as a landmark site. He also accessed the database via the Public Domain Web, which does not provide full text articles. He was very surprised to learn that his university library subscribed to the database and that accessing it via the library would provide full text.

Another group of four female participants (#615, ING: LC/LU; #443, ING: HC/AV; #141, ING: HC/HU; #698, ING: HC/HU) including the top two ranked females, did not read the task carefully and searched for articles and information about writing good university assignments. One of these participants had almost reached the end of the task when she read the task sheet in depth for the first time and verbalised:

Oh ... I realise I've researched the wrong thing (Female participant #443, ING: HC/Av)

Misunderstandings in the first task were of a different nature and occurred when the participants were relying on prior knowledge or used inappropriate keywords. The female participant who had just returned from Europe (#142, ING: Av/HU) where she had spent some time using rail transport, searched the Eurail site for train journeys recently travelled instead of looking for famous or classic train journeys. A male participant (#817, ING: Av/LU) decided that the word famous would not '*cut it as a keyword*' and searched the

Rail Europe site. As a consequence, both failed to find the information required to complete the task.

Nine of the male and seven of the female participants (40%) did not appear to understand the difference between the Public Domain Web that is accessible by search engines (open system) and the library, which is located in the Deep or Hidden Web and requires authentication to access information (closed system). A number of participants who were using enotes to record their findings copied search URLs when working in the databases instead of the bibliographic details for a resource. They obviously did not understand that a search URL in a database is, in many cases, 'ephemeral' and will change when the database is updated. This behaviour may be due to a general lack of understanding of how databases work or the fact that participants expect the information stored in a database to remain unchanged. It may even indicate that participants don't realise they are on the Web when searching the databases. There appeared to be an overall misunderstanding by participants of where they were in virtual space (network/Internet literacy) and the assumption that a database is in fact a static entity held by the library (similar to a book) instead of an interactive service available via the Web. The observed behaviours indicate that participants demonstrated a poor understanding of the differences between search engines like Google and search facilities in databases, and open and closed systems.

Participants moved in and out of the library databases, sometimes launching repeatedly new searches to access both the library homepage and Google. Others thought they were searching a fulltext database because they were using Google Scholar, when in fact they were still working in the Public Domain Web. In conversations following the Interviews, more than a third of the participants did not realise that the library offered access to full text articles via the databases. One female participant (#493, ING: LC/LU) studying Medical Science was very frustrated during the tasks. She was astounded to learn after the interview that the library at her university offered face-to-face sessions and online tutorials on how to search the full-text medical databases provided by her university, and how to use citation software such as Endnote (an explanation of

the term citation software was supplied by the researcher). She was at the end of her second year of study and had been using only the Public Domain Web to find information.

Participants did not appear to know where they were in virtual space when searching the Internet and when looking for journal articles in the library. A number of participants searched the journal titles database using keywords instead of searching for journal articles in specific databases. As a consequence, they were very unsuccessful since there are very few journals that contained the most common keywords used for the second task – lifelong learning and good university assignments. Almost all participants returned to Google or the library homepage when they became ‘lost’, using these as landmark sites to re-orientate themselves in virtual space. Very few of the participants used the drop-down boxes in the browser to get back to the library or Google. Instead they typed in the full URL for Google and the university homepage or used the back button repeatedly.

7.1.3. Search strategies and information-seeking

Participants used a variety of methods to access information during the second task; however, everyone used the Google search engine for the first task. Only three female (#32, INGLC/LU; #687, ING: HC/LU; #313, ING: HC/HU) and two male participants (#53, ING: Av/LU; #92, ING: HC/HU) also tried another search engine, usually Yahoo and searches were very brief. Participant #53 tried Yahoo when the Internet connection became very slow. One male (#736, ING: HC/HU) indicated he had used only Google during the previous twelve months after coming to Australia to study, as it was not popular in his home country (Russia). However, he now used only Google. The results for this dataset are presented in Figure 7-3 below.

Males - Task Analysis	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Completed Task 1		Pt			Pt			Pt					Pt	Pt	Pt		Pt			
Completed Task 2								Pt		Pt	Pt			Pt	Pt					
Evidence of behaviours																				
Use Google																				
Use other Search engine																				
Wikipedia																				
Landmark																				
Intelligence																				

Females - Task Analysis	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Completed Task 1							Pt		Pt	Pt						Pt		Pt		Pt
Completed Task 2																				
Evidence of behaviours																				
Use Google																				
Use other Search engine																				
Wikipedia																				
Landmark																				
Intelligence																				

Figure 7-3: Information-seeking – search engines, Wikipedia and landmarks

Ten male and five female participants (37.5%) used Wikipedia to research the second task. However, Wikipedia was not used as much during the first task. When Wikipedia was used in the first task, participants scanned the information presented to find the names of famous train journeys and then used Google to search for specific titles. In the second task, participants used the information in Wikipedia as a specific source (website) or to define the term lifelong learning or both. Verbalisations during the task indicate that participants were well aware that Wikipedia is not regarded as an authoritative resource by the universities. Participants' commentary below suggests that university students use Wikipedia for direct referencing, to help them understand terminology, and as a finding aid to other online references. They do not appear to read the articles in depth, a behaviour that is examined later in this chapter.

Wikipedia references are good sources of information ... uni says we can't reference it as a source ... but I can use the references at the bottom so long as they are valid (Male participant #92, ING: HC/HU).

I'll have Wikipedia <Reads task in depth while page loading>
ah but Wikipedia is not, as many lecturers have ... a very good academic resource <laughs as she verbalises> (Female participant #32, ING: LC/LU).

Wikipedia is always quick, not a valid resource but it's informative ... I'm presuming it means keep learning throughout lifetime (Female participant #423, ING: Av/LU).

For the website I'm picking the website under Wikipedia, because it also incorporates references in it ... references from books and it suggests further readings from this topic and also gives extra links so I can research the topic a bit more as well (Female participant #17, ING: Av/HU).

I don't really like using websites as resources, but we'll use the Wikipedia one cos that seems quite all right. ... Wikipedia is good to use because it is long enough and has several references and resources at the end (Female participant #319, ING: HC/Av).

I'll use Wikipedia, it may reference something that's useful, I don't know about the particular Wikipedia article itself (Male participant #699, ING: LC/LU).

I use Wikipedia a lot because you can get relatively accurate and reliable information (Male participant #402, ING: HC/HU).

Such commentary was also spread across the participant ING categories and included both males and females. The percentage of university students who use Wikipedia as a valid or directional source for information may be even higher than observed in the participants in this group, due to the awareness factor and because they were conducting the task activity while at university. Their behaviour may be different when working by themselves at home.

Seven of the participants used Wikipedia as a landmark site, ie. they went back repeatedly to the Wikipedia homepage before moving out for further exploration on the Internet. Two participants, one male (#638, ING: Av/HU) and one female (#87, ING: LC/LU) used specific databases that were familiar, as landmarks in the second task. All students tended to use the Google search engine homepage as a landmark site, either revisiting it regularly during their searches or relaunching the homepage in a new window. This behaviour was consistent across the participant ING categories.

Two male and four female participants attributed intelligence to either the search engine or the computer and verbally confirmed this by talking directly to the screen.

Google knows everything (Male participant #845, ING:HC/LU).

I don't know if they will let you in. they're accredited.

The Google site didn't take me straight to it when that's what I clicked – I find that really annoying.

OK, we don't like these people we're gonna ditch them and go back to Google, clicking back a million times (Female participant #845, ING:HC/LU).

No, I never want to install anything that's very iffy. <Software installation popup> click don't send cos I always click don't send, however it hasn't actually closed my thing. Very useful Google – it knows when I get it wrong. (Female participant #336, ING: Av/LU).

ahh the Ghan, that was also in Google, so that looks like a well known one in Australia. It was back here (Female participant #99, ING: Av/LU).

OK it doesn't want me to use this website ... back to Google I go.

I think the Internet has just died and I've broken the Internet again (Female participant #319, ING: HC/Av).

Common behaviours demonstrated while students were information-seeking using a search engine were also observed. These results are presented in Figure 7-4 below.

Males - Task Analysis	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av													
Completed Task 1		Pt			Pt			Pt				Pt	Pt	Pt			Pt			
Completed Task 2							Pt		Pt	Pt				Pt	Pt					
Evidence of behaviours																				
Advanced search			Ltd					Ltd	Ltd		Ltd				Ltd	Ltd		Ltd		Ltd
Basic search																				
Satisficing																				
Snatching																				
Habitual behaviour - prior learning																				
Authority established								Ltd						Ltd	Ltd					
Relevance = authority																				
Information on single website																				

Females - Task Analysis	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Completed Task 1							Pt	Pt	Pt							Pt			Pt	Pt
Completed Task 2																				
Evidence of behaviours																				
Advanced search	Ltd			Ltd	Ltd						Ltd	Ltd								Ltd
Basic search																				
Satisficing																				
Snatching																				
Habitual behaviour - prior learning																				
Authority established																				
Relevance = authority																				
Information on single website																				

Figure 7-4: Information-seeking behaviours – search engines

Nine males and eight females (42.5%) attempted to use the advanced search in Google or the databases. All of the males except one (a Library and Information Science student) and six of the females exhibited a very limited understanding of how to use the advanced search features. In Google participants used italics only as an advanced search strategy, sometimes at the beginning of the keywords, but usually at the beginning and the end of the

keywords. This appears to be habitual behaviour or something they have learnt. The behaviour was not consistent, with participants using italics once or twice and then omitting to use them. Only one female participant (#698, ING: HC/HU) used the italics to search different keywords together or to separate out keywords which were unrelated. These behaviours indicate that participants using italics did not really understand how to use advanced search features. The behaviours extended over into the database searches, where the only student to conduct an intense Boolean search strategy was a male (#402, ING: HC/HU) who was studying Library and Information Science. This student spent half of the second task using basic search methods (simple keywords) when working in the databases before going to the advanced search screen and verbalising:

Should have done this before but I just forgot ((Male participant #402, ING: HC/HU)

This comment illustrates the power of a culture of use. Although the student was in a course where advanced searching, information management and the use of electronic resources were part of his study regime, he still resorted to the simple keyword search strategies that represent how he first learnt to use the Internet. All students used simple keywords when trying to find information using both search engines and the databases. They did not appear to understand that the databases use different search algorithms to Google which often produces either the most popular site first or corporate sites which have paid to appear first (Spencer, 2012). Participants' lack of sophisticated search skills meant they experienced high levels of frustration when they couldn't find the information they were looking for, a factor discussed later in this chapter.

Two behaviours emerged during the tasks when participants were selecting links from the search results screen. One behaviour indicated high levels of satisficing (near enough is good enough), where participants did not read or select links beyond what they could see on the screen (approximately one third of what was on the results page). In fact, few of the participants scanned beyond the first four links on any results page. Satisficing behaviour was observed in all of the participants in the follow-up group. Participants would select from the first three or four results. Sometimes they would scroll rapidly down the screen, but always come back to the top and select from the

first four results. They even selected results links which were indented indicating they were links to sub pages within a site they had already visited and discarded. This behaviour indicates that participants presumed Google results are presented in order of relevance, ie. the best or most appropriate site for my query appears first.

Satisficing also occurred when participants could not find information that addressed specific task criteria such as the distance travelled on a particular famous train journey. An extreme example of satisficing behaviour is demonstrated below by a male student who misinterpreted the first task and accessed his information using the public transport website *Rail Europe*.

I am going to go to Google cos that is where I always go ... name of train journey would be Inter Rail <company providing service>. Europe, starting wherever I want, ending wherever I want, distance travelled wherever I go, and I am looking for a continuous month and that's going to be 292 pounds ... I guess that is one famous rail trip (Male participant #817, ING: Av/LU).

The satisficing behaviour observed in the first task was also evident when participants were searching the databases and the library catalogue. They rarely went beyond the first page of results and usually selected from the first four results even when it was obvious from the title that the item or article was inappropriate. Two males, both in the ING HC/HU category (#639, ING: HC/HU; #929, ING: HC/HU) and one female (#687, ING: HC/LU) used Amazon to find a book for the second task, rather than using the library catalogue. Participants #639 and #687 used the library in a limited capacity during the tasks, while #929 did not use it at all.

A second behaviour related to satisficing was also observed during both tasks. This behaviour involved the automatic selection of the first result on the screen, sometimes before the page had completely downloaded. This behaviour was immediate and involved no scrolling down the screen and no evidence of reading either the URL or the abstract on the results screen, since it was too quick. To differentiate this behaviour from the satisficing behaviour described previously, the term *snatching* will be used in this thesis. Snatching appears to be an extreme version of satisficing and exemplifies the implicit trust participants placed in the search results. Overall, ten males and eleven females

(52.5%) across all of the ING categories exhibited snatching behaviour during the tasks. This behaviour appeared to be less prevalent amongst participants from both genders who scored very low ING ratings and may be related to their low levels of confidence. Snatching behaviour was not confined to Google searches. It was also observed when participants were searching the databases and library catalogue for information, indicating that it is a common behaviour. Snatching behaviour led to some interesting sites as evidenced below for the highest ING scoring female participant.

<Clicks on first link even though title indicates it is inappropriate>
What's that? <Bare boobs site loads> (Female participant #698, ING: HC/HU)

Twelve males and eleven females (57.5%) also exhibited habitual behaviour when searching for information. This extended to using only one database because it was familiar or always using Google because it worked, to taking a circuitous route to the library homepage. Few students used the facilities of the browser, preferring to type in complete URLs for Google, the library, the currency converter or landmark sites, indicating they may be quite conservative in their explorations on the Web, and prefer to use sites that are familiar rather than exploring the unknown. Conservative information-seeking behaviours may also be a result of how these participants first learnt to use the Internet and indicates a strong culture of technology use, ie. I will stick with what I know and what has been successful in the past.

Three males made limited attempts to establish the authority of the information they had found. However, four of the females made concerted efforts to establish authority.

<Click on full view of catalogue record> Would usually look at it to see if it is any good, will write down for now.
Not written for universities specifically ... for this type of thing it doesn't have to be verified. If I was researching an assignment I wouldn't get information like this, writing about it is not so much of a problem (Male participant, #41, ING: Av/Av).

Visiting one of the organisation pages cos it has less biased information.
Using a government page on lifelong learning, cos it'd have a lot of important information (Male participant, #519, ING: Av/HU)

Think it would help if they were quite recent.
I do tend more towards books because I feel if they are published seems like a more reliable resource so I'll tend to put down that one.

Third edition of that one so it is obviously constantly being revised (Female participant, #141, ING: HC/HU).

<looking for database by subject> Is that the one I like?

References, let's see what references they've used. Lots of references.

So that's a link to a report. So is that a webpage? ... What do you people do? Do you have qualifications? Don't know, let's have a look.

Well the first journal article, well that's good cos it's peer reviewed, and that web page I would use because it's a government webpage (Female participant, #599, ING: HC/Av).

They've got a vision and a mission which is always important ... nothing said about endorsement through another company. Ahh they are based in WA, OK seem to be quite professional, have their own office etc so it's not just a website someone's set up on their own (Male participant #699, ING: LC/HU).

Normally books wouldn't get published unless they were a good source, reading through it <brief abstract> I'd notice if it was a bad source (Female participant #423, ING: Av/LU).

Most participants (72.5%) exhibited behaviour indicating they equated relevance with authority, ie. it is the first result and it appears to be relevant to my query so it must be good information. If the results link, title of a website, article or book contained their keywords, then it was perceived as authoritative. Since only a few of the participants demonstrated sophisticated methods for evaluating information they found on the Internet, this behaviour was not surprising. All participants exhibited rapid scanning behaviour and looked for keywords in titles, bolded headings and obvious hyperlinks (underlined).

Wow look at all these lifelong learning websites ... OK this is a lifelong learning web page. <reads dot point links> I'll check out a couple of links and might just put this down as a website (Male participant #699, ING: LC/HU).

No lifelong learning but information literacy skills ... that's not quite it. <Scans looking for keyword lifelong learning and headings> Yeah this looks good cos it has some actual cases, recommendations at the bottom. The problem with Proquest is that it's all specific like they have the electronic thingy on lifelong learning (Male participant #41, ING: Av/Av).

<Scanning title information in Amazon> Found a good book on lifelong learning.

<Journal results screen> Found an article on university study on effects of lifelong learning ... this one seems OK.

OK government site on lifelong learning, exec summary and link to PDF doc (Male participant #639, ING: HC/HU).

I'll just find one that says education ... that'll do, never been in it before. Put in learning and see what happens – this one's no fun.

Department of education so we're happy with that. (Female participant #87, ING: LC/LU).

<Website title: Lifelong learning: concepts and contexts> – Yeah that sounds good.

<New results page> That's one of the ones that was in the last one ... like the look of that one, kids who read succeed (Female participant #861, ING: HC/LU)

I just want a website really and I'm still in Google Scholar ... OK so just the first one that came up looks pretty good (Female participant #312, ING: HC/AV).

<Keywords – assignment writing> That looks good, 2003 ... I think I'll probably use this book, because it's had 4 editions and it's been used for 30 years and its not too long ago. ... 2003 that's pretty good, pretty recent ... I really like this one ... it's a really good guide so I'd use this one and it's a PDF so its easy to use (Female participant #698, ING: HC/HU).

Other participants verbalised a variety of reasons for choosing one resource over another.

It's a review of libraries and lifelong learning (electronic only). I wouldn't trust that one as much as the American Association. Informal World is an online service so I'd still trust it because it would still be peer reviewed but not as much as an Association I don't know why, just my way of thinking (Female participant #319, ING: HC/Av).

<Amazon editorial reviews to check content of title. Looks at citations list.> No reviews, but 96 other books that cite title. Contents pretty broad, give an overview of lifelong learning.

Article is a good one because it gives information about the effects a university education can have on learning throughout your life (Female participant #687, ING: HC/LU).

Quite a useful resource as it looks as if it has been developed to promote learning. ... Has been modified and updated in the past and should be quite relevant. ... OK it's a proper organisation endorsed by EFEIL so it should be quite good (Male participant #688, ING: LC/Av).

Five males and ten females (37.5%) also indicated they expected to find all the information on one website. This was evident in the first task where several websites were discounted because participants couldn't find all the required information on one site. In some cases the information was available on the site, but the participants couldn't find what they were looking for, mainly because they appeared to be scanning headings and obvious hyperlinks and only reading in-depth occasionally.

7.1.4. Reading from the screen

A number of behaviours were observed when participants were reading from the screen. In Phase One a surprise finding of this research was the importance and level of use of printers (Chapter 4, Section 4.1.5). This finding was explored further in the interviews in which participants indicated they had difficulty interpreting and reading text on the screen (Chapter 6, Section 6.1.7) and tended to print information for in-depth reading. Behaviours evident while participants were using the laptop to read and make meaning from information on the screen are presented below in Figure 7-5.

Males - Task Analysis	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Completed Task 1		Pt				Pt			Pt				Pt	Pt				Pt		
Completed Task 2									Pt		Pt	Pt				Pt	Pt			
Evidence of behaviours																				
Reading - peers at screen																				
Reading - cursor line-of-sight guide																				
Reading - scans for headings & links																				
Reading - attempts to read in depth																				Ltd
Reading - hidden/page links ignored																				

Females - Task Analysis	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
Completed Task 1																				
Completed Task 2																				
Evidence of behaviours																				
Reading - peers at screen																				
Reading - cursor line-of-sight guide																				
Reading - scans for headings & links																				
Reading - attempts to read in depth																				
Reading - hidden/page links ignored																				

Figure 7-5: Information-seeking behaviours – reading from the screen

Several behaviours were evident across the ING categories. If a participant read or attempted to read in-depth at any time during the tasks, then this was recorded in the pattern graph. Seven males and eleven females (45%) did not read in-depth at any time during the tasks. Instead they relied on scanning and copying headings, titles, and obvious links (underlined). Twenty-six of the participants (65%) peered very closely at the screen when working with the laptop. This may have been due to a lack of familiarity when working with the laptop or the smaller screen size (14 inch). However, thirty of the participants (75%) also used the cursor as a line-of-sight guide when reading text on the screen. The results from the previous findings in Phase One of the

research and the interviews, plus these behaviours indicates that reading and making meaning/interpreting text on screen is problematic for this group.

Two of the males and four of the females did not exhibit the rapid scanning behaviour that was common amongst the rest of the participant group. Three of these participants were in the LC/LU category (Female participants #572, #87, #32), one was rated as Av/LU (Male participant #688), one was Av/Av (Male participant #231), while one was in the HC/HU category (Female participant #698). The participant who scored Av/Av was the lowest scoring male for this category, while the participant who scored HC/HU was the top scoring female for this category. However, she demonstrated a more methodical approach to her search strategy, a behaviour that is discussed later in this chapter. One male participant (#845, ING: HC/LU) wrote down the bibliographic details for a free ebook rather than noting down the URL. This behaviour may be due to a preference by his lecturers for print information sources or it may indicate that he has a preference for reading print material when reading for meaning. Participants' commentary below further supports the findings from the Web questionnaire and the interviews that this generation of users still print out information, because they experience difficulties reading and making meaning from text on a screen.

Lots of books, 106 pages . I'm not going to read them.
Make this size 11. So there will be only one page, so I can print it out easily
(Male participant #736, ING: HC/HU).

At this point I might print it out, but at the moment I will browse it, see if it is what I want ... seems to have something quite good in terms of both these things. I believe this is an article therefore I shall take down the website so I can find it later and I would have probably printed out the PDF. PDFs are awesome. Issue with printing large PDFs and cost.
I'll see what it is ... article on book reviews and it's really hard to read.
At home I have two screens so when I'm writing an assignment I have Word open, but here we've only got one screen (Female participant #336, ING: Av/LU).

All but one participant in the follow-up group (Male participant #402, ING: HC/HU) did not see or failed to recognise hidden links. Hidden links included university logos, icons and coloured text (not underlined indicating a hyperlink). Instead participants typed in complete URLs to navigate their way to a university homepage or the library. Some participants had great difficulty

obtaining information, especially in the first task, even though the information was available on the web site, because they failed to explore text that was in another colour, indicating a hidden link. Instead, participants scanned for bolded headings (often clicking randomly on these and across the page to see if there were hidden links), obvious links (underlined) and their keywords (basic search).

7.1.5. Information-seeking and emotional responses

Participants reported high levels of confidence through all phases of the research, with 30% reporting feelings of frustration when using the Internet to find information in the interviews (Chapter 6, Section 6.1.8). Emotional responses observed during the tasks are presented in Figure 7-6 below.

Males - Task Analysis	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU	HU
Completed Task 1		Pt			Pt			Pt					Pt	Pt			Pt			
Completed Task 2								Pt		Pt	Pt			Pt	Pt					
Evidence of behaviours																				
Voices/indicates frustration																				
Voices/indicates task fatigue																				
Voices/indicates surprise																				
Voices/indicates confusion																				
Voices anxiety/anxiety noted																				
Voices/indicates attribution																				

Females - Task Analysis	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Completed Task 1							Pt		Pt	Pt										
Completed Task 2																				
Evidence of behaviours																				
Voices/indicates frustration																				
Voices/indicates task fatigue																				
Voices/indicates surprise																				
Voices/indicates confusion																				
Voices anxiety/anxiety noted																				
Voices/indicates attribution																				

Figure 7-6: Emotional response when searching the Internet

Thirteen of the male participants and all of the females except one (#141, ING: HC/HU) demonstrated or voiced frustration during the tasks. Evidence of frustration ranged from loud sighs, shuffling in the seat and pulling a faces at the screen, to sucking and biting on knuckles and fingers, head shaking and banging the keyboard hard or clicking randomly across the page and page tabs on the screen. Various sounds also indicated annoyance and frustration including *mmrrph*, grunts, groans, growls and *agghh*. Participants were frustrated when

they couldn't find the information they were looking for on a page, the Internet was slow, pages froze on the screen or they seemed to be caught in an information loop and they were revisiting sites/pages previously discarded. In this case the females were more vocal about their frustration than the males, who exhibited behaviours and sounds rather than vocalising their frustration outright.

What?... mm no I know where China is ... That's not going to help <sighs>
Oh my goodness ... what the hell? Nope! (Female participant #572, ING: LC/LU).

Maybe I should just call a travel agent!
Difficult to find all aspects of the task in one website, unless there's a search engine that gives you everything you're looking for. ... very frustrating'
Blank journal, that was a bit annoying (Female participant #615, ING: LC/HU).

Blast! ... OK, let's try that again (Female participant #861, ING: HC/LU).

Oh bugger! ... Is it peer reviewed? Where is it? Come on! OK that tells me deadly! Should just copy and paste it <referring to results page> (Female participant #599, ING: HC/Av).

At least it's here. ... Mmm bit unhelpful. ... Mmm that's not practical. ... Mmfph apparently you can't open that as a PDF, but html is all right (Female participant #698, ING: HC/HU).

Some language I can't read. ... What a pain, back to Google in that case. ... Nothing! Well that's a pain. ... Taking its time ... Yes it's finally loaded. It's taking its time, but its found the article. ... Here we go I've found a PDF file, I'll view that. It's taking its time to load, this is where I usually get impatient. ... cos I'm impatient, I'm going to go and search another site while it loads (Female participant #423, ING: Av/LU).

Doesn't seem to be ... it's a very annoying website! <sighs> Not making head nor tail of this one. Oh here we go ... Oh no this is coach tours!
Again a little bit annoying to find costs ... only comes in US or Canadian dollars ... that's a bit rude. ... Vacation ends, where?
Where's the lifelong learning one? OK that's not just gonna work.
<Depreciative laugh – keywords - to write a good university assignment – pulls faces> This is why I'm not doing teaching. ... Oh how ridiculous! I'm not doing so well here (Female participant #87, ING: LC/LU).

Oh this is crap, argghh!. (Female participant #313, ING: HC/HU).

<Mutters in own language, makes growling noise> Indian Pacific, where is it?
I found it difficult ... so annoying ... might as well write it! (Male participant #736, ING: HC/LU).

One male in the follow-up group regarded himself as a non-user (#53, ING: Av/LU) in the Web questionnaire, but rated his skill levels in the interview as

good. This participant had been using the Internet for eight years, but only used it sometimes. In the interview he reported very limited use of the Internet in his courses at university and a changing lifestyle in which study and part time work meant he had little time available for other activities. During this participant's recorded sessions the Internet connection was very slow in the first task and failed (froze) in the second task. It was interesting to observe this participant's behaviour. The researcher was out of the room conducting another interview at the time, however, he made no attempt to report the connection failure until the recording had finished. Below is a record of his behaviours.

Participant hit the enter key half a dozen times. Clicks all over Google homepage screen, hits enter again multiple times, sighs heavily, retypes in URL. Sighs heavily. Voices - Oh for fuck's sake!

Clicks multiple times on Google search button. Continually hits enter button for over 30 secs, then plays with something on the desk. Takes off earphones and throws them on the desk. Faces away from screen and yawns, looks at walls, glances back at screen periodically, then faces away from screen. Repeats this behaviour.

Displays anger/frustration – hits keyboard very hard, yawns again. (Male participant #53, ING: Av/LU).

This participant's frustration levels were extremely high; he swore badly even though he knew he was being recorded and treated the computer with disdain, turning his back on the screen, and glancing at it only occasionally. Although the participant knew the location of the connection information (browser link on the bottom of the screen) and accessed it several times, he did not disconnect and reconnect the Internet. He gave up trying to use the Internet five minutes into the second fifteen-minute task. While waiting for websites to download he hit enter repeatedly (for up to 30 seconds), apparently not realising this action caused the browser to refresh, thus making the download time even longer. He also clicked randomly on various parts of the page, an action observed in other task recordings when the connection was slow. This impatience was also observed in other recordings even when the connection was quite quick (pages taking between five and ten seconds to load).

I love waiting for logins. <Notes no loading bar at bottom of screen>
Means I'm not sure if it is loading or not. Kind of annoying.

<Laughs, puts head in hands, connection slow> Did you notice the information bar? You see I never read these things I just click OK.

However it doesn't tell me any costs! Nothing at all about costs.

Really frustrating to try and have Notepad or anything open.

Eighteen seconds of my life ... very slow loading this one. I am very impatient. If anything takes too long to load then I will open a new tab and

keep going. So I will have so many tabs open which is bad cos it slows it down. There's no logic in it (Female participant #336, ING: Av/LU).

<Opened up task manager> Running, running, running, running I don't like it when somebody is just left open (Male participant #736, ING: HC/HU).

Nine females and two males voiced surprise during the tasks, usually when they discovered a train journey that sounded interesting or found the information about costs. Two male and one female participant voiced confusion during the tasks. The males weren't quite sure where they were in virtual space while the female voiced confusion about the requirements for the second task. Five male and two female participants noted feelings of anxiety in the questionnaire included in the task activity. This question was included to ascertain if anxiety was a major factor during the tasks due to the nature of the tasks (out of normal context and with a time limit). Anxiety does not appear to be a major factor. In fact, while participants experienced and expressed feelings of frustration, they did not appear to be anxious. However, six male and ten female participants did express feelings of attribution. The feelings were mainly negative, self-deprecating or concerned the technology. For a group who say they are confident using the Internet and electronic resources to find information, the comments below tend to indicate otherwise. The word 'luck' was used in some of the commentary which was also spread across the ING participant categories for both males and females.

Urrumph anyway <table doesn't format properly> ... Arggh! this looks not good. ... It's going really slow so I ahh can't really gather information (Male participant #53, ING: Av/LU).

I don't like IBM computers. ... Excellent! <something works> (Male participant #736, ING: HC/HU).

Hope I find something. ... Not having much luck today! (Male participant #402, ING: HC/HU).

I'll try Google again and see what I can dig up, I suspect I won't have too much luck, but maybe I will, find out. ... See if I can do a university search. ... Be harder, will be the journal article and a book (Male participant #699, ING: LC/LU).

Possible computer error, I'll just keep going, technology at fault. ... Proquest too specific to a particular subject area. ... Looks promising. ... Oh that was wrong. ... Having a bit of trouble here with Internet <forgotten to click search button> (Male participant #41, ING: Av/Av).

Shows how much I already know! ... I'm going to be hopeless at the second one. ... I'm not very good at this. ... So easy dates, prices, thank goodness! ... You can tell I've never done a library. ... Will be interesting since I have only ever used the nursing website, because I'm only familiar with the Health Science website. ... Try the one that I know and then go into one I don't know. ... It's probably not going to have anything I need in here (Female participant #87, ING: LC/LU).

This looks a bit hairy, really not used to using Internet explorer, like Mozilla Firefox. ... <University login comes up> Have to type in my password don't I? ... Not sure if I should use an s or not. ... I don't know where I want to go. I don't really want to go outside Australia. I like Australia. ... Going back to Google again but this time I'm going to look in Google academic, not sure how to find it so am going to type in Google academic. I spelt it wrong. The keyboard is a bit weird, only a little bit. ... All articles, I wonder if this gives me anywhere to search? How am I going to find a website? (Female participant #336, ING: Av/LU).

Come up with rubbish so... unless I add Sydney, that might work. ... Just been on that one. Still not particularly useful so I'm going to click back and use the same search I had before. ... Looking back and forth to see if there is anything on this page that's useful, not really but I'll keep it just in case. ... Just going to try copying and pasting manually to see if it works, it did! (Female participant #423, ING: Av/LU).

Mmm that was my fault. ... Mmm that's not very good. ... <Media release appears again> Don't know what it is! ... Ouch! ... Try this one. If I could spell! ... Should have saved it before. (Female participant #698, ING: HC/HU).

<Closes down window> Oh stupid! <Clicks to go to fulltext> ... Oops! <Retypes URL, even though there is a direct link to Google on the page> ... <Selects first link> Oh duh! (Female participant #599, ING: HC/Av).

Try searching in Google I think. ... Try searching, mmmm. No results. Oh should have done scholarly. ... Oops, oh well an internal error, that's not good, let's try that again. Let's just put all dates, see what happens. Another internal error? (Female participant #861, ING: HC/LU).

And I've broken the Internet again! (Female participant #319, ING: HC/Av)

<Realises she has to open the browser> 'I'm being stupid' <laughs at herself> (Female participant #687, ING: HC/LU)

7.1.6. Information-seeking Behaviours

During the tasks two information-seeking behaviours (ISB) emerged. Participants using ISB-1 opened multiple windows usually with the right mouse button and within one browser, or by opening multiple copies of the browser. Complexity was introduced in this method as participants needed to navigate between multiple pages and enote programs such as Notepad or Microsoft Word

if they were taking notes electronically. They also tended to switch between different parts of the task. Such behaviour was most noticeable during the second task in which three different types of resource formats were required. Participants using this method tended to spend a lot of time switching between windows that appeared as tabs on the bottom of the screen or as a list of pages open in multiple copies of the browser. ISB-2 involved a more linear approach to information-seeking, where participants opened one window in a browser and worked methodically through the task. This method featured extensive use of the back button and using Google or the library as a landmark. In both methods, navigation using the back button was used extensively, as were print notes. Fourteen females and eight males (55%) created print notes and only three participants demonstrated word processing skills. The two types of information-seeking behaviours are examined separately by gender in the following sections, to determine if there are any differences in information-seeking behaviour between the males and females in this participant group.

7.1.6.1. Information-seeking behaviours - Males

The two methods of information seeking for the male follow-up participants are displayed in Figure 7-7.

Males - Task Analysis	Index Net Gen-ness (ING)																			
	699	688	53	689	817	231	322	41	377	629	753	946	638	519	845	922	92	639	402	736
	LC	LC	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	LU	Av	LU	LU	LU	Av	Av	Av	Av	Av	Av	Av	HU	HU	LU	Av	HU	HU	HU	HU
Completed Task 1		Pt			Pt			Pt				Pt	Pt	Pt		Pt				
Completed Task 2								Pt		Pt	Pt			Pt	Pt					
Information-seeking behaviour 1 (ISB-1)																				
Uses multiple windows																				
Method is complex																				
Page switching behaviour																				
Use browser features																				Ext
Enote basic																				
Enote advanced																				
Wordprocessing skills																				
Task 1&2 Multiple page revisits >40 Av=40-55, High=56-70, VHigh>70	Av			H		H	Av	Av		Av	Av	Av	Av						Av	VH
Task 1&2 Multiple new pages >40 Av=40-55, High=56-70, VHigh>70				H	Av	Av			Av	Av	Av	Av	Av	Av		VH			H	
Information-seeking behaviour 2 (ISB-2)																				
Uses single window																				
Method is linear																				
Uses back for navigation																				Ext
Pnote																				
Task 1&2 Multiple page revisits <40 Low=20-39, VLow<19		L	Av		L				L					L	L	L	L	L	L	
Task 1&2 Multiple new pages <40 Low=20-39, VLow<19	L	L	L				L	L							L		L	VL		L

Figure 7-7: Information-seeking methods, males

The follow-up males demonstrated high levels of confidence when using the Internet. Only two of the male participants (#688, ING: LC/Av; #41, ING: Av/Av, #519, ING: Av/HU) used ISB-2 exclusively. Another two males (#519, ING: Av/HU; #402, ING: HC/HU) used mainly ISB-2 techniques; with one using the browser facilities to open and close new windows, while the other switched extensively between the open pages and his enotes. Participants #92 (ING: HC/HU) and #638 (ING: Av/HU) opened two or three windows and switched between these and their enotes. Four participants (#817, ING: Av/LU; #753, ING: Av/AV; #845, ING: HC/LU) demonstrated both ISB-1 and ISB-2 behaviour patterns. All except three participants spread across the ING categories (LC/Av : Av/Av : HC/HU) used the back button for navigation. Browser facilities were not used extensively for navigating the Internet. Instead, participants used the browser to open new windows and to switch between windows. Only one male participant (#736, ING: HC/HU) used the keyboard to copy and paste information into his enotes, and two used features of their word processing program to create tables (#736, ING: HC/HU; #817, ING: Av/LU). Overall, eleven of the twenty males used ISB-1 exclusively for information-seeking in both tasks.

An examination of this dataset shows that male participants using the ISB-1 methodology to find information had a greater tendency to open multiple new pages and to make multiple page revisits during the search. However, even the participants using ISB-2, which involved a more linear approach to information-seeking, opened many new pages since the benchmark for low was set between twenty and thirty-nine new pages. Only one participant (#639, ING: HC/HU) scored very low and opened fewer than nineteen new pages, while two (#922, ING: HC/Av; #736, ING: HC/HU) scored very high and opened more than seventy new pages. During the tasks, participants using ISB-1 spent a great deal of time clicking randomly between the page tabs on the bottom of the screen as they looked for a particular page or their enotes. The number of pages/windows open varied between two or three up to fourteen at any one time. Eight of the males took print notes (pnote) in the first task, with five then taking enotes in the second task. It is impossible to draw definitive conclusions about the correlation between task completion and information-seeking behaviour since none of the males completed Task One and only two completed Task Two. For the male

participants who completed >80% (Pt) of the tasks, very few had all of the information required about each train journey for the first task, or quality academic resources for the second task, due to high levels of satisficing and snatching behaviour. Whole recording, frequency of activity graphs using the *Morae* software are presented in Figures 7-8 – 7-10. These graphs illustrate ISB-1 as demonstrated by the male participants from across the ING categories: LC/LU, Av/Av and HC/HU.

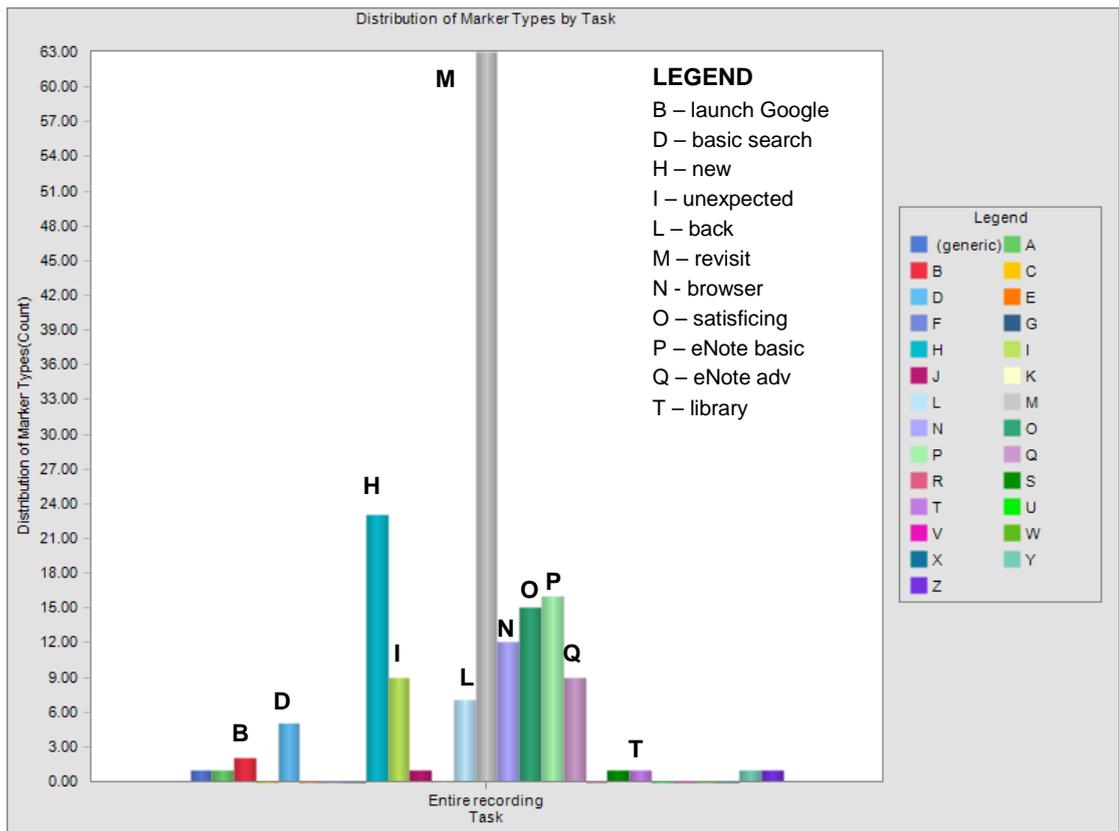


Figure 7-8: Frequency of activity, ISB-1, whole recording, #699. ING: LC/LU

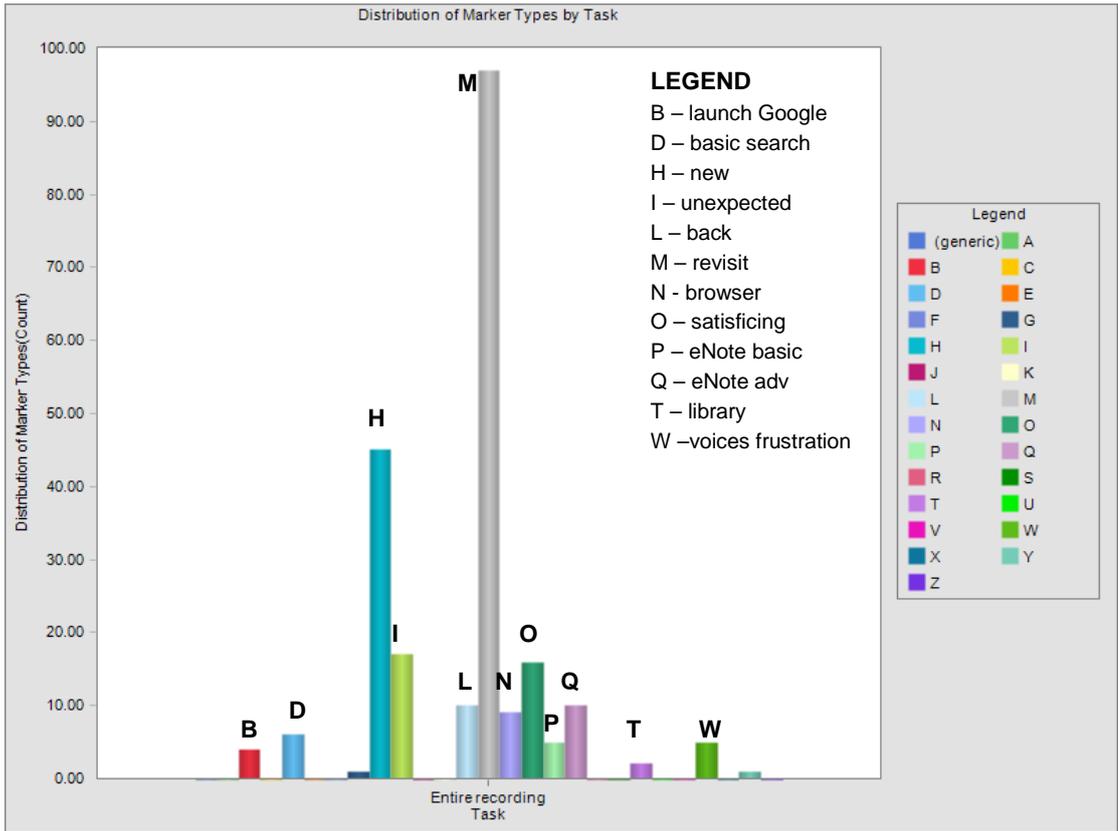


Figure 7-9: Frequency of activity, ISB-1, whole recording, #231. ING: Av/Av

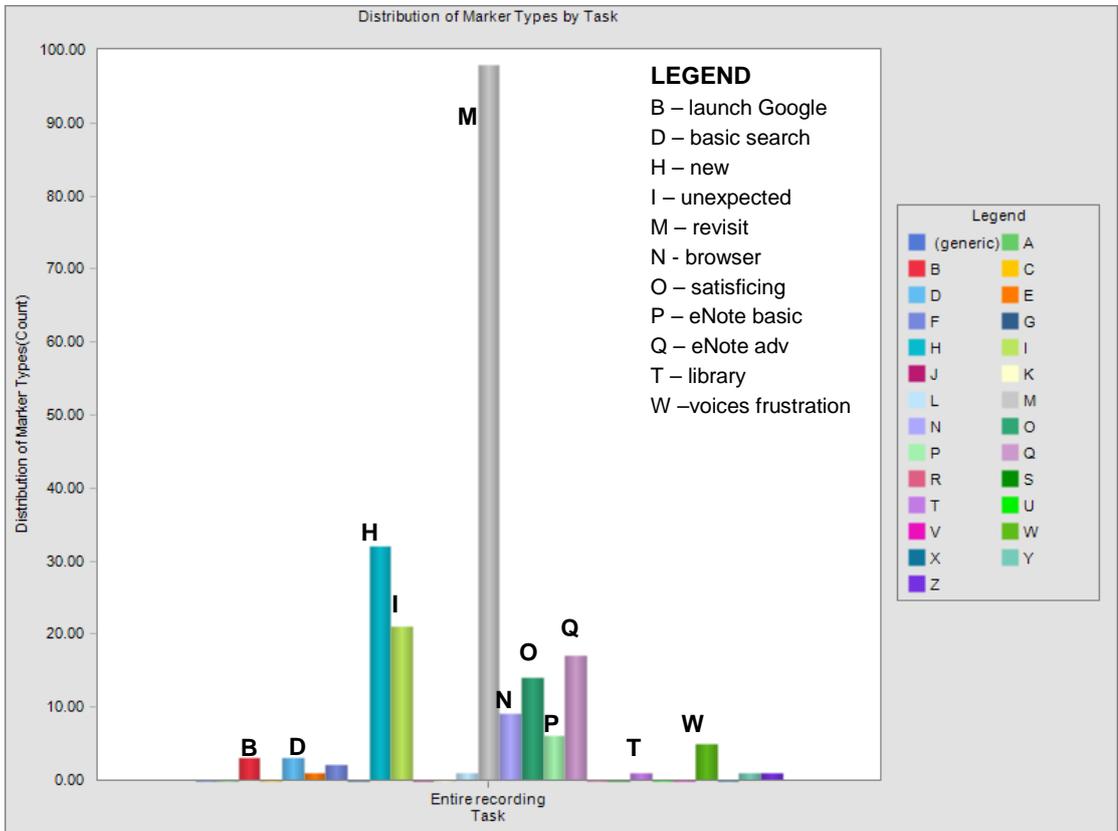


Figure 7-10: Frequency of activity, ISB-1. whole recording, #736, ING: HC/HU

The frequency of activity graphs clearly show that revisiting is a feature of this information-seeking behaviour, mainly due to page switching behaviour. Revisiting included revisiting open pages/windows on the screen, Google results pages and the Google homepage, landmarks such as Wikipedia or the library, notes (either print or enotes) and the task sheet. A further breakdown of the revisit tag for #213 (ING: Av/Av) indicates the same ISB-1 pattern and is presented in an Excel graph in Figure 7-11 below. The unexpected tag was used whenever a participant suddenly changed behaviour (started enotes when previously using print) or something unplanned occurred like a popup window. A comparative frequency of activity graph in Figure 7-12 shows how participant behaviour changed between Task One and Task Two. This graph indicates that while the information-seeking behaviour pattern is similar, the numbers of new pages, revisits, satisficing and frustration events are higher in Task Two, an indication that the participant was having difficulty finding specific information.

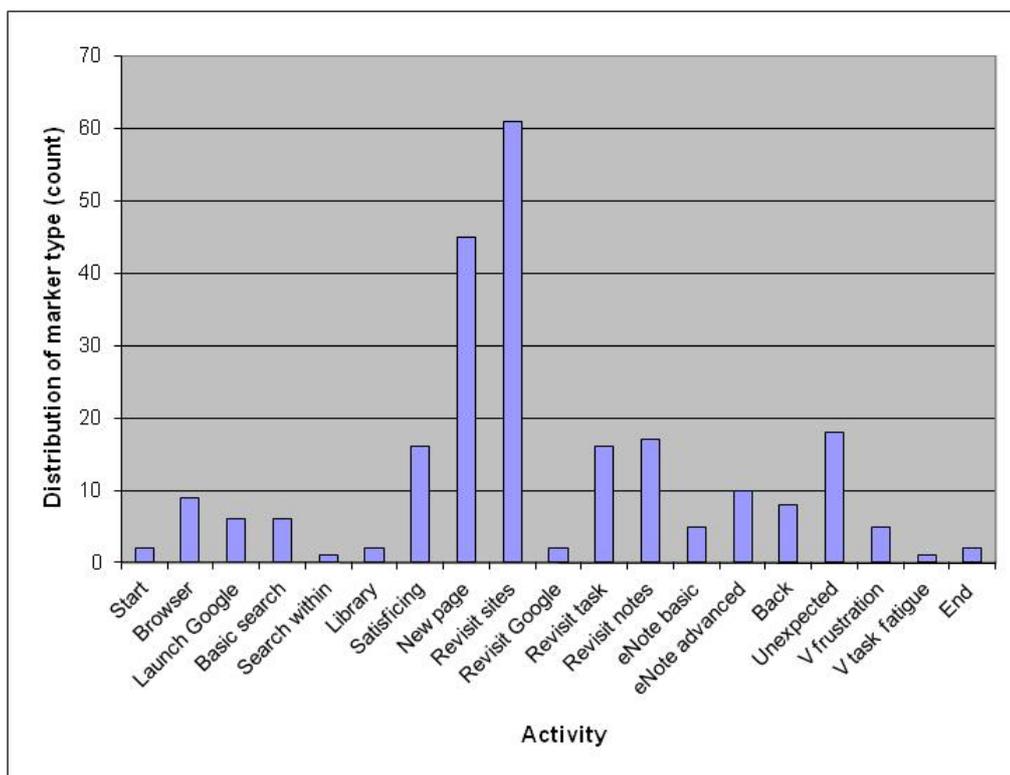


Figure 7-11: Frequency of activity, ISB-1, whole recording, #231, ING: Av/Av

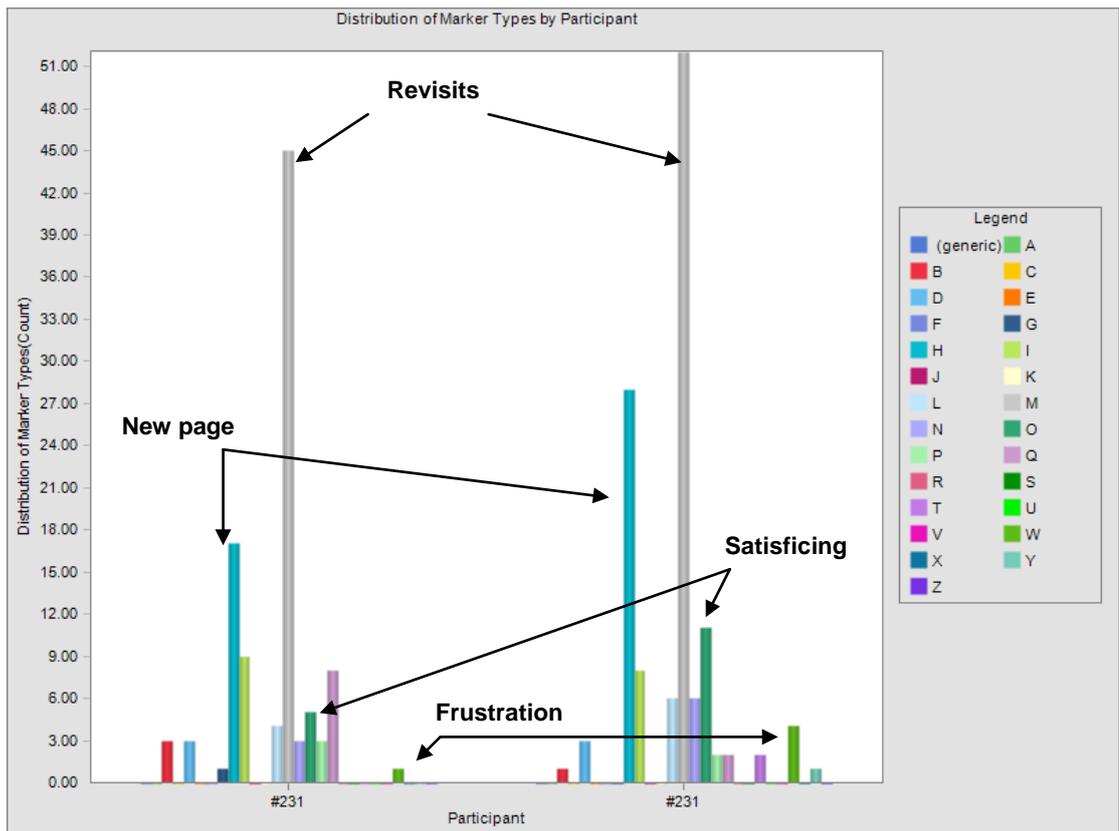


Figure 7-12: Frequency of activity, ISB-1, comparison Tasks 1 & 2, #231, ING: Av/Av

This behaviour pattern is typical for the male participants using ISB-1 to find information as the spikes in the comparative frequency of activity graphs in Figure 7-13 show.

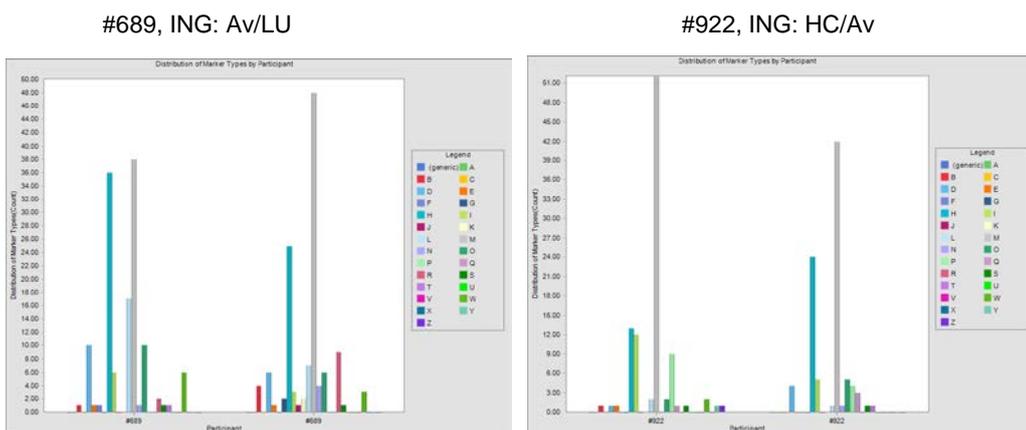


Figure 7-13: Information-seeking, ISB-1, comparative graphs, males

The pattern graphs for the male participants who used the ISB-2 method which featured a more linear approach to information-seeking and fewer than three pages open at any one time, look slightly different as illustrated in Figures 7-14 – 7-16 below.

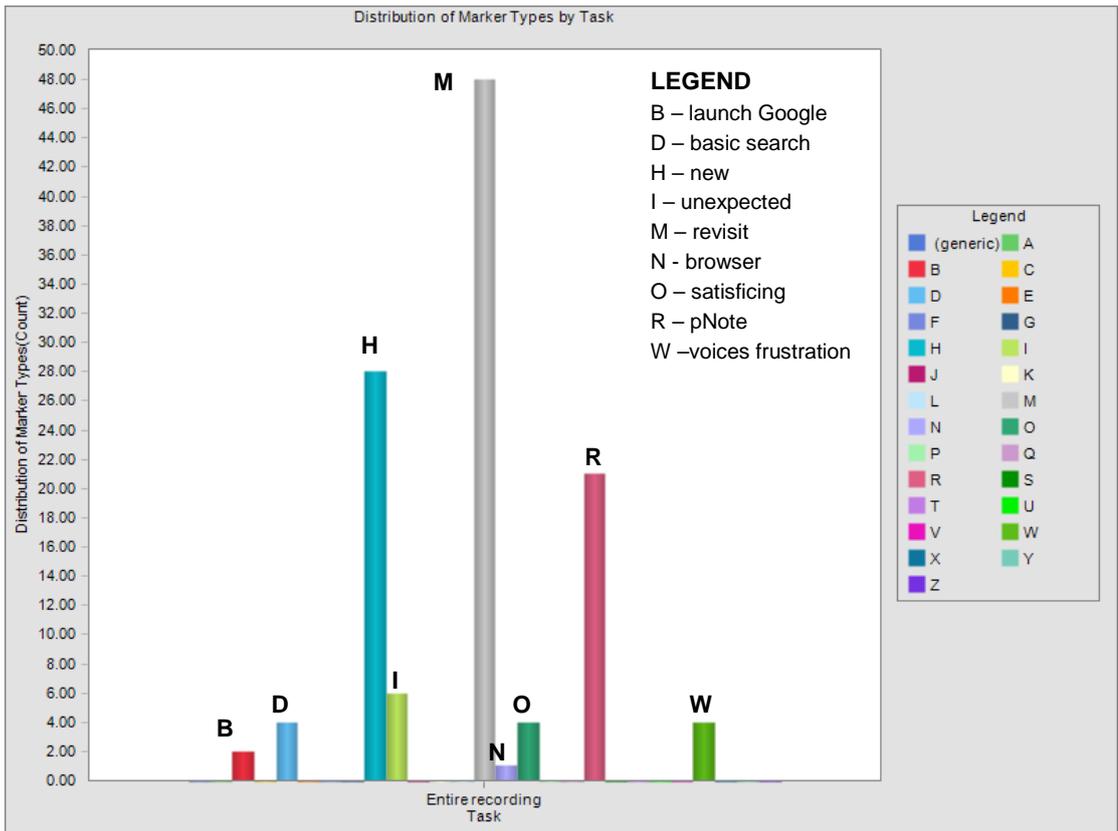


Figure 7-14: Frequency of activity, ISB-2, whole recording, #688, ING: LC/Av

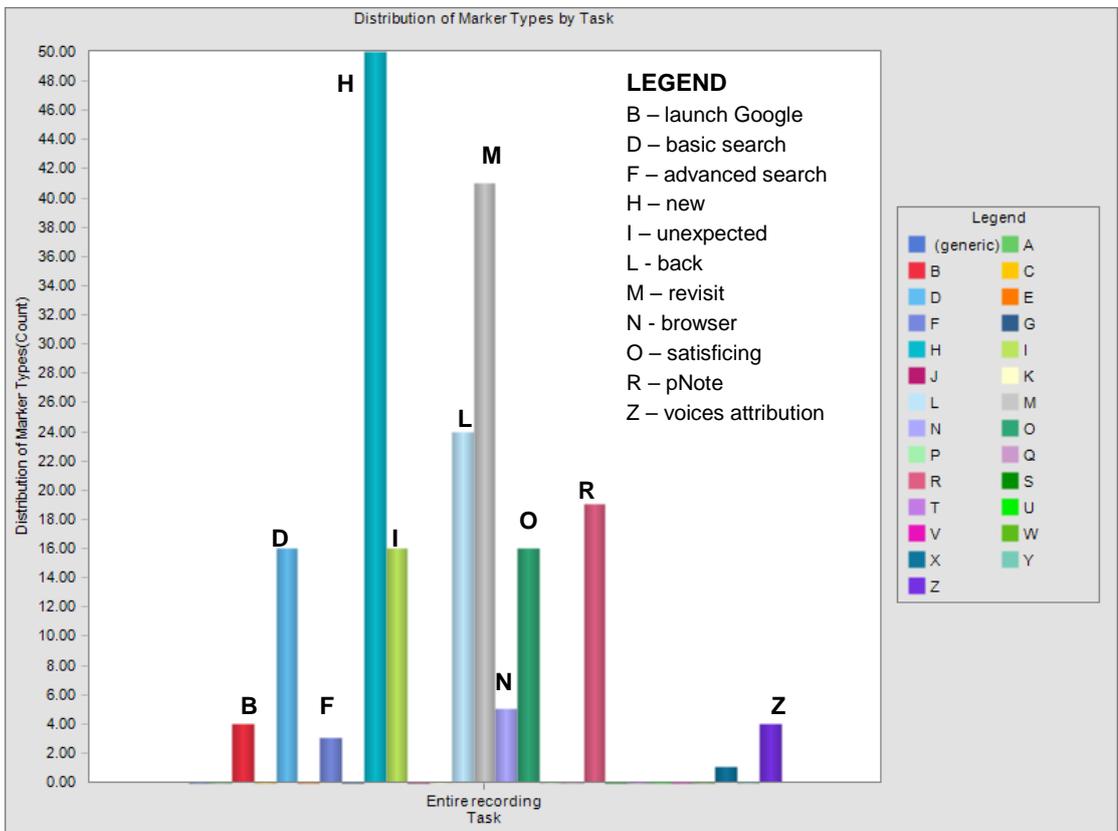


Figure 7-15: Frequency of activity, ISB-2, whole recording, #41, ING: Av/Av

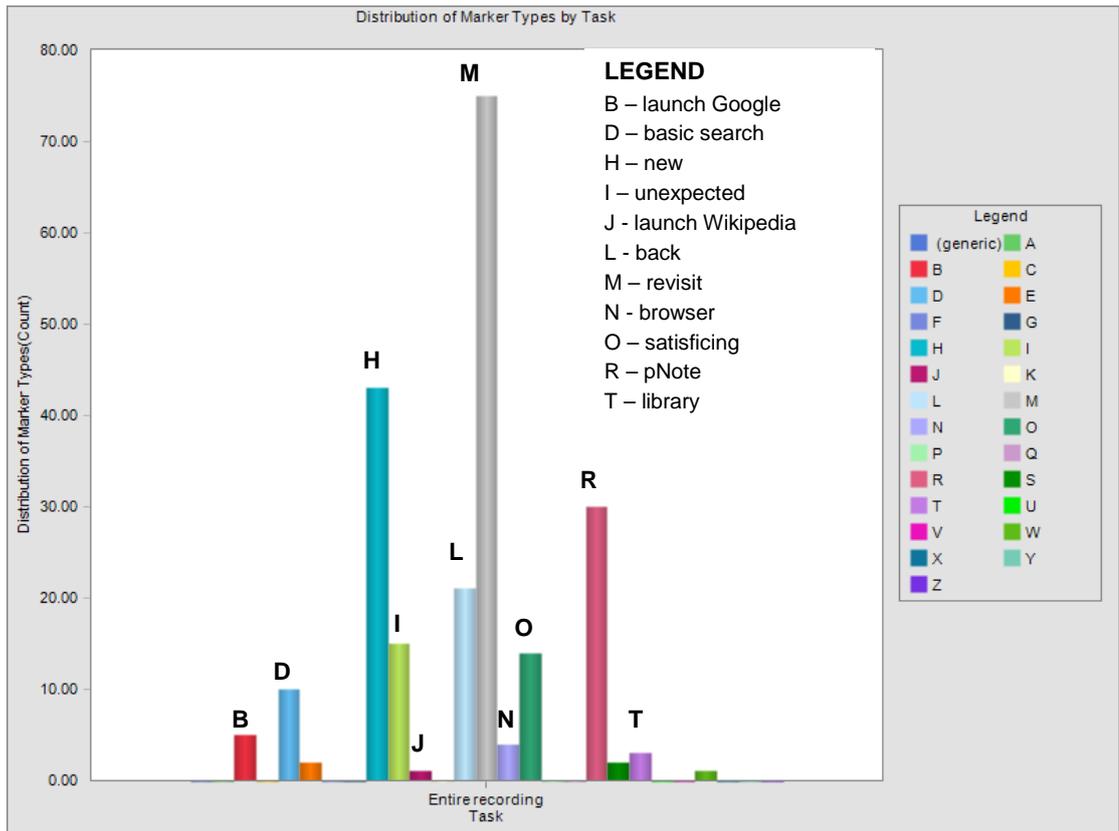
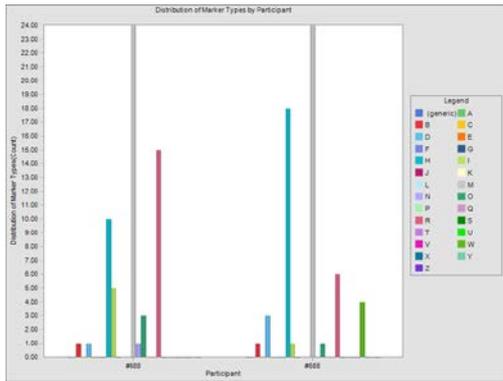


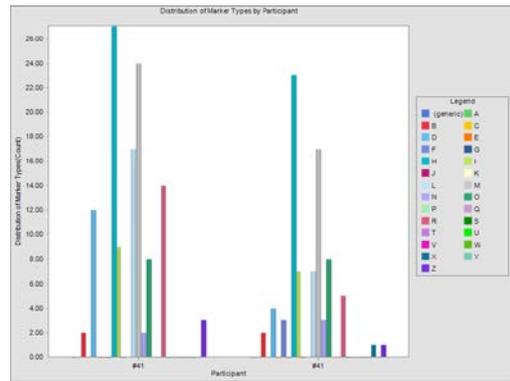
Figure 7-16: Frequency of activity, ISB-2, whole recording, #519, ING: Av/HU

Features of the ISB-2 method include the large number of new pages, extensive use of the back button (although participant #688 did not use it at all, Figure 7-14), and a long time spent on print notes (pnote). Since both methods demonstrate high numbers of new pages and revisits, the major difference between the two is the way students used the technology to conduct their searches. Both methods involved basic search strategies (keywords) and varying degrees of satisficing and snatching. What is different is the way students searched. ISB-1 involved multiple windows open at any one time and a lot of time spent switching between pages, while participants using ISB-2 had only one window open and their enotes if they were using an enote program for notemaking. Comparative frequency of use graphs for these participants are available in Figure 7-17. below.

#688, ING: LC/Av



#41, ING: Av/Av



#519, ING: Av/HU

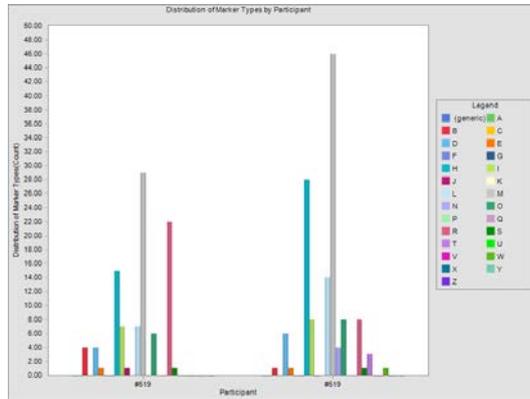
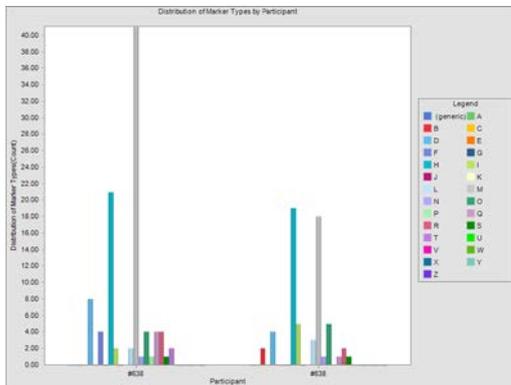


Figure 7-17: Information-seeking, ISB-2, comparative graphs, males

Participants who used both methods show slightly different activity levels when the tasks are presented in a comparative graph, but the spikes for revisits (grey) and new pages (blue) are consistent. Figure 7-18 presents the comparative graphs for two of the male participants who used both methods to search.

#638, ING: Av/HU



#817, ING: Av/HU

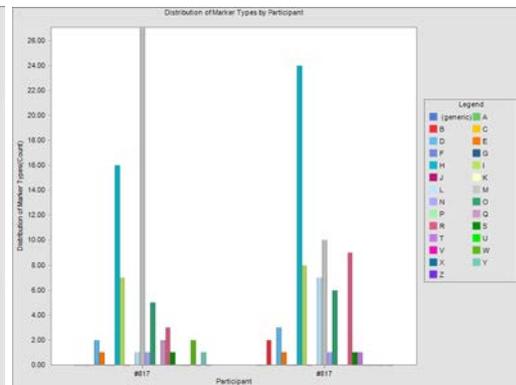


Figure 7-18: Information-seeking, ISB-1/ISB-2, comparative graphs, males

7.1.6.2. Information-seeking behaviours - Females

The females in the follow-up group tended to use ISB-2 (single page, linear) instead of ISB-1 (multiple pages, complex) method to find information. This preference may relate to how they originally learnt to use the Internet and may explain why the females appear to be less confident than the males, ie. because they are not task or page switching, they perceive themselves to be less tech-savvy. This observation may also explain why females are often perceived to be lagging behind males (less tech-savvy) in some of the research literature, even though recent statistics indicate that both genders are using the Internet on a frequent basis and for similar purposes. In the female dataset presented in Figure 7-19 below, six participants from across the ING categories used ISB-1 (#615, ING: LC/HU; #423, ING: Av/LU; #200, ING: LC/Av; #687, ING: HC/LU; #872, ING: HC/HU; #1412, ING: HC/HU), indicating that length of time using the Internet and confidence are not factors that affect the information-seeking behaviour being used. This finding is similar to the males where participants using ISB-1 and ISB-2 were spread across the ING categories, although the males in this group had a greater tendency to use ISB-1.

Females - Task Analysis	Index Net Gen-ness (ING)																			
	572	87	32	615	336	423	99	200	142	17	861	687	319	443	312	599	313	872	141	698
	LC	LC	LC	LC	Av	Av	Av	Av	Av	Av	HC									
	LU	LU	LU	HU	LU	LU	LU	Av	HU	HU	LU	LU	Av	Av	Av	Av	HU	HU	HU	HU
Completed Task 1						Pt		Pt	Pt						Pt				Pt	Pt
Completed Task 2																				
Information-seeking behaviour 1 (ISB-1)																				
Uses multiple windows																				
Method is complex																				
Page switching behaviour																				
Use browser features	Ltd		Ltd		Ltd	Ltd		Ltd	Ltd											
Enote basic																				
Enote advanced																				
Wordprocessing skills								Ltd												
Task 1&2 Multiple page revisits >40 Av=40-55, High=56-70, VHigh>70					VH	H		Av	Av			VH	Av	Av	Av	Av	H	VH	Av	Av
Task 1&2 Multiple new pages >40 Av=40-55, High=56-70, VHigh>70	Av	Av				Av			AV						Av			Av	Av	H
Information-seeking behaviour 2 (ISB-2)																				
Uses single window																				
Method is linear																				
Uses back for navigation																				
Pnote																				
Task 1&2 Less page revisits <40 Low=20-39, VLow<19	L	L	VL		VL	L			L	L										
Task 1&2 Less new pages <40 Low=20-39, VLow<19			L	L	L	L	L	VL			L	L	L	L	L		L			

Figure 7-19: Information-seeking methods, females

All but one female used the back button for navigation and 70% (14) created print notes (pnote). Three of the participants using ISB-1 revisited sites/pages >70 times during the tasks. Two of the LC/LU females used ISB-2 exclusively while the lowest ranked female opened two windows for a short time. Figures 7-20 – 7-22 present three of the ISB-1 females’ whole recording, frequency of activity graphs.

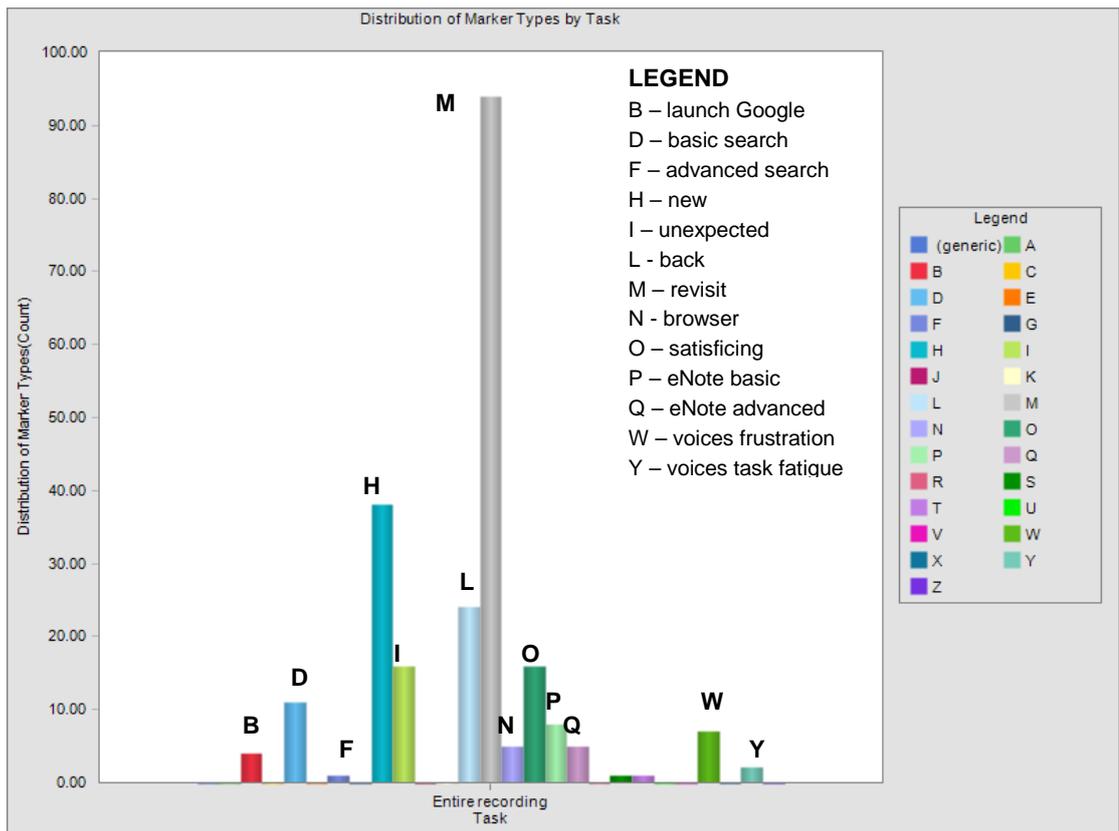


Figure 7-20: Frequency of activity, ISB-1, whole recording, #615. ING: LC/LU

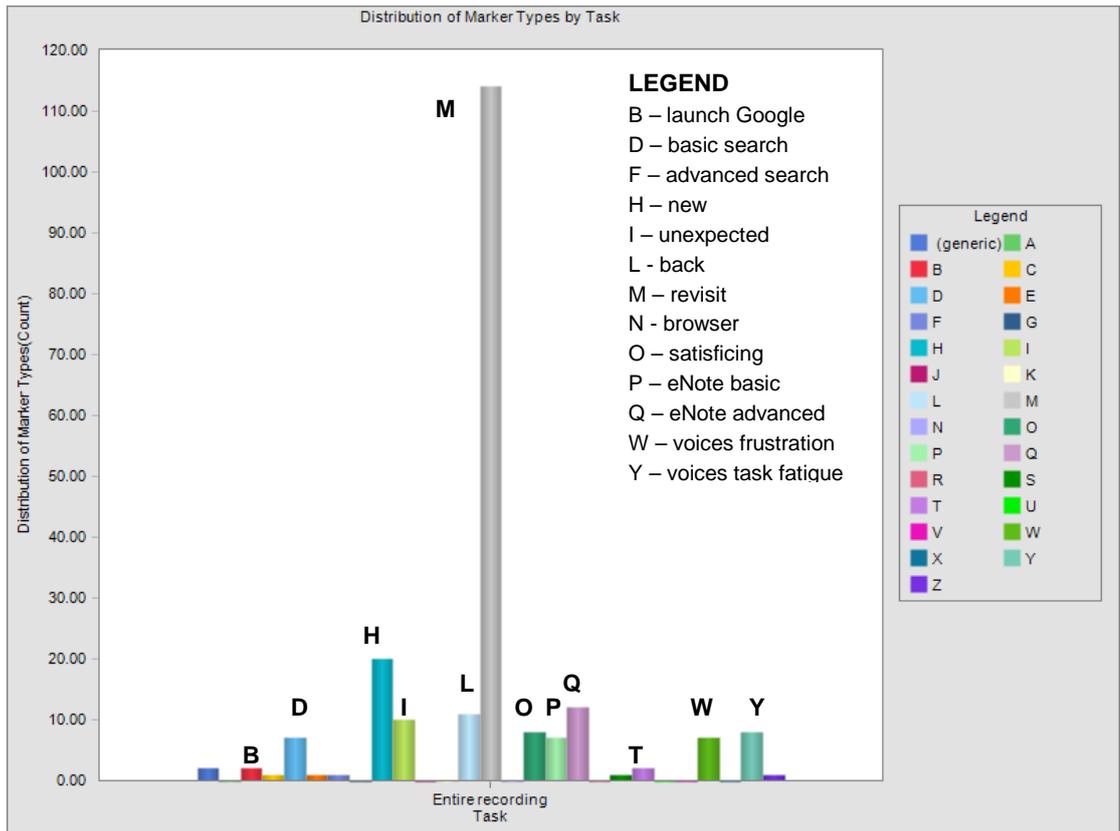


Figure 7-21: Frequency of activity, ISB-1, whole recording, #687. ING: HC/LU

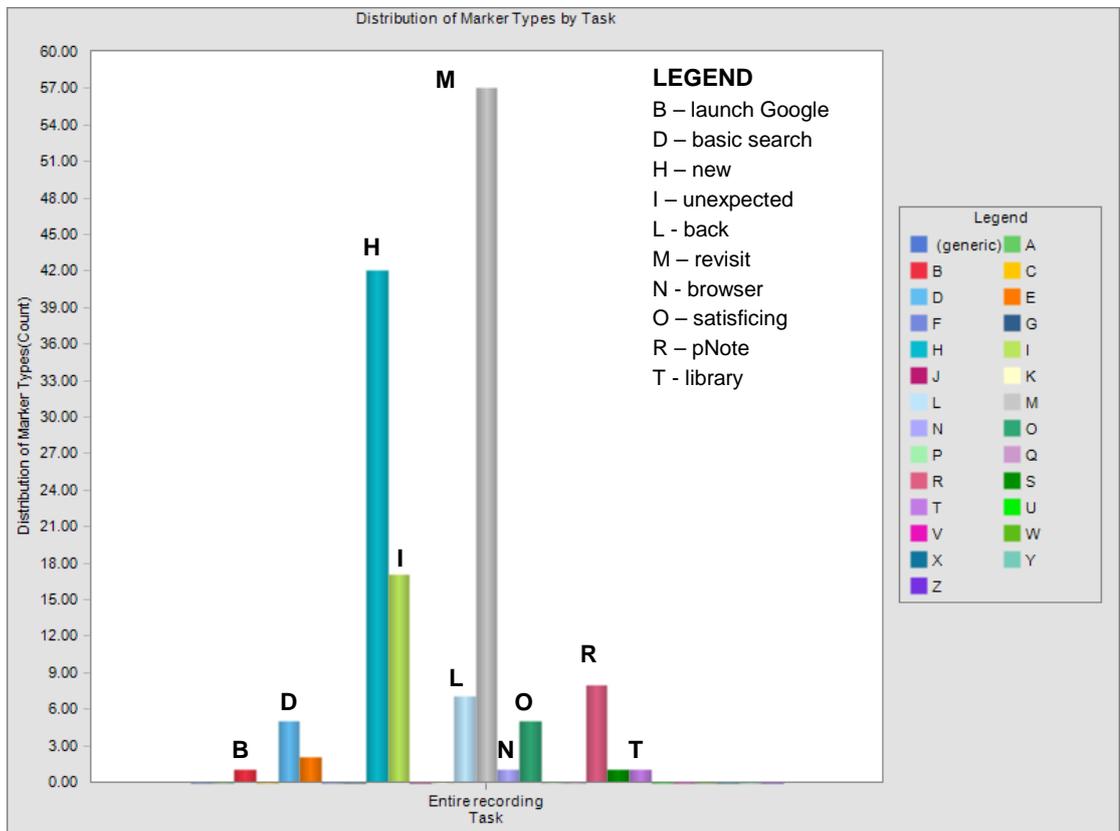


Figure 7-22: Frequency of activity, ISB-1, whole recording, #141. ING: HC/HU

The high number of new pages and revisits exhibited by the female participants in these graphs is similar to the male participants. None of the females used both ISB-1 and ISB-2 to find information. Instead, they adhered to one method. Participants who exhibited ISB-1 may have learnt how to search the Internet using ISB-2, but as they discovered how to open multiple windows progressed to ISB-1. Participants exhibiting both behaviours may still be in a transition phase or the type of task may dictate which method they use: simple data gathering = ISB-2, complex/interpretive data gathering, multiple resource formats = ISB-1.

A sample of females across the ING categories using ISB-2 is available in Figures 7-23 – 7-25.

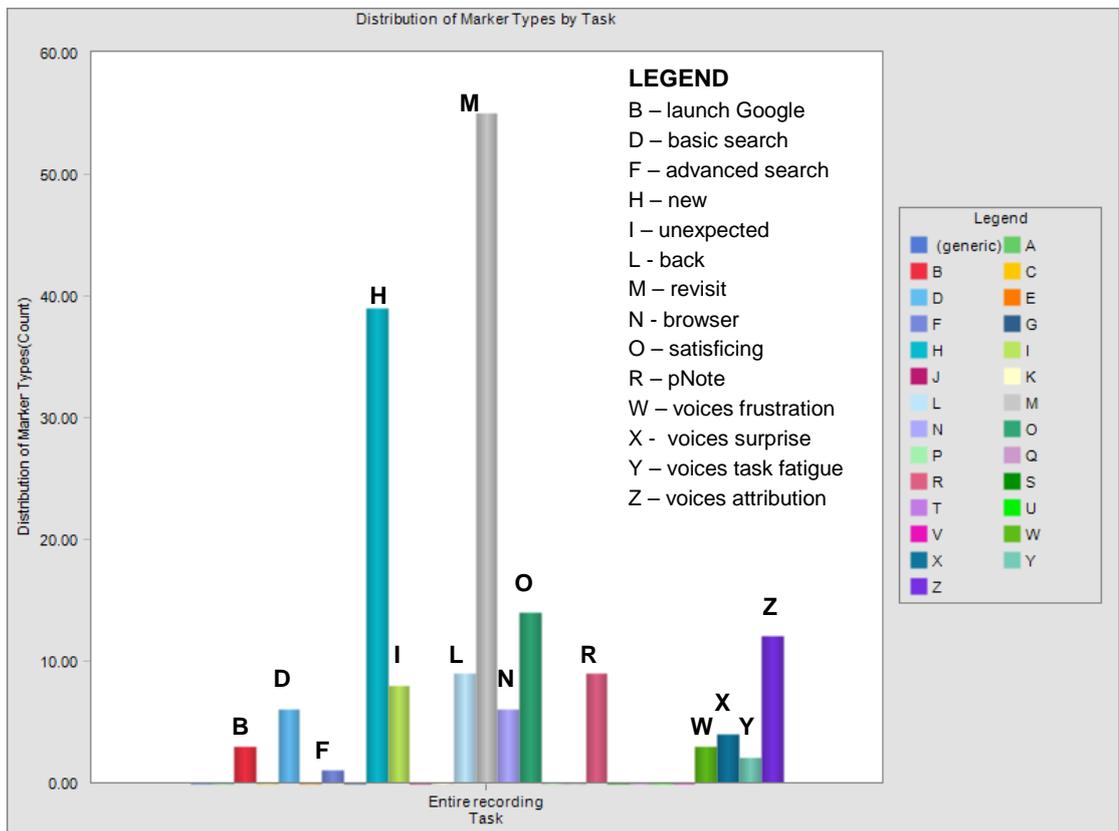


Figure 7-23: Frequency of activity, ISB-2, whole recording, #572. ING: LC/LU

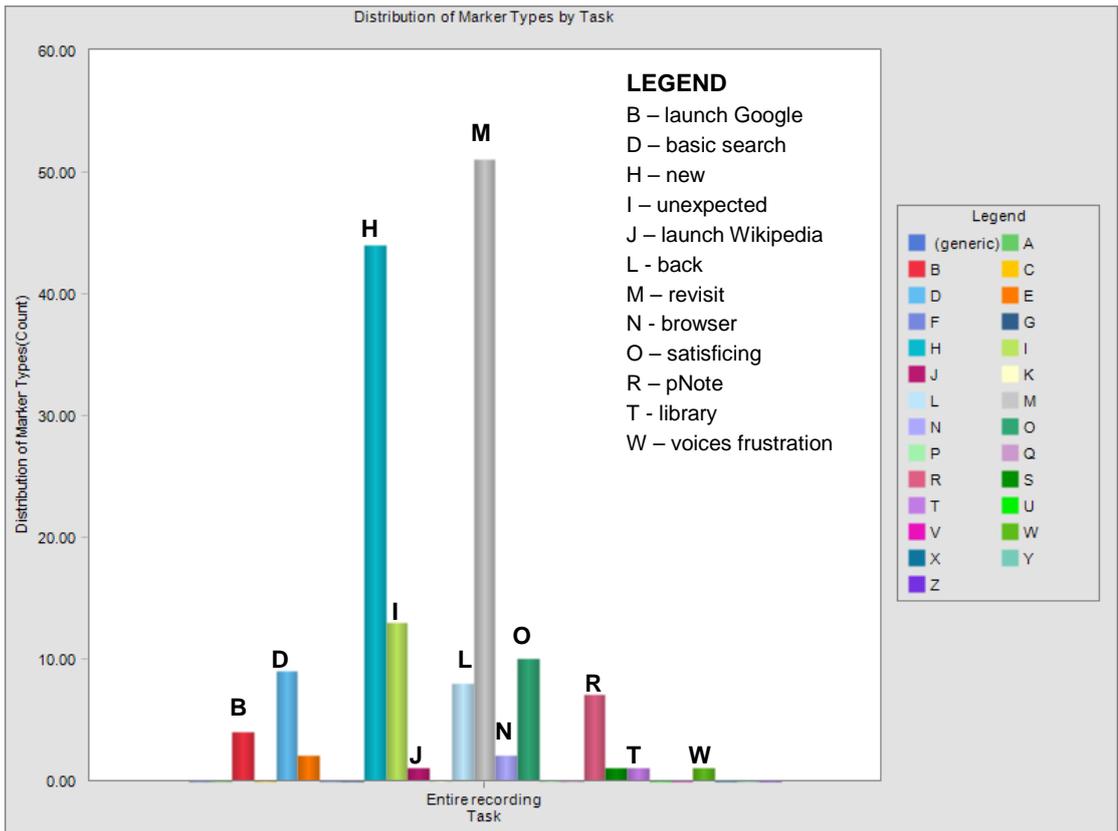


Figure 7-24: Frequency of activity, ISB-2, whole recording, #17. ING: Av/HU

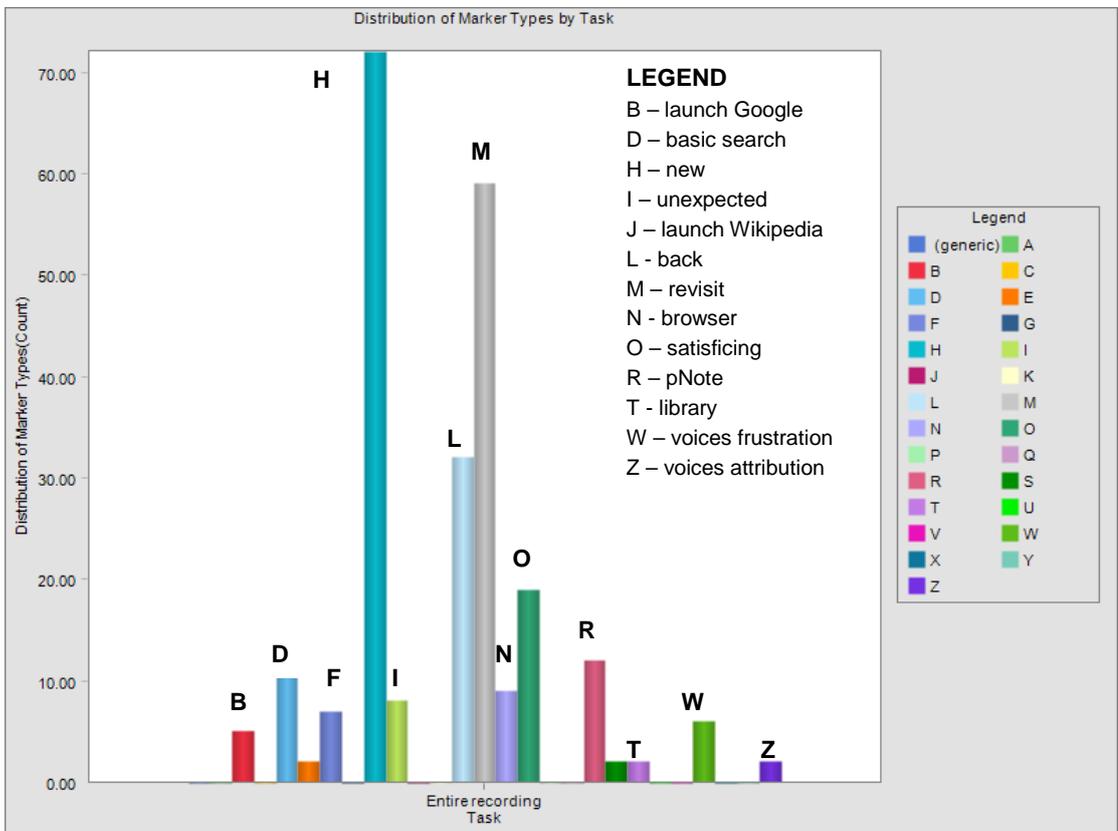
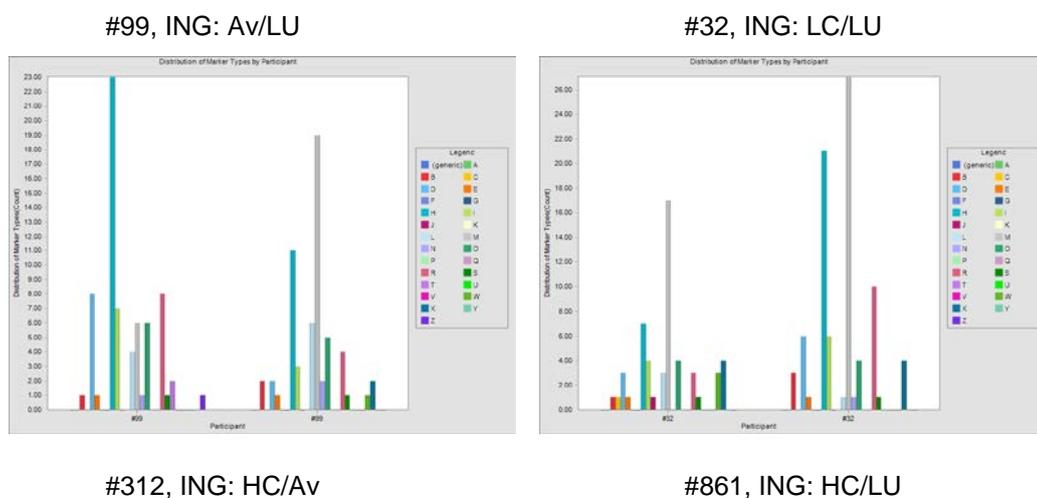


Figure 7-25: Frequency of activity, ISB-2, whole recording, #698. ING: HC/HU

Figure 7-23 presents the behaviours of the lowest ranking participant in the study. This female scored greater than one standard deviation below the mean for confidence (30.5) and almost two standard deviations from the mean for confidence for this group (39.5). The high level of attribution commentary recorded in the graph indicates her lack of confidence, which was usually self-depreciating and concerned her ability to use the Internet and electronic resources. She was the only participant who rated herself as a beginner in both the Web questionnaire and the interviews, and she had been using the Internet for one year only.

Similar to the males, the females using ISB-2 used the back button extensively and basic search strategies (keywords), they exhibited high levels of satisficing and snatching, opened many new pages and revisited pages/sites. Overall they appeared to open/visit fewer new pages than the males, but only one scored very low (VL = <19) for this criteria. Females scoring L (low) for multiple new pages were still opening between 20 and 39 pages. Figure 7-26 presents the comparative graphs for six of the other female participants who used ISB-2 to search. The spiking in the graphs is similar to the other participant graphs demonstrated by the follow-up group, where the recording of high levels of new pages (blue), revisits (grey), satisficing (green), basic searches (light blue) and feelings of frustration (light green) and attribution (purple) indicate unsuccessful searches.



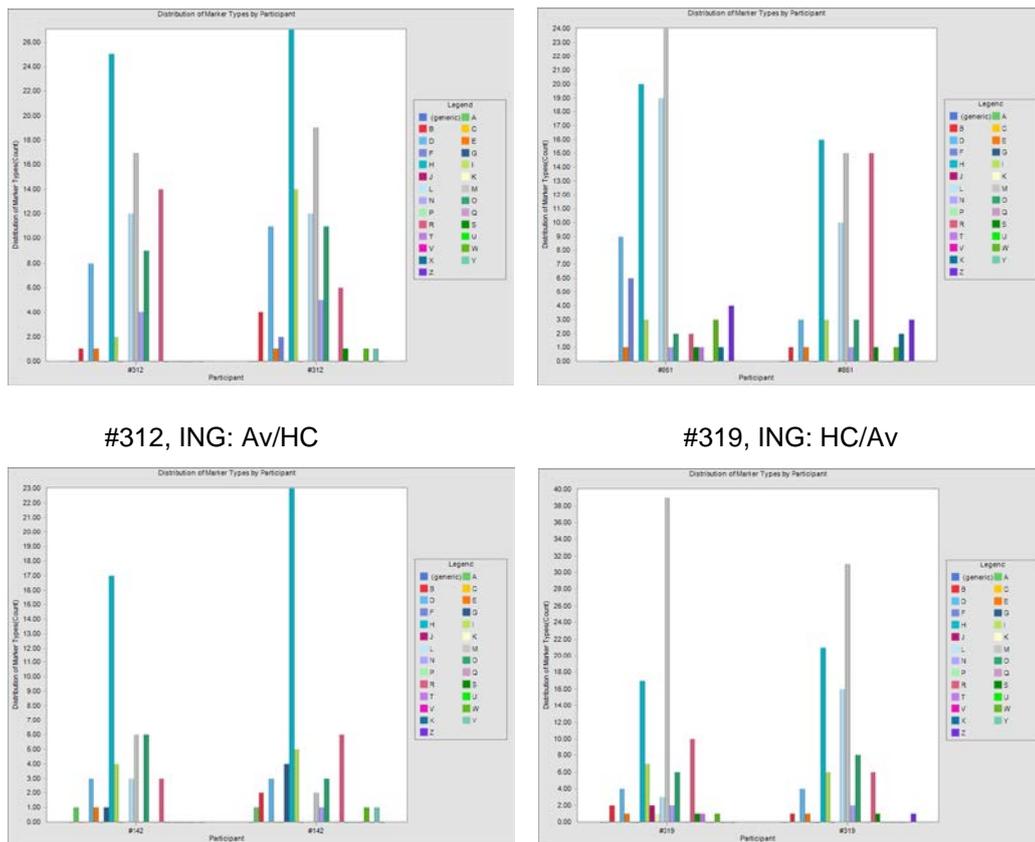


Figure 7-26: Information-seeking, ISB-2, comparative graphs, females

7.2. Findings and Discussion

Earlier findings from Phase One (Web questionnaire) and the interviews from Phase Two of this research were further supported by results from the participant observation and task analysis. The data from all three sections of the research method clearly show that length of time using the Internet does not affect how young people feel about their skill levels. The overriding factors that affect how young people feel about their skill levels when using the Internet and electronic resources to find and use information effectively are frequency of use and confidence. As found in an early research study with students from the upper end of the Net Generation (18-22 years of age), the method employed to extract information about skill levels from this group does affect how participants respond (Banwell,& Gannon-Leary, 2000). Just asking young people about their skills and levels of use is not enough, because the confidence factor does appear to influence their response. Hence, responses from the follow-up participants in this research were often different during different phases of the research.

In this last phase of the research, in all but four cases, follow-up participants completed the tasks before the interviews. Since very few of the participants actually completed the tasks in the assigned time or experienced no difficulties, it is not surprising that the interview questions (reflective) dealing with perceived skill levels when finding and using information elicited different responses from those recorded in the anonymous Web questionnaire. These results indicate that how young people react and the responses they give when asked about their technology skills is not consistent. Nor were participant responses in either the Web questionnaire or the interviews consistent with their behaviours and demonstrated skill levels in the task observation phase of the research. All students in the follow-up group experienced some difficulties; many expressed frustration and all exhibited satisficing behaviours when searching for information using the Internet and electronic resources. However, they remained positive about their ability to use the Internet to find information, since no one changed their rating level down to beginner after the tasks. Overall, the participants in this research were both confident and comfortable, and although they were often frustrated, it was not enough to dent their confidence.

In this phase of the research participants used similar search methods when searching the Internet and the electronic resources. Length of time using the Internet, age and gender were not pre-determinants for being able to use technology to find information. The results from this phase of the research clearly show length of time using the Internet does not determine how effectively the participants and perhaps young people in general use technology, as illustrated by the lack of sophistication when using search engines and browser facilities to streamline, manage and review their search method and the results of their search. These findings indicate that, while these young people might be confident users of the Internet, their skill levels are superficial and unsophisticated. They are not tech-savvy if this term means skilled use. These results are also supported across a wide range of rigorous academic studies (Chapter 2, Section 2.3).

The results from the participant observation and task analysis phase also support previous findings in this research and other studies which indicate that young people studying at university level do not engage with the electronic resources provided by their educational institutions (Armstrong et al, 2001; Griffiths & Brophy, 2002; Griffiths, 2003; Margaryan, Littlejohn & Vojt, 2011; Dawson, 2012). Overall, participants had great difficulty finding information using the electronic resources provided by their institutions. Many did not appear to have Internet literacy skills and were often lost in virtual space, hence the use of landmark sites, especially Google and Wikipedia. Participants also failed to differentiate between open (Internet) and closed systems (Library Intranet) indicating they assumed everything was on the Public Domain Web. During the tasks some participants did not use the electronic resources at all, while the rest struggled to use the journal databases provided by the library.

Everyone used simple keyword searches, with only one student demonstrating a genuine knowledge of Boolean search methods and advanced search. Even though this student was studying Library and Information Science (LIS), he used simple keyword searching for the first task and during half of the second task. He used an advanced search method after reminding himself there are more sophisticated ways of finding information. The participants' use of an unsophisticated search method based on simple keywords was consistent across the whole follow-up group. The consistency of behaviours across the group did not appear to be affected by length of use, frequency of use or even level of confidence, which indicates that another factor is involved in determining the information-seeking behaviour of this particular group of young people. Since nearly all of the participants in the Web survey reported independent learning as the main method for skills acquisition when using the Internet, it is highly likely that the way they learned how to use the technology is the major/common factor influencing behaviour.

Independent learning, where the learner learns by participation and self affirmation every time success is achieved, is the most powerful pedagogy in education. The learner internalises learning behaviours and processes based on their previous success. In this case, participants had taught themselves how to

use the Internet in a largely unsupported environment with few outside influences. The strongest outside influence came from friends (Chapter 4, Figure 4-46). It is not surprising then, that everyone was using the a similar method to find information both on the Internet and in the electronic databases and that single verbalisation by the LIS participant during the participant observation indicates just how strongly a culture of use can influence behaviour.

Should have done this before but I just forgot ((Male participant #402, ING: HC/HU)

The lack of sophistication demonstrated by the follow-up participants indicates a lack of fundamental understanding about how the technology and the Internet/Web actually work. Participants not only had difficulty knowing where they were in virtual space, they also failed to 'see' or recognise both obvious and hidden links on the screen. They did not differentiate between a search engine like Google and the journal databases (electronic resources), so they used the same search method for both. Some participants even misunderstood the nomenclature of the databases and tried to search journal-titles databases for journal articles using simple keywords. As a result, there were high levels of frustration across the follow-up group during the tasks. Their simplistic and superficial understanding of how the Internet works coupled with a confidence that is the result of a culture of technology use, influences strongly their information-seeking behaviour which was consistent across the whole group, with only two closely linked, information-seeking behaviours emerging. An interesting follow-up research study would be to examine the information-seeking behaviour of students at secondary level for a comparative study. Such a research project might confirm the notion of a culture of technology use and provide more detailed information about students' understandings and beliefs.

Participants experienced high levels of frustration during the tasks. This response was a result of their poor understandings of how search engines work and the structure of the Web (Public and Hidden Domains). Since participants were using unsophisticated search strategies (simple keywords) and demonstrated high levels of satisficing, everyone experienced some difficulty in finding the required information for both tasks. Although only 30% of the Interviewees reported feelings of frustration when using the Internet to find

information, this was not the case in the task observation. Overall, 82.5% of the follow-up participants verbally expressed or demonstrated behaviours indicating frustration. Many others voiced self-deprecating comments, swore, or used the word 'luck' when searching the Internet and electronic resources. Although confidence levels were very high across this group, feelings of frustration appeared to be a common experience for many of the participants. While the participants said they were confident, they also exhibited high levels of satisficing and selected information sources based on the position of the site on the results page, or the inclusion of the keyword/s used in the initial search in the result. Hence, participants found it difficult to meet the task requirements. These results indicate that confidence, poor understandings, and satisficing do influence information-seeking behaviour; and the effectiveness of any search strategies used was often compromised. When participants were unsuccessful, the Internet was slow or they became locked in an information loop due to these factors, they experienced high levels of frustration, which often led to even higher levels of satisficing.

Snatching was another behaviour observed in this phase of the research and indicates high levels of confidence and implicit trust in search engine results. Snatching is an extreme form of satisficing in which participants immediately select the first result without reading the abstract or URL to verify/guide selection. It appears to be related to high levels of impatience and often led to frustration among these participants when the information could not be found easily. The impatience shown by the participants indicates that this generation do want things to happen fast. While this behaviour could be due to the age of the participants (ie. young people often seem to want things immediately), it may also be a result of advances in technology, which has become faster and more immediate. Web 2.0 communications utilities such as Twitter, social networking sites such as Facebook, email and online classroom white boards give the impression of immediacy and sometimes urgency. The levels of impatience observed in this research may also be a result of over-confidence, ie. *I know what I'm doing so it should happen now!* Snatching behaviour was not confined to Google searches. It was also observed when participants were searching the databases and library catalogue for information,

indicating that it is a common behaviour. The transfer of behaviours from the Public Domain Web (Google and similar search engines) to other search utilities and resources such as databases, is also an indication of a culture of technology use and reflects how participants first learnt to use the Internet – in the public domain, learning by themselves and for recreational and entertainment purposes.

Impatience, high levels of confidence and satisficing may also explain the first information-seeking behaviour (ISB-1) used exclusively by 42.5% of the participants. When using ISB-1 participants utilised multiple windows, exhibited complex page switching and task switching behaviour and spent a great deal of time revisiting sites. Many appeared lost in virtual space and as a consequence used landmark sites to re-orientate themselves. The Google homepage, Wikipedia and the university homepage were all used as landmarks by all of the participants during the tasks. Opening multiple pages was a common behaviour observed in participants who used ISB-1, but it did not make them more successful, because they were using simple keyword searches, demonstrated little or no thinking/planning for their searches, and exhibited both satisficing and snatching behaviours. While participants using ISB-2 used a more linear approach (only one page at a time was open on the screen), they too experienced only limited success. Again, high levels of confidence, satisficing and snatching behaviours, as well as being lost in virtual space seemed to preclude the successful completion of the tasks. Behaviours observed were similar across the ING categories and in both genders with the males exhibiting ISB-1 more frequently than females. Since early research in this area reported higher levels of competency for males when using computers and Internet utilities such as browsers (Young, 2000; Hargittai & Shafer, 2006), this result may be due to fact that the males are more prepared to experiment with technology features/gadgets than females. ISB-2 appears to be a more conservative and less complex method for seeking information than ISB-1. Certainly the length of time of Internet use is not a factor influencing information-seeking behaviour in this research. Instead, the frequency of use, confidence, and how participants learnt how to use the Internet appear to be major factors influencing information-seeking behaviour. The fact that only two closely linked, information-seeking methods emerged also supports the notion

that these young people have a culture of technology use when using the Internet and electronic resources to find information.

A major finding from the earlier phases of this research was the importance of printers and the expressed need by participants to print in order to make meaning/comprehend text on the screen. This finding was further supported by observed behaviours when participants were trying to read information on the screen. They peered closely at the screen and/or used the cursor as a line of sight guide when reading in depth. Academic research into reading and making meaning from text on screen indicates that distraction and task switching preclude deep or focused meaning, which affects understanding/comprehension (Mark, 2009). Research by Corio shows that screen literacy skills are closely related to good traditional literacy skills. Students need to be literate before they can 'read' and make meaning from information on the screen, and even students with good literacy skills 'miss' information on the screen (Corio, 2003, 2007). Liu maintains that reading from the screen is different, that networked digital media does a poor job of balancing focal and peripheral attention, that readers suffer tunnel vision and do not have an organized sense of the whole, and that online literacy or screen literacy requires a new skills set to match a new paradigm (Liu, 2009). Recent research by Hanho (2012) found that while students liked the idea of e-books in general, they were not yet ready to give up print books. Great challenges remain in terms of making e-book content more available and producing devices that enable improved comprehension and the reduction of eye fatigue. While there is a need for more research in this area, the results of this study indicate that participants were having difficulty making meaning from text on screen, and many were still printing any information they thought would require more in-depth interrogation.

Participants also failed to 'see' or recognise both obvious and hidden links on the screen. Sometimes this was due to a failure to read the information on the screen closely, while in other cases it appeared to be due to habitual behaviour, in which the participant resorted to using what was familiar. In several cases this meant using a particular database or landmark site even if it

was unsuitable. Evidence of habitual behaviours also support the notion that members of this generation have a culture of technology use and are conservative users of the Internet.

Participants in this research believed they were good users of the Internet, who knew how to find information easily and in many cases felt they were better than their peers both inside and outside university. However, as demonstrated in the tasks, participants' perceptions and beliefs do not necessarily match the reality of their information-seeking behaviour. Only a few of the participants completed the tasks successfully, most demonstrated high levels of satisficing and snatching, and most failed to exhibit simple authentication and evaluation skills. Most of the participants also failed to demonstrate knowledge and sophisticated skill levels when using the browser software to manage, store, create and bookmark information for later use. These findings have also been demonstrated in a wide range of other research studies (Agosto, 2002; Griffiths & Brophy, 2002; Griffiths, 2003; Livingstone, Bober & Helsper, 2005; Pan et al, 2007; Shenton, 2007; Nicholas, Rowlands & Huntington, 2008; Bullen, Mayan and Qayyum, 2011; Kolowich, 2011; Dawson, 2012). If this participant group is representative of the Net Generation, then the results of this research indicate that members of this generation are unsophisticated and superficial information-seekers who are easily satisfied and trust the information they find. They exhibit a strong culture of technology use which they tend to revert to when seeking new information, even if they have received instruction and have the knowledge and tools available to improve their search method. When faced with an open-ended challenge to find information on the Internet and in the electronic databases, this group of Net Generation participants' idealised view of themselves as tech-savvy users did not match their behaviours. They were neither efficient nor effective information-seekers.

Chapter 8 - Discussion and Conclusion

8.0. Introduction – Research question

The primary research question for this thesis asked how the Internet and the emerging culture of technology use around it influences information-seeking behaviour, specifically in young adult Internet users. To explore this question, two areas of investigation were identified. The first investigation used a Web survey to explore young adults' information-seeking behaviour and their perceived skill levels when using Information Communication Technologies (ICTs) to access the Internet and electronic information resources. The second investigation sought to explore, the notion that young people from the Net Generation have a different culture of technology use of the Internet and used interviews and a usability tracking tool to observe participants' information-seeking behaviour in situ at a micro level. Hence, the method used in this research study employed both quantitative and qualitative approaches to provide a more extensive description of how a particular group of young people at the upper end of the Net Generation age limits (18 – 22 years of age) were using the Internet and electronic resources for information-seeking at the time of data collection. The data collected ranged from the macro-level in the anonymous Web questionnaire (how participants think they use technology) and interviews (how they say they use technology - reflective), through to the micro-level in the observation and task analysis (how they actually use technology), in which participants' behaviours, verbal think alouds and information-seeking activities were recorded in detail. The study provides a snapshot in time of the behaviours exhibited by a group of young people when using the Internet and electronic resources to satisfy their information needs during a twelve-month period from early 2007 to early 2008. This chapter provides a summary of the research findings and discussion about what these may mean for the citizen of the future, followed by recommendations for further research in this area.

8.1. Findings - Summary

Findings in this research have also been found in other academic studies conducted over the previous ten – twelve years. Similar to other studies (Kvavik, 2005; Kennedy et al, 2006; Lohnes & Kinzer, 2007; Chang, Kennedy, & Petrovic, 2008; Kennedy, et al., 2008; Bullen, Mayan & Qayyum, 2011) the participants in this group were not extensive or ubiquitous users of technology. While they used email and mobile phones extensively, they were not using social networking and Web based utilities such as listservs, discussion forums and Internet telephony to any great extent. Instead there was evidence they were discerning users who based their use of a range of technologies on perceived need at a particular time in their lives. While this group of young people did appear to have a need to be connected, an attribute ascribed by the proponents of the Net Generation, there was also evidence they were adapting a technology to suit their communication needs. Hence, social networking sites were being used mainly by the follow-up participants to contact specific friendship groups, while email was reserved for more formal and immediate communication. The readiness to adapt technology to suit their needs does appear to fit in with the notion that young people of the Net Generation are tech-savvy. However, there was also evidence this group of Net Generation users were conservative users of their personal hardware preferring to use their mobile phones for traditional talk and text, digital cameras for serious photography and mp3 players and ipods for music. Although cost may account for the traditional use of their mobile phones, the other patterns of use suggest a culture of technology use associated with the specific technology, ie. my camera is for taking photographs and my ipod is for my music. These findings suggest that these young people were discerning users of technology and may even be using it to compartmentalise their lives. Similar findings have been noted in other research studies (Jones & Cross, 2009; Corrin, Bennett & Lockyer, 2010; Roberts, 2010; Bullen, Mayan and Qayyum, 2011; Margaryan, Littlejohn & Vojt, 2011). If this group is representative of the Net Generation, then young people are not afraid to be discerning and adapt and use technology according to perceived need/s, nor are they afraid to move on to new technologies or no technology if work and life changes intervene.

In other research, including large population studies (Eurostat, 2011; Dutton, & Blank, 2011; Center for the Digital Future, 2011), a 20% (approximate) figure has consistently appeared for non-users or users who do not like using the Internet for information-seeking, education, communication and commercial activities. While this figure appeared in this research in the Web questionnaire, it has also been noted in other studies dealing with young people aged between 15 – 22 years, particularly in educational contexts (Aldridge, et al, 2002; Kvavik, 2005; Nicholas, Rowlands & Huntington, 2008). In this research the participants were using the Internet, even though 20% did not like using it, since everyone had used it frequently during the previous three months. Population studies also indicate that use of the Internet occurs across age groups and that young people are inclusive users. They do not use the Internet in a global manner, as purported by the proponents of the Net Generation. Instead they prefer to connect with people they already know and will often resort to trusted/significant others when engaged in serious information-seeking (Livingstone & Bober, 2003; Shenton, 2004; Eisenberg, 2010). This behaviour was also reiterated in this research, with very few of the follow-up participants contacting others outside their family and friendship groups. Despite a push by governments around the world to implement e-government strategies and increasing levels of online information and service delivery in education and commerce, only a small percentage of participants in the research group were using these utilities. These figures have also been noted in the large population studies. Political and civic activity is low in the population studies (Dutton, & Blank, 2011) as well as amongst young people. If the 20% non-engagement figure is representative of all age groups, then e-government, business and education strategies for online delivery designed to cater for the citizen of the future ie. the Net Generation, may need to be revised. Certainly, the participants in this particular group did not exhibit the attributes of the Net Generation, a conclusion that is supported by other research over the last ten years. How young people use the Internet and a range of technologies across a variety of contexts varies widely and does not conform to the idea of a '*digital native*' who is tech-savvy.

Other findings in this research that confirm results from other studies include young people's trust in search engines (Fallows, 2005; Livingstone, Bober & Helsper, 2005; Pan et al, 2007; Center for the Digital Future, 2011), unsophisticated information-seeking behaviour that is based on simple keywords and phrases (Griffiths & Brophy, 2002; Griffiths, 2003; Lenhart, Madden, & Hitlin, 2005; Edwards, 2006; ETS, 2006; Kolowich, 2011), the prevalence of satisficing behaviour (Agosto, 2002; Fallows, 2005; Pan, et al., 2007) and poor Internet/network literacy skills in navigating informational space resulting in the use of landmark sites to reorientate themselves (Fidel et al, 1999; Martzoukou, 2004; Scott, & O'Sullivan, 2005; Nicholas, Rowlands & Huntington, 2008,). Similar to results from other studies (Griffiths & Brophy, 2002; Griffiths, 2003; Edwards, 2006; Kolowich, 2011; Dawson, 2012), participants in this research were also poor users of the electronic resources provided by their university libraries and had great difficulty finding information, even though twelve of the forty follow-up participants in the interviews said they had received specific instruction on how to use the library and electronic databases at university and over half said they used these resources.

Closer examination of the follow-up participants' information-seeking behaviour in the observation and task analysis revealed that participants were using the same behaviours across contexts. They appeared to use similar methods when information-searching on the Internet for recreation and for more serious educational purposes. In the tasks they demonstrated unsophisticated search behaviours based on simple keywords and the consistent use of Google and Wikipedia. While the Google algorithm has changed since this research was conducted, the reliance on Google and simple keyword searching was consistent during the second phases of the research, indicating habitual search behaviour for the follow-up participants in this group. Only three participants showed any evidence of a thinking/planning process to solve an information problem/task, while only a few used other search engines or advanced search features. All of the participants said they used the same method to find information, while thirty-two of the forty said '*it works for me*' when asked why they used the same method. The other common comment from this group when referring to their search method was '*if it ain't broke don't fix it*'. This consistency across the

follow-up group in this research suggests habitual behaviour and a culture of technology use when using the Internet and electronic resources for information-seeking, rather than active attention to searching

Participants exhibited strong satisficing behaviours that have also been observed in other studies (Agosto 2002; Fallows, 2005; Pan et al. 2007; Kolowich, 2011). Satisficing is 'the phenomenon of making do with information retrieved, even though it may not be the most complete, detailed or accurate' (Case, 2002) or 'near enough is good enough'. In her seminal work on information-seeking, Dervin suggested that information seekers make a number of dubious assumptions when seeking information. A major assumption is that 'only objective information is valuable' (Dervin, 1976 in Case, 2002, p. 8.). As a result of this belief, people tend to rely on sources of information that are easily available and related to social contexts, and they will often settle for the first piece of information that appears to solve their information need/problem (Case, 2002). All of the participants in this research exhibited satisficing behaviour, clicked on the first result in a search results page (Google and electronic journals) and rarely went beyond the first four results, even when the result abstract or URL indicated the resource was unsuitable. An extreme form of satisficing, termed *snatching* in this thesis, was also exhibited by over half of the follow-up participants, where they selected the first result before the results page had finished downloading. The word 'luck' was used by a number of participants during the initial search phase, while the word relevant was often used when referring to the authority or quality of the resources found, ie. if it appears relevant then it must be good. Few of the follow-up participants exhibited behaviours that indicated an informed or consistent evaluative thinking process when information-seeking. Such common behaviours indicate a culture of technology use involving a strong trust in search engine results, the tendency to satisficing behaviour which leads to a reliance on single sources of information (Fallows, 2005) and the expectation that the Internet will do the thinking for them (Everhart & Valenza, 2004). These behaviours were observed during both tasks across all participants indicating that for these young people, their information-seeking behaviour when using the Internet does not change to

suit different contexts, ie. recreational data gathering (lower importance) versus educational purposes (greater importance).

A surprise finding in the Web questionnaire was the importance of the printer. When questioned in the interviews, over half of the follow-up participants indicated they had difficulty making meaning from text on screen and printed anything they considered significant or relevant to their information-seeking. During the tasks many participants either used the cursor as a line-of-sight guide and/or peered very closely at the screen when attempting to read in-depth. Half of the group relied on the rapid scanning of keywords, obvious links (underlined) and headings to direct their information-seeking. This group did not read anything on the screen in depth. Difficulties when reading from the screen have also appeared in the research literature during the last ten years (Corio, 2003, 2007; Nicholas, Rowlands & Huntington, 2008; Liu, 2009; Hanho, 2012). This is an area of research that requires more in-depth investigation, if reading and making meaning from text on the screen represent another skill set that may need to be part of formal reading instruction in educational settings increasingly set up for the online delivery of programs. This is particularly relevant in view of the Australian Government's agenda to place computers in schools, one-to-one laptop programs and the use of other mobile technologies in the classroom such as ipads and iphones (Commonwealth Government of Australia, 2011a). If making meaning from text on screen is difficult, as the research suggests, then this factor will have an impact on everyone using the Internet for information-seeking, not just students engaged in education.

Minimal use of browser tools, heavy use of the back button for navigation, and a failure to recognise hidden links were also commonplace during the tasks. As a result, many of the follow-up participants exhibited high levels of frustration, but few reported feelings of anxiety. Most of the follow-up participants appeared to be comfortable and confident throughout the tasks even though only a few managed to complete either task within the designated time limit. Unsophisticated search skills and satisficing/snatching behaviours meant that participants in this research were often frustrated and did not achieve their information-seeking goals, but they remained confident. Shenton (2007) calls

the habitual behaviours exhibited by young people when information-seeking online as a paradox, where young people 'are often highly critical of particular information resources, yet continue to use them habitually' (Shenton, 2007, p. 4). Another of Shenton's paradoxes is related to this habitual behaviour and notes that 'despite the sophistication of today's information age, youngsters frequently follow a basic formula for action when finding and using information' (Shenton 2007, p.4). Strong evidence of such behaviours was apparent in the follow-up group in this research.

A major finding of this research which supports Shenton's idea of habitual behaviour and the notion of a culture of technology use when seeking information, was the homogenous nature of the Web survey group and common behaviours and beliefs reported in the interviews and observed in the tasks. Common behaviours were exhibited across the follow-up participants who were described using the ING metric which incorporated both levels of use (Effective Domain) and levels of confidence (Affective Domain). Only two closely related information-seeking behaviours emerged during the tasks. Participants using ISB-1 (mostly males) opened multiple windows or browsers and spent most of their time switching between them, while participants using ISB-2 took a more linear approach and usually had one window open at any one time. However, participants exhibiting either or both information-seeking behaviours used the back button extensively for navigation and landmark sites to reorient themselves (usually Google), exhibited heavy satisficing and snatching behaviours, constantly revisited websites and opened large numbers of new pages. Hence, there was a high level of consistency of results from across the two phases of data collection, which included how the participants were using technology and which technologies they used (Web questionnaire); how they perceived themselves and their use of technology (reflective interviews); and their actual information-seeking behaviours and technology use (observation and tasks). This consistency suggests strongly that there is an existing culture of technology use amongst this group of young people when they use the Internet and electronic resources for information-seeking purposes.

Another major finding of this research was the level of confidence exhibited by the whole group and the connection between confidence, frequency of use and the way participants first acquired their skills when using the Internet. While participants in the Web questionnaire fell slightly below the mean for levels of use (Effective Domain), they scored nearly one standard deviation higher for confidence (Affective Domain). They were extremely confident users across all the ING categories. This confidence even extended to technology they had never used before. Unlike other studies which have suggested that competence is the result of longevity of exposure to the Internet (Livingstone, 2006; Madden, Ford, Miller & Levy, 2006), in this study there was a correlation between confidence and frequency of use, and an even stronger connection between confidence and how participants acquired their Internet skills. Participants reported overwhelmingly that they had acquired their skills on their own using experimentation or with friends as mentors. Teachers were not rated highly as instructors or mentors and most participants reported using the Internet for mainly personal/recreational use and only sometimes for study purposes at home, indicating that formal instruction in how to use the Internet in educational settings was not a common occurrence for this group. According to educational theory (Kolb, Boyatzis & Mainemelis, 1999; Moon, 2004; Chapman, Ramondt & Smiley, 2005; Kearsley, 2010b; Kolb, & Yeganeh, 2012) learning by experimentation and self-affirmation is a very powerful educational pedagogy that leads to deep learning. Kuhlthau also demonstrated the importance of social learning and the influence of 'friends' in her work on information-seeking behaviour in the early 1990s before the advent of the Internet (Kuhlthau, 1991; 1993; 1994).

In this research experiential learning and how participants first learnt to use the Internet showed a strong correlation to participants' confidence and how they felt about themselves as users of the Internet and other technologies. Since confidence in this study was also affected by frequency of use and everyone was using the Internet, the development of a habit or culture of technology use that is continually being re-affirmed by the user is highly likely. All the follow-up participants were using Google, their information-search behaviours were very similar and they evidenced little knowledge of how the technology/Internet

actually works. Only the Library and Information Studies student who had completed some intensive instruction on information-seeking processes and techniques demonstrated an understanding of advanced search techniques. However, his initial strategies used simple keyword searches and Google. In other words, he reverted to his original approach, indicating an habitual culture of technology use. His recorded verbalisations indicate how powerful this culture of use can be. Similarly, the 30% of follow-up students who had received instruction on how to use the library databases also exhibited unsophisticated information-seeking behaviours. Only when deep learning occurs can a culture of use develop that is strong enough to over-ride other behaviours and account for Shenton's paradox: 'despite the sophistication of today's information age, youngsters frequently follow a basic formula for action when finding and using information' (Shenton 2007, p.4).

Information-seeking is also different to locating information or information-searching, which is one component of the information-seeking continuum. Information-seeking includes problem-solving to deconstruct an information need, information search strategies and planning, evaluation of the resources found, and being able to analyse and use the information to meet a prescribed need, ie. information-seeking is a complex process that is a component of information literacy. While participants were extremely confident in their ability to locate or find information, they were not as confident in their ability to manipulate it, store it or re-find it. These are basic information literacy skills and responses from participants in both the Web questionnaire and the interviews indicated that they understood the difference. Reports from the academic literature also indicate that the so-called *digital natives* of the Net Generation have poor information literacy skills (Coulson, Ray & Banwell, 2003; ETS, 2006; Livingstone, 2006; Nicholas, Rowlands & Huntington, 2008; Head & Eisenberg, 2010; Kolowich, 2011). However, participants in this research exhibited high levels of confidence throughout all phases of the research. If, as suggested by the findings in this study, young people have developed a culture of technology use when using the Internet based on experiential learning that is continually being reinforced the more they use the technology, then changing this culture of use and the associated behaviours will

be very difficult. Change can occur only if a new culture is introduced and employed consistently by the users.

8.2. The Net Generation - Confidence and a culture of technology use

Confidence is perhaps the key to understanding how this generation uses technology, an aspect observed and postulated on at length by the proponents of the Net Generation idea which originated during the very early days of the public Internet. They misinterpreted this confidence and assumed that it also translated into intentional, meaningful, effective and efficient information-seeking. Since the population studies indicate that young people are heavy users of technology, this confidence is borne out of familiarity with the technology. As indicated by participants in this research, young people use technology even if they dislike using it and they use it with confidence. High levels of confidence also means they are not afraid to use, adapt or move on to new technologies if a perceived need is evident. Hence, the young people in this group used technology in a discerning manner and reported changes in their usage patterns, as their lifestyle and information needs changed. These attitudes to the uptake and use of technology may explain why they were not using a wide range of technologies as implied by the idea of a Net Generation. However, findings also suggested participants were conservative users and were using technology to be connected to known others more than anything else, as well as for recreation and entertainment. Findings from this research suggest that young people use technology for finding information when the need arises and they have acquired a culture of technology use when seeking information via electronic means that is closely linked to how they first learnt to use the Internet – at home, by themselves and for entertainment/leisure activities.

In this research confidence was an important factor in determining how the participants used the Internet for information-seeking. The findings suggest a strong habit had developed predicated on how they first learnt to use technology. This habit was prevalent across contexts: how they first learnt to use technology for entertainment, communication and browsing the Internet at home was transferred to more serious contexts such as information-seeking for

information and educational purposes. Confidence levels were very high, and it could be argued had led to a certain amount of complacency, evident in the high levels of satisficing, low levels of anxiety and participants' certainty they could find the information they needed on the Internet. Even when frustrated and unsuccessful, they remained confident. Participants' confidence in their ability to find information was such an over-riding factor that the findings also suggested they often assumed all the information would be available from a single source, or if they couldn't find the information required, then it didn't exist.

If the research participants' attitudes and uses of technology are representative of young people elsewhere, then when confidence and complacency are the result of a developing culture of technology use, achieving competence in information-seeking skills becomes problematic, particularly when the information-seeking process is unsophisticated and linked only to locating information rather than incorporating the higher order thinking skills that form part of the information literacy continuum. Proponents of the Net Generation idea assume young people are confident and competent when using technology simply because they have never known an information landscape that is not dominated by the Internet and electronic media. The idea of a Net Generation and the *digital native* has been fostered 'particularly by educators and politicians seeking to be part of the 'digital rhetoric' where ICTs are defined as the main driver for innovative education and training systems' (Buchanan, & Chapman, 2009). However, research by Lei (2009) and more recently by So, Choi, Lim, & Xiong (2012), indicate that while Net Generation teachers are tech-savvy when it comes to using basic technologies and the Internet for socialising and communication, they do not appear to integrate technology into their curriculum programs, nor do they teach information-seeking skills or the information literacy process to their students. It is not surprising then that participants in this research appeared to be transferring their information-seeking strategies learnt in a recreational context (home) to more serious contexts such as education. Do educators foster a climate of limited formal information-seeking skills instruction because they also have similar skill levels, but not the confidence of youth? Or is the lack of skills instruction in schools a result of the

idea of a Net Generation of *digital natives* who do not need to be taught how to use technology and the Internet? A lot more research needs to be conducted in both areas to ascertain whether current and pre-service teachers require extra training and whether the notion of a culture of technology use is prevalent in both younger members of the Net Generation and people from older generations or the so-called *digital immigrants*.

As evidenced by the findings in this research, younger people appeared to transfer their information-seeking behaviours from one context to another, for example from recreational to educational purposes. How much of a role do perceptions of purpose play in how young people seek information and how is this affected by the notion of a culture of technology use? During the task analysis and interviews students checked the task sheet in the second task (academic) often, but rarely checked the task sheet in the first task (recreational), even though the information requirements were quite complex and a range of information was required from a number of sources. The second task required students to find information from three different resource formats, but it also required interpretation and to be successful, a definition of terms and concepts ie. some problem-solving was required. The first task represented data gathering for a recreational purpose (a holiday), while the second task represented a research assignment for university (educational context). The tasks were designed to represent a simulation of real-life contexts experienced by this particular group. Even though the tasks were inherently different, participants continued to exhibit the same information-seeking behaviours across both contexts. Results from this study suggest that the seriousness of the context does not alter the information-seeking behaviour, reaffirming Shenton's paradox (2007) that these unsophisticated behaviours are habitual. So even when the context and consequences become more serious, the information-seeking behaviours remain consistent, and the probability that the quality of the information retrieved and its usefulness/value to the user will decrease, becomes a distinct possibility.

This concept is represented in Figure 8.1 below.

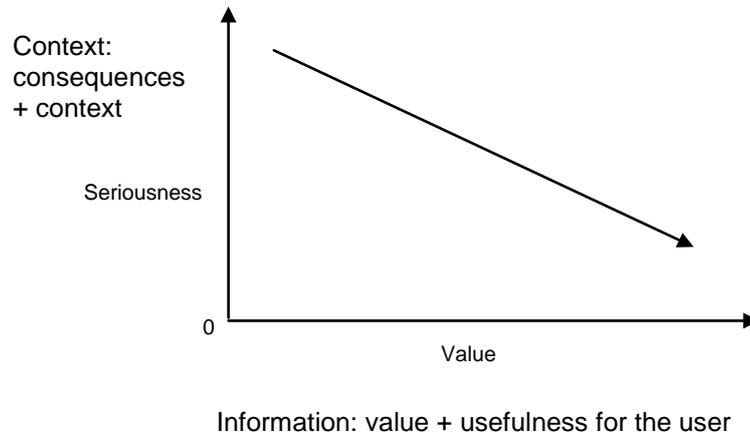


Figure 8-1: Information-seeking behaviour, context and consequences

Poor information-seeking skills become important when the context and the consequences are serious. When the context for the information-seeking is for education, business and commerce, or accessing Government e-services, then the consequences can be extremely serious for the user. Even accessing personal information via the Internet such as health information can have serious consequences for the uninformed user who does not have the skills to locate and authenticate the information they find. For citizens who have English as a second language, accessing and interpreting information from community support groups and Government e-services is also problematic. Serious information-seeking is about solving information problems which can have serious consequences, so teaching the current and future generations how to use technology for information-seeking is extremely important for a society in the twenty-first century where information and service delivery may be available wholly online. If the group who participated in this research study are representative of young people in general, then their lack of skills, unsophisticated information-seeking behaviours, and developing attitudes and culture of technology use, do not bode well for an informed twenty-first century citizen.

8.3. Future proofing and the information-rich citizen

Since the information landscape today is more complex and in a state of constant flux, the ability to find, interpret and use information using a range of digital technologies is more important than ever before. For pre-Internet generations, the information landscape was dominated by print media that included certain publishing processes which assured the user of a level of authority and authenticity. Information remained solid and changed slowly, usually after a rigorous revision process. The landscape was much simpler, and users could distinguish more easily between information in a serious context and information for entertainment and leisure.

The Internet and a rapidly changing information landscape that incorporates social networking and multiple delivery modes and formats have blurred the once-defined boundaries between information contexts, resulting in less obvious signposting for the user. The difficulties for users when information-seeking in this medium have been exacerbated by the multiple layers/nature of the Web (Internet/media) and rapid, ongoing developments in new technologies; the amount of information available; the lack of organisation of information on the Web; the simultaneous use of various Web utilities and delivery modes for commercial, informational, and educational purposes; and the lack of authority of information on the Internet.

This is an evolving, often confusing and complex environment. To navigate it to any degree requires certain information-seeking skills which are more than being able to use the latest browser utility or putting keywords or phrases into Google. Information-seeking includes problem-solving, which requires both technical skills and thinking skills, so the user can adapt to the constantly changing landscape and learn new skills as required. While Tapscott recognised the importance of language to describe this group (Tapscott, 1998, p.33), the term Net Generation primarily identifies young people with the network (technology) and connectivity rather than information-seeking and problem-solving. It was assumed that young people would acquire these skills because they were connected. However, a culture of technology use based on the need to be connected and entertained, which is primarily how young people

learn to use the Internet, is quite different from being savvy, knowledgeable, able to access and use information/knowledge to solve a problem.

As governments, educational systems and commerce worldwide move towards the delivery of all information and services wholly online, there is a distinct possibility that large numbers of citizens will be left behind or as Floridi predicts (2007), information-poor. If the assumption during in this transition stage is that new service delivery modes currently being implemented are to cater for a generation of users who already have the skills to use technology (Net Generation), then this and other research studies over the previous 10 years indicate that future citizens will be disenfranchised and unable to get the information they need when the context and consequences are serious. As Lei (2009) suggests and the findings of this research support, the attitudes and beliefs established during young people's primary use of the Internet, has a major effect on how young people seek information. They appear to be unable to make the transition from a *toy* used for entertainment to an information-seeking *tool*. The findings in this research suggest strongly that as they grow older and their lives change their information-seeking behaviour remains constant across all contexts. To change such strong habitual behaviour will require the consistent application of information-seeking skills instruction and information literacy using the Internet from the very earliest educational settings. However, current research by Lei (2009) and So et al. (2012) indicates that Net Generation teachers are not embedding such skills teaching in their programs. The findings of this research also suggest that everyone across the generations is using the Internet in a similar fashion, so the findings from this research have ramifications for all citizens.

8.4. Conclusion and Recommendations

The findings from this research support strongly the notion that young people exhibit habitual information-seeking behaviours or a culture of technology use when using the Internet and technology for information-seeking and problem-solving predicated on how they first learnt to use the Internet. If this sample group represents beliefs, assumptions and information-seeking behaviours that are common amongst the Net Generation, then while young

people may gravitate towards technology because it is perceived as fun (tech oriented), and they may use it because service delivery is increasingly only available online, it does not follow that they are capable, effective or efficient users (tech-savvy). If everyone is using the Internet for information problem-solving in the same way, then society as a whole is not prepared for the idea of a twenty-first century, digital citizen. As with other research conducted over the previous twelve years, this study indicates clearly, that there is no such thing as a Net Generation or a *digital native*. To counteract these labels which still have resonance with the general public, the media, politicians and educators, the following areas are recommended for further research.

1. Cross-generational, comparative studies need to be included in the research agenda to ascertain how people of all ages are using technology to satisfy their information needs. This research will provide Governments and education systems with relevant information to make informed policy decisions when funding curriculum innovation and the provision of technology in schools.
2. Information problem-solving (information literacy skills) instruction and information-seeking skills need to be included in educational programs at the earliest possible stage in schools to counteract the culture of technology use evident in this research. Such skills need to be embedded and taught consistently across all stages of schooling to build an alternative culture and develop future citizens who are truly information-savvy when using the Internet and electronic resources for information-seeking.
3. Government particularly needs to recognise that training and support for citizens when seeking information is an important part of information service provision for all citizens. This is particularly relevant for Australia which has a large component of citizens who speak English as a second language.

The findings from academic research conducted over the last ten to twelve years also needs to reach the general public to counteract the myth of a

tech-savvy, Net Generation; an idea which still has profound resonance, even though it was first coined at a time when public use of the Internet was in its infancy. Although there is a large body of rigorous research in this area, policy decisions at Government and systemic educational levels are still based on the idea of a Net Generation and a *digital native*. Only when the academic research becomes part of the mainstream media and public perception will educators and politicians move beyond the ‘digital rhetoric’; ‘competing agendas, different hierarchical positions and contested power relations’ noted by Buchanan and Chapman (2009, p.2). Only when informed, critical and rational debate is conducted by politicians and educators in schools and universities will the moral panic observed by Bennett (Bennett, Maton & Kervin, 2008) subside, and ensure that educators and Government take appropriate steps to prepare future citizens who will be able to address ‘the needs of a highly skilled and technologically capable workforce’ (Baskin & Williams, 2006, p.455).

Chapter 9 - References

Aamodt, S. (2009). A test of character. Does the brain like e-books? *New York Times*. Retrieved November 9, 2012 from <http://roomfordebate.blogs.nytimes.com/2009/10/14/does-the-brain-like-e-books/>

Agosto, D.E. (2002). Bounded rationality and satisficing in young peoples' Web-based decision-making. *Journal of the American Society for Information Science and Technology*, 53(1), 16-27.

Ainley, (2010). What can Australian students do with computers? *Research Developments*, 23, 1-4.

Ainley, J. & Enger, L. (2007). *Student use of, and engagement with information technology*. Australian Council for Educational Research (ACER). Retrieved September 20, 2012 from <http://pandora.nla.gov.au/tep/82406>

Ainley, J. & Searle, D. (2005). *Students in a digital age: Some implications of ICT for teaching and learning*. Australian Council for Educational Research (ACER). Retrieved September 20, 2012 from <http://pandora.nla.gov.au/tep/82404>

Alch, M.L. (2000). Get ready for a new type of worker in the workplace: The Net Generation. *SuperVision*, 6(4), 3-8.

Aldridge, J., Fraser, B., Murray, K., Combes, B., Proctor, D & Knapton, P. (2002). Learning environment teaching strategies and the implementation of a grade eleven online nuclear physics program. Paper presented at the *National Association for Research in Science Teaching Conference*, March, New Orleans.

Anderson, K., Clayden, J., Combes, B., Ring, J. & Williams, T. (2005). Out of the frying pan and into the spa: Developing an online learning community and culture. *Pacific Asian Education: A Journal about Education in Pacific Circle Countries*, 17(1), 44-53.

Arafeh, S., Levin, D., Rainie, L. & Lenhart, A. (2002). *The digital disconnect: The widening gap between Internet savvy students and their schools*. Pew Internet & American Life Project. Retrieved September 30, 2012 from <http://www.pewinternet.org/Reports/2002/The-Digital-Disconnect-The-widening-gap-between-Internetsavvy-students-and-their-schools.aspx>

Armstrong, C., Fenton, R., Lonsdale, R., Stoker, D., Thomas, R. & and Urquhart, C. (2001). A study of the use of electronic information systems by higher education students in the UK. *Aslib Proceedings*, 35(3), 241-262.

Australian Bureau of Statistics (ABS) (2011). *8146.0 - Household Internet and computer access, Australia, 2010-11*. Retrieved September 30, 2012 from <http://www.abs.gov.au>

Avison, D., Lau, F., Myers, M., & Nielsen, P. A. (1999). Action research. *Communications of the ACM*, 42(1), 94-97.

Babbie, E. (2010). *The practice of social research* (12th ed.). Belmont, CA: Wadsworth Cengage.

Banwell, L. and Gannon-Leary, P. (2000). JUBILEE: Monitoring user information behaviour in the electronic age. *OCLC Systems and Services*, 16(4).

Barak, L. (2012). Multitasking in the university classroom. *International Journal for the Scholarship of Teaching and Learning*, 6(2). Retrieved September 30, 2012 from <http://academics.georgiasouthern.edu/ijstol/v6n2.html>.

Barnes, K., Marateo, R. & Ferris, S. (2007). Teaching and learning with the Net Generation. *Innovate Journal of Online Education*, 3(4). Retrieved September 28, 2012 from http://www.innovateonline.info/pdf/vol3_issue4/Teaching_and_Learning_with_the_Net_Generation.pdf

Barone, C. (2005). The new academy. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Baskin, C., & Williams, M. (2006). ICT integration in schools: Where are we now and what comes next? *Australasian Journal of Educational Technology*, 22, 455-473.

Bauerlein, M. (2009). *The dumbest generation: How the digital age stupefies young Americans and jeopardizes our future*. New York: Jeremy P. Tarcher/Penguin.

Bayne, S., & Ross, J. (2007). The 'digital native' and 'digital immigrant': a dangerous opposition. Paper presented at the *Annual Conference of the Society for Research into Higher Education*.

BECTA, (2008). *Emerging technologies for learning*, 3. Retrieved September 30, 2012 from http://www.mmiweb.org.uk/publications/ict/emerging_tech03.pdf

Bednar, A. K., Cunningham, D. Duffy, T. M. & Perry, J. D. (1998). Theory into practice: How do we link? In T. M Duffy and D. H. Jonassen (Eds.) *Constructivism and technology of instruction: A conversation*. Hillsdale, NJ: Lawrence Erlbaum Associates, 17-35.

Beinhoff, L. (2011). The Millennials: A survey of the most cited literature. *CHOICE: Current Reviews for Academic Libraries*, 48(12), 2225-2232.

Bennett, S. & Maton, K. (2010). Beyond the 'digital natives' debate: Towards a more nuanced understanding of students' technology experiences. *Journal of Computer Assisted Learning*, 26, 321-331

Bennett, S. & Maton, K. (2011) Intellectual field or faith-based religion: Moving on from the idea of 'digital natives'. In Thomas, M. (ed.) *Deconstructing Digital Natives: Young people, technology and the new literacies*. New York, Routledge.

Bennett, S., Maton, K. & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775-786.

- Berners-Lee, T. & Fischetti, M. (1999). *Weaving the Web: The past, present and future of the World Wide Web by its inventor*. London: Orion Business Books.
- Bernier, A. (2005). *Libraries and teens meet @ technology: Comments on the PEW Study*. Retrieved on July 30, 2005 from LM_NET Listserv
- Billings, D. (2004). Teaching learners from varied generations. *The Journal of Continuing Education in Nursing*, 35(3) 104-106.
- Bingham, T. (2009). Learning gets social: A powerful force - unlike any in history - is altering the learning profession's landscape. *T + D*, 63(8), 56-61.
- Blaxter, L., Hughes, C., & Tight, M. (1998). *How to research*. Buckingham, Philadelphia: Redwood Book, Trowbridge.
- Blurton, C (1999). *World communication and information report, UNESCO*. Retrieved December 7, 2012, from www.unesco.org/education/educprog/lwf/dl/edict.pdf
- Boddie, W., Contardo, J. & Childs, R. (2007). The future workforce: Here they come. *Public Manager*, 36(4) 25-28.
- Bogan, K. (2006). *College students fall short in demonstrating the ICT literacy skills necessary for success in college and the workplace*. Educational Testing Service. Retrieved September 30, 2012 from http://mclaitec603sbrsd.wikispaces.com/file/view/info_lit_students_falling_short.pdf
- Borgatti, S.P. & Cross, R. (2003). A relational view of information seeking and learning in social networks, *Management Science*, 49(4) 432.
- Bow, A. (2000). Ethnographic techniques. In Williamson, K. (2000). *Research Methods for Students, Academics and Professionals: Information Management and Systems*. (2nd Ed.). Wagga Wagga, NSW: Centre for Information Studies Charles Stuart University, 247-261.
- Branch, J.L. (2000). Investigating the information seeking processes of adolescents: The value of using think alouds and think afters. *Library and Information Science Research*, 22(4), 371-392.
- Branch, J.L. (2003). Instructional Intervention is the key: Supporting adolescent information seeking. *School Libraries Worldwide*, 9(2), 47-61.
- Braunsberger, K., Wybenga, H. & Gates, R. (2007). A comparison of reliability between telephone and web-based surveys. *Journal of Business Research*, 60(7), 758-764.
- Brinsden, C. (2012). Govt not mulling public service job cuts. *AAP, The West Australian*. Retrieved September 25, 2012 from <http://au.news.yahoo.com/thewest/a/-/national/14956300/govt-not-mulling-public-service-job-cuts/>
- Brooks, D. (2000). What's the matter with kids today? Not a thing. *New York Times*. Retrieved September 28, 2012 from <http://www.nytimes.com/books/00/11/05/reviews/001105.05brookst.html>

- Brown, G. (2008). *How to manage Generation Y. Your Life Works*. Retrieved September 30, 2012 from <http://yourlifeworks.ninemsn.com.au/article.aspx?id=611211>
- Brown, J.S. (2000). Growing up digital: How the Web changes work, education, and the ways people learn. *USDLA Online Journal*, 10-20. Retrieved December 7, 2012 from http://www.usdla.org/html/journal/FEB02_Issue/article01.html
- Brown, M. (2005). Learning spaces. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>
- Bryman, A. (2007). Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research*, 1(1), 8-22.
- Buchanan, E.A. (2004). *Readings in Virtual Research Ethics: Issues and Controversies*. Hershey, United States of America: Information Science Publishing
- Buchanan, R & Chapman, A. (2009). Dialogue and difference: The sorry story of the digital native. *Philosophy of Education Society Australasia (PESA) 38th Annual Conference*, Honolulu, Hawaii. Retrieved Jan 1, 2012 from <http://www2.hawaii.edu/~pesaconf/zpdfs/37buchanan&chapman.pdf>
- Bullen, M. (2007). *Net Gen skeptic: OECD New Millenium Learners' Conference 2009* [blog]. Retrieved September 30, 2012 from <http://www.netgenskeptic.com/2009/09/oecd-new-millennium-learners-conference.html>
- Bullen, M., Morgan, T. & Qayyum, A. (2011). Digital learners in higher education: Generation is not the issue. *Canadian Journal of Learning and Technology*, 37(1). Retrieved Jan 3, 2012 from www.cjlt.ca/index.php/cjlt/article/download/550/298
- Cacioppo, J. T., von Hippel, W. & Ernst, J.M. (1997). Mapping cognitive structures and processes through verbal content: The thought-listing technique. *Journal of Consulting and Clinical Psychology*, 65(6) 928–940.
- Cambridge University Press. (2013). *Cambridge dictionaries online*. Retrieved September 27, 2013 from <http://www.collinsdictionary.com/dictionary/english>
- Case, D.O. (2002). *Looking for information: A survey of research on information seeking, needs and behaviour*. California: Academic Press.
- Castek, J., Zawilinski, L., McVerry, G., O'Byrne, I., & Leu, D. J. (2011). The new literacies of online reading comprehension: New opportunities and challenges for students with learning difficulties In C. Wyatt-Smith, J. Elkins, & S. Gunn (Eds.) *Multiple Perspectives on Difficulties in Learning Literacy and Numeracy*. New York, NY: Springer.
- Center for the Digital Future (2009). *The Digital Future Project 2011 – Surveying the digital future year ten*. University of Southern California (USC) Annenberg School. Retrieved September 30, 2012 from <http://www.digitalcenter.org/>

Chang, R., Kennedy, G. & Petrovic, T. (2008). Web 2.0 and user-created content: Students negotiating shifts in academic authority. In *Hello! Where are you in the landscape of educational technology? Proceedings Ascilite Melbourne 2008*. Retrieved December 7, 2012 from <http://www.ascilite.org.au/conferences/melbourne08/procs/chang.pdf>

Chapman, C., Ramondt, L. & Smiley, G. (2005). Strong community, deep learning: Exploring the link. *Innovations in Education and Teaching International*, 42(3), 217–230.

Charp, S. (1997). Some reflections. (The 30-year history of computers in education) (Industry Trend or Event), *T H E Journal (Technological Horizons in Education)*, 24(11), 8.

Chief Information Officers Council (CIO). (2012). *Recruiting the Net Generation*. Retrieved September 30, 2012 from <http://www.ascilite.org.au/conferences/melbourne08/procs/chang.pdf>

Clarke, R. (2009). *Origins and Nature of the Internet in Australia*. Retrieved December 7, 2012 from <http://www.rogerclarke.com/II/OzI04.html#Beg>

Clayton-Pedersen, A.R. & O’Neill, N. (2005). Curricula designed to meet 21st century expectations. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Coates, J. (2007). *Generation Y - The Millennial Generation. Generational Learning Styles*. Retrieved December 2009 from <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/GenY.htm>

Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56(6). Retrieved December 7, 2012 from http://www.readingonline.org/electronic/elec_index.asp?href=/electronic/rt/2-03_column/index.html

Coiro, J. & Dobler, B. Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly*. 42, 214-257. Retrieved December 7, 2012 from <http://www.newliteracies.uconn.edu/pubs.html>

Cole, G., Smith, R. & Lucas, L. (2002). The debut of Generation Y in the American workforce. *The Journal of Business Administration Online*, 1(2). Retrieved September 30, 2012 from http://www.atu.edu/business/jbao/Fall2002/cole_smith_lucas.pdf

Collins. (2013). *The Collins English dictionary*. Retrieved November 18, 2013 from <http://www.collinsdictionary.com/>

Collins. (2013). *Definition of digital native*. Retrieved September 27, 2013 from <http://www.collinsdictionary.com/dictionary/english/digital-natives>

Combes, B. (2005a). Computers, ICTs and online curriculum: A role for the Teacher Librarian? *IASL Reports, 2005, Information Leadership in a Culture of Change*, Hong Kong, China.

Combes, B. (2005b). The copy-and-paste culture of the Net Generation: Strategies for dealing with plagiarism. *ACCESS 19(1)*, 21-24.

Combes, B. (2006). Techno savvy and all-knowing or techno-oriented? Information-seeking Behaviour and the Net Generation. *IASL Reports 2006: The Multiple Faces of Literacy, Reading, Knowing, Doing*, Lisbon, Portugal.

Combes, B (2007). The search for information and the Net Generation. *Cyberspace, D-world, E-learning: Giving libraries and schools the cutting edge, The 2007 IASL Conference*, National Taiwan Normal University, Taipei, Taiwan, 16-20 July 2007

Combes, B. (2008). The Net Generation: Tech-savvy or lost in virtual space? *37th Annual Conference of the IASL: World Class Literacy and Learning Through School Libraries*, Berkeley University, California, 3-7 August, 2008.

Combes, B. (2009). Generation Y: Are they really digital natives or more like refugees? *Synergy*, 7(1), 31-40.

Combes, B & Valli, R. (2007). The future of learning objects. In *Principles and Practices of the Effective Use of Learning Objects*, Alex Koochang & Keith Harman (Eds.), UK: Informing Science Press.

Commonwealth Government of Australia. (2006). *2006 e-Government strategy, responsive government: A new service agenda*. Department of Finance and Deregulation. Retrieved September 21, 2012 from <http://www.finance.gov.au/publications/2006-e-government-strategy/index.html>

Commonwealth Government of Australia. (2008). *Road safety report no 4. Department of Infrastructure, Transport, Regional Development and Local Government*. Retrieved September 20, 2012 from http://www.infrastructure.gov.au/roads/safety/publications/2009/pdf/rsr_04.pdf

Commonwealth Government of Australia. (2011a). *Experience the digital education revolution*. Department of Education, Employment and Workplace Relations. Retrieved September 20, 2012 from <http://www.deewr.gov.au/Schooling/DigitalEducationRevolution/Pages/default.aspx>

Commonwealth Government of Australia. (2011b). *National secondary school computer fund*. Department of Education, Employment and Workplace Relations. Retrieved September 20, 2012 from <http://www.deewr>

Commonwealth Government of Australia. (2012). *Publications*. Retrieved September 20, 2012 from <http://australia.gov.au/publications>

The Conference Board Inc. (2006). *Are they really ready for work? Employers perspectives on the basic knowledge and applied skills of new entrants to the 21st century US workforce*. Workforce Readiness Project Team. Retrieved September 30, 2012 from http://www.p21.org/storage/documents/FINAL_REPORT_PDF09-29-06.pdf

Corrin, L., Bennett, S. & Lockyer, L. (2010). Digital natives: Everyday life versus academic study. *Proceedings of the 7th International Conference on Networked Learning*, p. 643-650. Retrieved September 30, 2012 from Proceedings of the 7th International Conference on Networked Learning

Coulson, G., Ray, K. and Banwell, L. (2003). The need for a converged approach to EIS provision? Evidence from the JUBILEE project. *Library Review*, 52(8/9) 438-444.

Couper, M.P. (2000). Web surveys: A review of issues and approaches. *Public Opinion Quarterly*. 64(4), 464-495.

Coyne, R. (2001). Digital consumption: From the market direct to the home. Paper presented at the *Cultural Usability Seminar at UIAH Media Lab*. Retrieved September 27, 2012 from http://www.mlab.uiah.fi/culturalusability/papers/Coyne_paper.html

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice*, 39(3), 124-130.

Creswell, J. W., & Tashakkori, A. (2007). Editorial: Developing publishable mixed methods manuscripts. *Journal of Mixed Methods Research*, 1(2), 107-111.

Cummins, R.A. & Gullone, E. (2000). Why we should not use 5-point Likert scales: The case for subjective quality of life measurement. *Proceedings, Second International Conference on Quality of Life in Cities*, Singapore: National University of Singapore, 74-93.

Damle, M. (2012). Social media burnout visible amid youth in urban India. *The Times of India*. Retrieved November 5, 2012 from http://articles.timesofindia.indiatimes.com/2012-02-01/india/31012680_1_social-media-social-networks-d-s-rawat

Davenport, T.H. (1997). Information behavior: Why we build systems that users won't use. *Computerworld*, 31(37), S1-S11.

Dawson, D. (2012). *Digital education: Comparison in attitudes*. Australian Policy Online. Retrieved March 17, 2012 from <http://apo.org.au/commentary/digital-education-comparison-attitudes>

Dede, C. (2005). Planning for neomillennial learning styles: Implications for in technology and faculty. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

DeFelice, A. (2008). Peter Sheahan demystifies Gen Y. *Accounting Technology*, 24(11), 40.

della Cava, M.R. (2010). Some ditch social networks to reclaim time, privacy. *USA Today*. Retrieved October 30, 2012 from http://usatoday30.usatoday.com/tech/webguide/internetlife/2010-02-10-1Asocialbacklash10_CV_N.htm?csp=34

- Department of Broadband, Communications and the Digital Economy (DBCDE). (2011). *#au 20 National Digital Economy Strategy*. Retrieved September 20, 2012 from http://www.nbn.gov.au/files/2011/05/National_Digital_Economy_Strategy.pdf
- Dervin, B. (1998). Sense-making theory and practice: An overview of user interests in knowledge seeking and use. *Journal of Knowledge Management* 2(2), 36-46.
- Dick, B. (1999). Sources of rigour in action research: Addressing the issues of trustworthiness and credibility. *Association for Qualitative Research Conference, Issues of Rigour in Qualitative Research*, Melbourne, Victoria, 6-10 July 1999. Retrieved on March 18, 2012 from <http://www.aqr.org.au/local/offer/papers/BDick.htm>
- Dick, B. (2000). *A beginner's guide to action research*. Retrieved on December 7, 2012 from <http://www.aral.com.au/>
- Dorman, S.M. (2000). Implications of growing up digital. Review of Tapscott's Growing up digital. *The Journal of School Health*, 70(10) 420-422
- Downes, S. (2007). Places to go: Google's search results for "Net Generation". *Innovate* 3(4). Retrieved December 7, 2012 from <http://www.innovateonline.info/index.php?view=article&id=455>
- Dudek, D., Mastora, A. & Landoni, M. (2007). Is Google the answer? A study into usability of search engines. *Library Review*, 56(3), 224-233.
- Duff, A.S. (2003). Four "e"pochs: The story of informatization. *Library Review*, 52(2), 58-64.
- Dutton, W.H. and Blank, G. (2011). *Next generation users: The Internet in Britain 2011*. Oxford Internet Institute, University of Oxford. Retrieved September 30, 2012 from <http://www.oii.ox.ac.uk/microsites/oxis/>
- Dutton, W.H. & Helsper, E.J. (2007). *Oxford Internet Survey 2007 Report: The Internet in Britain*. Oxford Internet Institute, University of Oxford. Retrieved October 30, 2012 from http://www.oii.ox.ac.uk/research/oxis/OxIS2007_Report.pdf
- Dutton, W.H. & Helsper, E.J. & Gerber, M.M. (2009). *Oxford Internet Survey 2009 Report: The Internet in Britain*. Oxford Internet Institute, University of Oxford. Retrieved October 30, 2012 from http://www.oii.ox.ac.uk/research/oxis/OxIS2009_Report.pdf
- Dytham, C. (2001). *Choosing and using statistics: A biologist's guide*. UK : Blackwell Science.
- Dziuban, C., Hartman, J.L. & Moskal, P. (2005). Preparing the academy of today for the learner of tomorrow. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>
- Dzubak, C.M. (2008). Multitasking: The good, the bad, and the unknown. *Synergy: The Journal of the Association for the Tutoring Profession*, 5. Retrieved from <http://www.myatp.org/wp-content/uploads/2012/06/Synergy-Vol-5-Dzubak.pdf>

Educational Broadcasting Commission (2004). *Constructivism as a paradigm for teaching and learning: Workshop*. Retrieved October 30, 2012 from <http://www.thirteen.org/edonline/concept2class/constructivism/index.html>

Educational Testing Service (ETS). (2006). *2006 ICT Literacy Assessment: Preliminary Findings*. Retrieved January 11, 2010 from <http://www.ets.org>

Educational Testing Service (ETS). (2007). *iSkills*. Retrieved September 30, 2012 from http://www.ets.org/Media/Products/ICT_Literacy/pdf/2006_Preliminary_Findings.pdf

Edwards, S.L. & Bruce, C.S. (2006). Panning for gold: Understanding students' information searching experiences. In Bruce, C.S., Mohay, G., Smith, G., Stoodley, I., & Tweedale, R. (Eds.). *Transforming IT education: Promoting a culture of excellence*. Santa Rosa, California: Informing Science Press. pp. 351-369.

Eisenhardt, K. M. (1989). Building theories from case study research. *The Academy of Management Review*, 14(4), 532-550.

Ellis, Y., Daniels, W. & Jauregui, A. (2010). The effect of multitasking on the grade performance of business students. *Research in Higher Education Journal*, 8. Retrieved December 7, 2012 from <http://www.aabri.com/manuscripts/10498.pdf>

Elsevier (2012). *Scirus: For scientific information only*. Retrieved November 9, 2012 from <http://www.scirus.com/>

Eurostat (2011). *Internet access and use in 2011*. Retrieved September 30, 2012 from <http://europa.eu/rapid/pressReleasesAction.do?reference=STAT/11/188&format=HTML&aged=0&language=EN&guiLanguage=en>

Everhart, N. and Valenza, J. (2004) Research into practice: Internet-savvy students and their schools. *Knowledge Quest*, 32(4), 50-55.

Fallows, D. (2005). *Search engine users*. PEW Internet & American Life Project. Retrieved September 30, 2012 from <http://www.pewinternet.org/Reports/2005/Search-Engine-Users.aspx>

Feiertag, J. & Berge, Z. L. (2008). Training Generation N: How educators should approach the Net Generation, *Education & Training*, 50(6), 457-464.

Fidel, R., Davies, R.K., Douglass, M.H., Holder, J.K., Hopkins, C.J., Kushner, E.J., Miyagishima, B.K. & Toney, C.D. (1999). A visit to the information mall: Web searching behaviour of high school students. *Journal of the American Society for Information Science*, 50(1).

Floridi, L. (2007). A look into the future impact of ICT on our lives. *The Information Society*, 23, 59-64.

- Frاند, J.L. (2000). The information age mindset: Changes in students and implications for higher education. *EDUCAUSE Review*, 35(5), 14-24. Retrieved December 7, 2012 from <http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume35/TheInformationAgeMindsetChange/157642>
- Franklin, T. & van Harmelen, M. (2007). *Web 2.0 for learning and teaching in higher education*. The Observatory for Borderless Higher Education. Retrieved October 2, 2012 from http://www.obhe.ac.uk/documents/view_details?id=24
- Freeman, C. & Louca, F. (2001). *As time goes by: From the Industrial Revolutions to the Information Revolution*. Oxford: Oxford University Press.
- Gargiulo, S. (2012). Generation Y set to transform office life. *CNN Business*. Retrieved September 30, 2012 from <http://edition.cnn.com/2012/08/20/business/generation-y-global-office-culture/index.html>
- Gaston, J. (2006). Reaching and Teaching the Digital Natives. *Library Hi Tech News*, 23(3), 12 – 13.
- Gebhard, S. (2012). Situated learning. In Lawrence A. Tomei, *Encyclopedia of Information Technology Curriculum Integration*, p. 771-774. Retrieved October 30, 2012 from Encyclopedia of Information Technology Curriculum Integration
- Geck, C. (2006). *The Generation Z connection: Teaching information literacy to the newest Net Generation*. RedOrbit. Retrieved November 5, 2012 from http://www.redorbit.com/news/technology/397034/the_generation_z_connection_teaching_information_literacy_to_the_newest/
- Gibson, W. (1984). *Neuromancer*. New York, N.Y.: Ace Books
- Godbold, N. (2006). Beyond information seeking: Towards a general model of information behaviour. *Information Research*, 11(4). Retrieved September 30, 2012 from <http://informationr.net/ir/11-4/paper269.html>
- Gogoi, P. (2005). Welcome to the Gen Y workplace. *Business Week Magazine*. Retrieved September 30, 2012 from http://www.businessweek.com/bwdaily/dnflash/may2005/nf2005054_4640_db_083.htm
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4), 597-607.
- Government of Western Australia. (2012). *Jobs WA*. Retrieved September 21, 2012 from <http://www.jobs.wa.gov.au/>
- Grazian, D. (2005). A digital revolution? A reassessment of new media and cultural production in the Digital Age. *Annals of the American Academy of Political and Social Science*, 597, 209-222.
- Grasiano, A. M., & Raulin, M. L. (2004). *Research methods : A process of inquiry*. Boston, United States of America: Pearson Education Group.

Greene, J.C., Caracelli, VJ. & Graham, WF. (1989). Toward a conceptual framework for mixed-method evaluation design. *Educational Evaluation and Policy Analysis*, 11(3), 255-74.

Griffiths, J.R. (2003). Evaluation of the JISC information environment: Student perceptions of services. *Information Research*, 8(4), paper no. 160. Retrieved on September 30, 2012 from <http://informationr.net/ir/8-4/paper160.html>

Griffiths, J.R. & Brophy, P. (2002). Student searching behaviour in the JISC information environment. *Library Trends*, 53(4), 539- 554

Hammersley, M & Atkinson, P. (1995). *Ethnography: Principals and practice*, (2nd ed.). London: Routledge.

Hanho, J. (2012). A comparison of the influence of electronic books and paper books on reading comprehension, eye fatigue, and perception. *The Electronic Library*, 30(3), 390 – 408.

Hargittai, E. (2010). Digital Na(t)ives? Variation in Internet skills and uses among members of the Net Generation. *Sociological Inquiry*, 80(1), 92-113.

Hargittai, E. & Shafer, S. (2006). Differences in actual and perceived online skills: The role of gender. *Social Science Quarterly*, 87(2), 432-448.

Harvard University. (2011). *Digital natives*. Berkman Center for Internet & Society. Retrieved September 14, 2012 from <http://cyber.law.harvard.edu/research/youthandmedia/digitalnatives>

Hay, L.E. (2000). Educating the Net Generation (educational planning for technology-knowledgeable students). *School Administrator*, 57(4), 6.

Head, A.J. & Eisenberg, M.B. (2010). *Truth be told: How college students evaluate and use information in the Digital Age*. Project Information Literacy, The Information School of Washington and the Macarthur Foundation. Retrieved September 30, 2012 from http://projectinfolit.org/pdfs/PIL_Fall2010_Survey_FullReport1.pdf

Hempel, J & with Lehman, P. (2005). The MySpace generation, *BusinessWeek Online*. Retrieved September 30, 2012 from http://www.businessweek.com/magazine/content/05_50/b3963001.htm

Holstein, J.A., & Gubrium, J.F. (1995). *The active interview*. Thousand Oaks: SAGE.

Howe, N. & Strauss, W. (2000). *Millennials rising: The next great generation*. Vintage, NY.

Huang, K., H., Lubin, I.A. & Ge, X. (2011). Situated learning in an educational technology course for pre-service teachers. *Teaching and Teacher Education*, 27(8), 1200- 1213.

Hughes, I. (2004) *Introduction in I. Hughes (ed) Action research electronic reader*. The University of Sydney. Retrieved on 2 February 2006 from www.fhs.usyd.edu.au/arow/o/reader/rintro.htm

Huntley, R. (2006). *The world according to Y: Inside the new adult generation*. NSW: Allen & Unwin.

Imam, J. (2012). The anti-social network: Life without Facebook. *CNN*. Retrieved October 30, 2012 from <http://edition.cnn.com/2012/05/18/tech/social-media/facebook-deactivation-ireport/index.html>

Ito, M., Horst, H., Bittanti, M., Boyd, D., Herr-Stephenson, B., Lange, P.G., Pascoe, C.J., and Robinson, L. (2008). *Living and learning with new media: Summary of findings from the Digital Youth Project*. Retrieved December 7, 2012 from <http://digitalyouth.ischool.berkeley.edu/files/report/digitalyouth-WhitePaper.pdf>

Ito, M., Baumer, S., Bittanti, M., Boyd, D., Cody, R., Herr, B., Horst, H.A., Lange, P.G., Mahendran, D., Martinez, K., Pascoe, C.J., Perkel, D., Robinson, L., Sims, C. & Tripp, L. (with Antin, J., Finn, M., Law, A., Manion, A., Mitnick, S., Schlossberg, D. & Yardi, S.). (2009). *Hanging out, messing around, geeking out: Living and learning with new media*. Cambridge: MIT Press.

Janes, J. (2001). Survey research design, *Library Hi Tech*, 19(4), 419-421.

Jick, T. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24(12), 602-611.

Joint Information Systems Committee (JISC). (2012). *Google Generation*. Retrieved September 30, 2012 from <http://www.jisc.ac.uk/whatwedo/programmes/resourcediscovery/googlegen.aspx>

Johnson, C.A. (2004) Choosing people: The role of social capital in information seeking behaviour. *Information Research*, 10(1).

Jones, C. (2011). Students, the Net Generation and digital natives: Accounting for educational change. In Thomas, M. (Ed.) *Deconstructing digital natives: Young people, technology, and the new literacies*. New York: Routledge.

Jones, C. & Cross, S. (2009). Is there a net generation coming to university? In *ALT-C 2009 In Dreams Begins Responsibility: Choice, Evidence and Change*, 8-10 September 2009, Manchester, UK.

Jukes, I. and Dosaj, A. (2004). *Understanding digital kids (DKs): Teaching and learning in the new digital landscape*. The Infosavvy Group. Retrieved on December 7, 2012 from <http://www.infosavvygroup.com>

Junco, R. (2012). In-class multitasking and academic performance. *Computers in Human Behavior*, 28(6), 2236-2243.

Kaplan, B., & Duchon, D. (1988). Combining qualitative and quantitative methods information systems research: A case study. *MIS Quarterly*, 12(4), 571-586.

Katz, I.R. (2005). Beyond technical competence: Literacy in information and communication technology. *Educational Technology Magazine*, 45(6), 44-47.

Katz, I.R. & Macklin, A.S. (2007). Information and communication technology (ICT) literacy: Integration and assessment in higher education. *Systemics, Cybernetics and Informatics*, 5(4), 50-55. Retrieved November 5, 2012 from [http://www.iiisci.org/Journal/CV\\$/sci/pdfs/P890541.pdf](http://www.iiisci.org/Journal/CV$/sci/pdfs/P890541.pdf)

Kearsley, G. (2010a). Situated learning (Lave, J.). *Explorations in Learning & Instruction: The Theory into Practice Database*. Retrieved October 30, 2012 from <http://tip.psychology.org/vygotsky.html>

Kearsley, G. (2010b). Social development theory (L. Vygotsky). *Explorations in Learning & Instruction: The Theory into Practice Database*. Retrieved October 30, 2012 from <http://tip.psychology.org/vygotsky.html>

Keating, B.W., Quazi A.M. & Kriz, A.P. (2009). Financial risk and its impact on new purchasing behavior in the online retail setting, *Electronic Markets: The International Journal on Networked Business*, 19, 237-250.

Kennedy, G., Dalgarno, B., Bennett, S., Judd, T., Gray, K. & Chang, R. (2008). Immigrants and natives: Investigating differences between staff and students' use of technology. In *Hello! Where are you in the landscape of educational technology? Proceedings Ascilite Melbourne 2008*. Retrieved December 7, 2012 from <http://www.ascilite.org.au/conferences/melbourne08/procs/kennedy.pdf>

Kennedy, G., Dalgarno, B., Gray, K., Judd, T., Waycott, J., Bennett, S., Maton, K., Krause, K.L., Bishop, A., Chang, R. & Churchward A. (2007). The net generation are not big users of Web 2.0 technologies: Preliminary findings. In *ICT: Providing Choices for Learners and Learning. Proceedings Ascilite Singapore 2007*. Retrieved December 7, 2012 from <http://www.ascilite.org.au/conferences/singapore07/procs/kennedy.pdf>

Kennedy, G., Krause, K., Gray, K., Judd, T., Bennett, S., Maton, K., Dalgarno, B. & Bishop, A. (2006). Questioning the Net Generation: A collaborative project in Australian higher education. *Proceedings of the 23rd Annual Ascilite Conference: Who's learning? Whose technology?* p. 413-417. Retrieved December 7, 2012 from http://www.ascilite.org.au/conferences/sydney06/proceeding/pdf_papers/p160.pdf

Kennedy, G., Judd, T., Dalgarno, B. & Waycott, J. (2010). Beyond natives and immigrants: Exploring types of net generation students. *Journal of Computer Assisted Learning* 26, 332-343

Kennisnet, BECTA & ISTE. (2009). *The International Summit on ICT in Education (EDUsummit)*. Retrieved December 7, 2012 from <http://edusummit.nl/>

King, R. (2011). *Cisco Gen Y study: Mobile devices valued more than higher salaries*. ZdNet. Retrieved September 30, 2012 from <http://www.zdnet.com/blog/btl/cisco-gen-y-study-mobile-devices-valued-more-than-higher-salaries/62246>

Kleinrock, L. (1969). *The day the infant Internet uttered its first words*. University of California Los Angeles (UCLA). Retrieved September 27, 2012 from http://www.lk.cs.ucla.edu/internet_first_words.html

Kolb, D. A., Boyatzis, R.E. & Mainemelis, C. (1999). *Experiential learning theory: Previous research and new directions*. Retrieved October 30, 2012 from <http://www.d.umn.edu/~kgilbert/educ5165-731/Readings/experiential-learning-theory.pdf>

Kolb, D. A., & Yeganeh, B. (2012). Deliberate experiential learning: Mastering the art of learning from experience. In K. Elsbach, C. D. Kayes & A. Kayes (Eds.), *Contemporary organizational behavior in action* (1st Ed.). Upper Saddle River, NJ: Pearson Education. Retrieved October 30, 2012 from <http://learningfromexperience.com/media/2012/02/deliberate-experiential-learning.pdf>

Kolikant, Y.B. (2010). Digital natives, better learners? Students' beliefs about how the Internet influenced their ability to learn. *Computers in Human Behaviour*, 26(6), 1384-1391.

Kolowich, (2011). *What students don't know*. Inside Higher Ed. Retrieved December 1, 2012 from http://www.insidehighered.com/news/2011/08/22/erial_study_of_student_research_habits_at_illinois_university_libraries_reveals_alarmingly_poor_information_literacy_and_skills

Kraushaar, J.M & Novak, D.C. (2010). Examining the affects of student multitasking with laptops during the lecture. *Journal of Information Systems Education*, 21(2), 241-252.

Krosnick, J.A. (1999). Survey research. *Annual Review of Psychology*, 50, 537-568.

Krosnick, J.A., Holbrook, A.L., Berent, M.K., Carson, R.T. et al. (2002). The impact of "no opinion" response options on data quality: Non-attitude reduction or an invitation to satisfice. *Public Opinion Quarterly*, 66(3); 371-404.

Kuhlthau, C.C. (1991). Inside the search process: Information seeking from the user's perspective. *Journal of the American Society of Information Science*, 42(5), 361-371.

Kuhlthau, C.C. (1993). *Seeking meaning: A process approach to library and information services*. Norwood, NJ: Ablex.

Kuhlthau, C.C. (1994). *Teaching the library research process*. Metuchcn, NJ: Scarecrow Press.

Kuhlthau, C. C. (1996). The process of learning from information. In *The virtual school library: Gateway to the information superhighway*. Englewood, Colorado: Libraries Unlimited.

Kuusela, H. & Pallab, P. (2000). A comparison of concurrent and retrospective verbal protocol analysis. *The American Journal of Psychology*, 113(3), 387-404.

Kvavik, R.B. (2005). Convenience, communications and control: How students use technology. In In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved December 7, 2012 from <http://www.educause.edu/educatingthenetgen>

Laidlaw, G. (2010). *How to avoid social media burnout*. Gigaom. Retrieved November 5, 2012, from <http://gigaom.com/2010/06/01/how-to-avoid-social-network-burnout/>

Lee, A. S. (1994). Electronic mail as a medium for rich communication: an empirical investigation using hermeneutic interpretation. *MIS Quarterly*, 18(2), 143-157

Lee, E. (2006). Social sites becoming too much of a good thing. Many young folks burning out on online sharing. *New York Times*. Retrieved October 30, 2012 from <http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2006/11/02/MNGG3M4KB31.DTL>

Lei, J. (2009). Digital natives as pre-service teachers: What technology preparation is needed? *Journal of Computing in Teacher Education*, 25(3), 87-97.

Lenhart, A., Madden, M & Hitlin, P. (2005). *Teens and technology: Youth are leading the transition to a fully wired and mobile nation*. PEW Internet & American Life Project. Retrieved September 30, 2012 from http://www.pewinternet.org/~media/Files/Reports/2005/PIP_Teens_Tech_July_2005web.pdf.pdf

Levine, E. (2002). Libraries in the digital age. *Information Today*, 19(7), 18-19.

Liamputtong, P. & Ezzy, D. (1999). *Qualitative research methods* (2nd ed.). Melbourne: Oxford.

Lindsay, J. & Davis, V. (2012). *Flat classroom: NetGen Ed*. Retrieved September 27, 2012 from <http://www.netgened.org/>

The Linux Information Project. (2006). *MS-DOS a brief introduction*. Retrieved September 30, 2012 from <http://www.linfo.org/ms-dos.html>

Lippincott, J.K. (2005). Net Generation students and libraries. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Liu, A. (2009). A new metaphor for reading. Does the brain like e-books? *New York Times*. Retrieved November 13, 2012 from <http://roomfordebate.blogs.nytimes.com/2009/10/14/does-the-brain-like-e-books/>

Living Internet. (1996-2012). *Web browser history*. Retrieved September 27, 2012 from http://www.livinginternet.com/w/wi_browse.htm

Livingstone, S. (2006). *UK Children Go Online: End of award report*, London School of Economics. Retrieved January 4, 2010 from <http://www.lse.ac.uk/collections/children-go-online/>

Livingstone, S., & Bober, M. (2003). *UK children go online: Listening to young people's experiences*. London School of Economics and Political Science, London, UK. Retrieved September 30, 2012 from <http://eprints.lse.ac.uk/388/>

Livingstone, S & Bober, M. (2004). *UK Children Go Online. Surveying the experiences of young people and their parents*. London School of Economics and Political Science, London, UK. Retrieved September 30, 2012 from <http://eprints.lse.ac.uk/395/1/UKCGOsurveyreport.pdf>

Livingstone, S., Bober, M. & Helsper, E. (2004). *Active participation or just more information? Young people's take up of opportunities to act and interact on the Internet*. London School of Economics and Political Science, London, UK. Retrieved September 30, 2012 from <http://eprints.lse.ac.uk/396/1/UKCGOparticipation.pdf>

Livingstone, S., Bober, M. & Helsper, E. (2005). *Internet literacy among children and young people: Findings from the UK Children Go Online Project*. London School of Economics and Political Science, London, UK. Retrieved on September 30, 2012 from <http://eprints.lse.ac.uk/397/1/UKCGOonlineLiteracy.pdf>

Lohnes, S. & Kinzer, C. (2007). Questioning assumptions about students' expectations for technology in college classrooms. *Innovate*, 3(5). Retrieved July 23, 2009 from <http://www.innovateonline.info/index.php?view=article&id=431>

London School of Economics. (2006). *UK Children Go Online: Emerging opportunities and dangers*. Retrieved September 20, 2012 from <http://www.lse.ac.uk/collections/children-go-online/>

Long, S.A. (2005). Digital natives: If you aren't one, get to know one. *New Library World*, 106(3/4), 187-189.

Lorenzo, G. & Dziuban, C. D. (2006) Ensuring the Net Generation is net savvy. *EDUCAUSE Learning Initiative White Paper 2*. Retrieved September 30, 2012 from <http://www.educause.edu/library/resources/ensuring-net-generation-net-savvy>

Lynch, B. (2008). Keeping 'digital natives' from getting restless. *The Journal of New England Technology*. Retrieved September 30, 2012 from <http://www.masshightech.com/stories/2008/09/01/weekly10-Keeping-digital-natives-from-getting-restless-.html>

Madden, A.D., Ford, N.J., Miller, D. & Levy, P. (2006). Children's use of the Internet for information-seeking. *Journal of Documentation*, 62(6), 744-761.

Mark, G. (2009). The effects of perpetual distraction. Does the brain like e-books? *New York Times*. Retrieved November 13, 2012 from <http://roomfordebate.blogs.nytimes.com/2009/10/14/does-the-brain-like-e-books/>

Martin, J. (2010). Comparative book review: Born digital: Understanding the first generation of digital natives. Grown up digital: How the Net generation is changing your world. *Learning and Teaching in Higher Education: Gulf Perspectives*, 7(2), 73-79.

Margaryan, A., Littlejohn, A. & Vojt, G. (2011). Are digital natives a myth or reality? University students' use of digital technologies. *Computers & Education*, 56(2), 429-440.

Martzoukou, K. (2004). A review of Web information seeking research: considerations of method and foci of interest. *Information Research*, 10(2). Retrieved September 30, 2012 from <http://informationr.net/ir/10-2/paper215.html>

Mason, J., Dellit, J., Adcock, G. & Ip, A. (1999). *EdNA online and the propagation of value-add, AusWeb99-Proceedings*. Retrieved December 7, 2012 from <http://ausweb.scu.edu.au/aw99/index.html>

- McCrindle, M. (2012a). *Beyond Z: Meet Generation Alpha*. McCrindle Research. September 20, 2012 from http://mccrindle.com.au/resources/whitepapers/McCrindle-Research_ABC-10_Beyond-Z_Meet-Generation-Alpha_Mark-McCrindle.pdf
- McCrindle, M. (2012b) *Generations defined*. McCrindle Research. Retrieved September 20, 2012 from <http://mccrindle.com.au/resources/Generations-Defined-Sociologically.pdf>
- McKenzie, J. (2007). Digital nativism digital delusions and digital deprivation. *FNO*, 17(2). Retrieved on January 11, 2010 from <http://fno.org/nov07/nativism.html>
- McNeely, B. (2005). Using technology as a learning tool, not just the cool new thing. In Oblinger, D. and J. Oblinger, J. (2005a). (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>
- Mellon, C.A. (1990). *Naturalistic inquiry for library science: Methods and applications for research, evaluation and teaching*. London, UK: Greenwood.
- Merriam-Webster. (2013). *Dictionary*. Retrieved September 30, 2013 <http://www.merriam-webster.com/>
- Merriam-Webster. (2012). *Savant*. Retrieved September 28, 2012 from <http://www.merriam-webster.com/dictionary/savant>
- Merrick, B. (2001). Move over Generation X. *Credit Union Magazine*, 67(9) 18.
- Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*, (2nd Ed.). Thousand Oaks, CA: Sage Publications.
- Millea, J., Green, I. & Putland, G. (2005). *Emerging technologies: A framework for thinking*. Canberra: education.au limited. Retrieved September 30, 2012 from http://www.det.act.gov.au/__data/assets/pdf_file/0010/74485/ACT_EmTech_Report_v1_2.pdf
- Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEECDYA). (2010). *National Assessment Program ICT Literacy Years 6 and 10 Report 2008*. Carlton South, Victoria: Curriculum Corporation.
- Ministerial Council for Education, Employment, Training and Youth Affairs (MCEETYA) (2008). *Digital education: Making change happen*. Retrieved September 20, 2012 from <http://aictec.edu.au/wp-content/uploads/Digital-Education-Making-Change-Happen.pdf>
- Ministerial Council for Education, Employment, Training and Youth Affairs (MCEETYA) (2005). *Pedagogy strategy: Learning in an online world*. Retrieved September 20, 2012 from http://www.mceecdy.edu.au/verve/_resources/ict_learningonline-world-pedagogystrategy.pdf

- Miniwatts Marketing Group. (2001-2012). *Internet world stats: Usage and population statistics*. Retrieved December 7, 2012 from <http://www.internetworldstats.com>
- Moon, J. A. (2004), *A handbook of reflective and experiential learning*. New York: RoutledgeFalmer
- Moore, A.H., Moore, J.F. & Fowler, S.B. (2005). Faculty development for the Net Generation. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>
- Moore, N. (2000). *How to do research*. London, England: Library Association Publishing.
- Morrison, H.G. (1999). Online catalogue research and the verbal protocol method. *Library Hi Tech*, 17(2), 197-206.
- Murray, C. (2004). *Ultra-communicators demand more email access, better software*. eSchool News. Retrieved September 30, 2012 from www.schenectady.k12.ny.us/TechResources/olconline/articles.htm
- Murray, S. (2007). Skills and learning: How to train 'digital natives'. *Financial Times*. Retrieved September 30, 2012 from http://www.ft.com/cms/s/0/8e6ae542-c587-11db-9fae-000b5df10621.html?nclick_check=1
- Nachmias, D., & Nachmias, C. (1981). *Research methods in the social sciences* (2nd ed.). New York: St. Martin's Press.
- Nancarrow, C., Pallister, J. & Brace, I. (2001). A new research medium, new research populations and seven deadly sins for Internet researchers. *Qualitative Market Research: An International Journal*, 4(3), 136-149.
- National Board of Employment, Education and Training. (1995). *Converging communications and computer technologies: Implications for Australia's future employment and skills. Discussion paper*. Employment and Skills Formation Council.
- National Road Safety Council (NRSC). (2012). *Young drivers*. Retrieved September 20, 2012 from http://www.nrsc.gov.au/young_drivers/
- NetDay. (2004). *Voices and views of today's tech-savvy students*. Retrieved September 20, 2012 from <http://www.netday.org/downloads/voices%20and%20views%20final.pdf>
- New England Regional Association for Language Learning (NERALLT). (2010). The digital native language learners are here: How do we effectively teach language to the digital native? *NERALLT Conference, October 21st-22nd, 2010*, College of the Holy Cross Worcester, MA. Retrieved September 30, 2012 from <http://www.nerallt.org/2010-fall/>
- Nicholas, D., Dobrowolski, T., Russell, C. & Whitney, R. (2003). Digital information consumers, players and purchasers: Information seeking behaviour in the new digital interactive environment. *Aslib Proceedings*, 55(1/2), 23-32.

Nicholas, D., Huntington, P., Williams, P. & Dobrowolski, T. (2004). Re-appraising information seeking behaviour in a digital environment: Bouncers, checkers, returnees and the like. *Journal of Documentation*, 60(1), 24-43

Nicholas, D., Rowlands, I. & Huntington, P. (2008). *Information behaviour of the researcher of the future. A Ciber Briefing Paper*. University College London (UCL) CIBER Group. Retrieved September 30, 2012 from <http://www.jisc.ac.uk/whatwedo/programmes/resourcediscovery/googlegen.aspx>

Nova Southeastern University. (2009). *Innovate Journal of Online education*. Fischler School of Education and Human Services. Retrieved September 14, 2012 from <http://innovateonline.info/>

Oblinger, D.G. (2008). Growing up with Google: What it means to education. *Emerging technologies for learning*, 4, Becta.

Oblinger, D. & J. Oblinger, J. (2005a). (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Oblinger, D. & J. Oblinger, J. (2005b). Is it age or IT: First steps towards understanding the Net Generation. In Oblinger, D. & J. Oblinger, J. (Eds) *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Oliver, B & Goerke, V. (2007). Australian undergraduates' use and ownership of emerging technologies: Implications and opportunities for creating engaging learning experiences for the Net Generation. *Australasian Journal of Educational Technology*, 23(2), 171-186.

Organisation for Cooperation and Development (OECD). (2005). *Are students ready for a technology-rich world: What PISA studies tell us*. Paris: OECD.

Organisation for Cooperation and Development (OECD). (2010). *Are the New Millennium Learners Making the Grade?: Technology Use and Educational Performance in PISA 2006*. Educational Research and Innovation: OECD Publishing.

Organisation for Cooperation and Development (OECD). (2012). *Centre for Educational Research and Innovation (CERI) - New millennium learners*. Retrieved September 30, 2012 from <http://www.oecd.org/edu/ceri/centreforeducationalresearchandinnovationceri-newmillenniumlearners.htm>

Oxford University Press. (2013). *Definition of culture in English*. Retrieved September 27, 2013 from <http://oxforddictionaries.com/definition/english/culture?view=uk>

Palfrey, J. & Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. New York: Perseus Books.

- Palmer, C. (2012). *ANU vice-chancellor issues MOOCs warning*. The Conversation. Retrieved September 30, 2012 from <http://theconversation.edu.au/anu-vice-chancellor-issues-moocs-warning-9881>
- Pan, B., Hembrooke, H., Joachims, T., Lorigo, L., Gay, G. & Granka, L. (2007). In Google we trust: Users' decisions on rank, position, and relevance. *Journal of Computer-Mediated Communication*, 12(3), <http://jcmc.indiana.edu/vol12/issue3/pan.html>
- Partington, G. (2001). Qualitative research interviews: identifying problems in technique. *Issues in Educational Research*, 11(2), 32-44.
- Patterson, B. (2012). *Gen Y and the collaborative workplace*. Forbes. Retrieved September 30, 2012 from <http://www.forbes.com/sites/microsoftdynamics/2012/05/29/gen-y-and-the-collaborative-workplace/>
- Patton, M.Q. (2000). *Qualitative research and evaluation methods*. (2nd ed.). London, UK: Sage.
- Payne, M. (2007). *Why is Google so popular?* Associated Content, Technology. Retrieved September 30, 2012 from http://www.associatedcontent.com/article/335787/why_is_google_so_popular.html
- PEW Internet and American Life Project. (2012). *PEW Internet Research Center*. Retrieved September 20, 2012 from <http://pewinternet.org/>
- Pickard, A.J. (2007). *Research methods in information*. London, UK: Facet Publishing.
- Pickard, A.J. (2007). *Research methods in information*. London, UK: Facet Publishing.
- Prahu, M.T. (2008). *Ed tech central to Obama's recovery plan*. eSchool News. Retrieved September 20, 2012 from <http://www.eschoolnews.com/2008/12/09/ed-tech-central-to-obamas-recovery-plan/>
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5). Retrieved December 7, 2012 from <http://www.marcprensky.com/writing/>
- Prensky, M. (2004). *The emerging online life of the digital native: What they do differently because of technology, and how they do it*. Retrieved September 28, 2012 from http://www.marcprensky.com/writing/Prensky-The_Emerging_Online_Life_of_the_Digital_Native-03.pdf
- Prensky, M. (2007). How to teach with technology: Keeping both teachers and students comfortable in an era of exponential change. In *Emerging Technologies for Learning 2, British Educational Communications and Technology Agency (BECTA)*. Retrieved August 25, 2008 from www.becta.org.uk
- Prensky, M. (2009). H. sapiens digital: From digital immigrants and digital natives to digital wisdom. *Innovate*, 5(3). Retrieved September 28, 2012 from http://www.innovateonline.info/pdf/vol5_issue3/H._Sapiens_Digital-__From_Digital_Immigrants_and_Digital_Natives_to_Digital_Wisdom.pdf

Prensky, M. (2011a). Digital wisdom and homo sapiens digital. In Thomas, M. (Ed.) *Deconstructing digital natives: Young people, technology, and the new literacies*. New York: Routledge. p. 15-29.

Prensky, M. (2011b). *Marc Prensky: Biography*. Retrieved December 7, 2012 from http://www.marcprensky.com/speaking/Marc_Prensky-Bio.pdf

Preston, M. (2007). *Who'd hire a Gen Y?* Smart Company. Retrieved September 30, 2012 from <http://www.smartcompany.com.au/Premium-Articles/Top-Story/Whod-hire-a-Gen-Y.html>

Pribyl, J.R. (1994). Using surveys and questionnaires. *Journal of Chemical Education*, 71(3), 195-196.

Project Tomorrow. (2012). *Project tomorrow: Preparing today's students to be tomorrow's innovators, leaders and engaged citizens*. Retrieved September 20, 2012 from <http://www.tomorrow.org/index.html>

Purcell, K., Rainie, L., Heaps, A., Buchanan, J., Friedrich, L., Jacklin, A., Chen, C. & Zickuhr, K. (2012). *How teens do research in the digital world: A survey of advanced placement and National Writing Project teachers finds that teens' research habits are changing in the digital age*. PEW Internet and American Life Project. Retrieved November 9, 2012 from <http://pewinternet.org/Reports/2012/Student-Research>

Quoting Quotes. (2012). *Socrates*. Retrieved September 30, 2012 from <http://quotingquotes.com/>

Rainie, L. (2005). *Tech term awareness*. PEW Internet & American Life Project. Retrieved September 30, 2012 from <http://www.pewinternet.org/Reports/2005/Tech-Term-Awareness.aspx>

Rainie, L. & Horrigan, J.B. (2002). *Counting on the Internet*. PEW Internet & American Life Project. Retrieved September 30, 2012 from <http://www.pewinternet.org/Reports/2002/Counting-on-the-Internet-Most-find-the-information-they-see-expect.aspx>

Ramaley, J.A. & Zia, L. (2005). The real versus the possible: Closing the gaps in engagement and learning. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Rice, R.E. (2001) Primary issues in Internet use: Access, civic and community involvement, and social interaction and expression. In L.A. Lievrouw and S. Livingstone (Eds) *The Handbook of New Media*, p. 105–29. London: Sage.

Richardson, V. (Ed.) (1997). *Constructivist teacher education: Building a world of new understandings*. London: RoutledgeFalmer.

Rikhye, R., Cook, S. & Berge, Z.L. (2009). Digital natives vs digital immigrants: Myth or reality? *International Journal of Instructional Technology and Distance Learning*, 6(2), 3-10.

Ring, J. and Watson, A.C. (1995). The virtual campus, ECU's developmental path. In Beattie, K., McNaught, C. and Wills, S. (Eds). *Interactive Multimedia in University Education*. Amsterdam : Elsevier

Roberts, G.R. (2005). Technology and learning expectations of the Net Generation. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Roberts, M.R. (2010). The Digital Generation and Web 2.0: E-Learning concern or media myth? In *Handbook of research on practices and outcomes in e-Learning: Issues and trends*, p. 93-115. Hershey, Pa.: Information Science Reference

Robson, C. (1997). *Real world research: A resource for social scientists and practitioner-researchers*. Oxford: Blackwell.

Russo, J.E., Johnson, E.J. & Stephens, D.L. (1989). The validity of verbal protocols. *Memory & Cognition*, 17(6), 759–769.

Salamon, A. (2008). *The DNS Resources Directory*. Retrieved September 27, 2012 from <http://2600.wrepp.com/2600/Links/17/3/www.dns.net/dnsrd/>

Salaway, G. & Caruso, J. with Nelson, M. (2008). *The ECAR study of undergraduate students and information technology*. Boulder, Co: EDUCAUSE.

Sandvig, J.C and Baiwa, D. (2004). Information seeking on university web sites: An exploratory study. *The Journal of Computer Information Systems*, 45(1), 13-23.

Scanlon, C. (2009) The natives aren't quite so restless. *The Australian Higher Education Supplement*. Retrieved September 30, 2012 from <http://www.theaustralian.com.au/higher-education/opinion-analysis/the-natives-arent-quite-so-restless/story-e6frgcko-1111118616452>

Schild, M. (1999). *Statistical literacy: Thinking critically about statistics*. Retrieved October 30, 2012 from <http://web.augsburg.edu/~schild/MiloPapers/984StatisticalLiteracy6.pdf>

Scott, T.J. & O'Sullivan, M.K. (2005). Analyzing student search strategies: Making a case for integrating information literacy skills into the curriculum. *Teacher Librarian*, 33(1), 21-25.

Shaeffer, E.M., Krosnick, J.A., Langer, G.E. & Merkle, D.M. (2005). Comparing the quality of data obtained by minimally balanced and fully balanced attitude questions. *Public Opinion Quarterly*. 69(3), 417-429.

Shenk, D. (1997). *Data smog: Surviving the information glut*. San Francisco: HarperEdge

Shenton, A.K. (2004a). Research into young people's information-seeking: Perspectives and methods. *Aslib Proceedings*, 56(4), 243-254.

Shenton, A.K. (2004b). The application of information-seeking concepts to the behaviour of young people. *Education Libraries Journal*, 47(3) 5-11

Shenton, A.K. (2007). The paradoxical world of young people's information behavior. *School Libraries Worldwide*, 13(2) 1-17.

Skiba, D. (2003). *The net generation: Implications for nursing education and practice*. In NLN Living Book. Retrieved September 30, 2012, from <http://electronicvision.com/nln/chapter01/>

- Skiba, D. (2010). Digital wisdom: A necessary faculty competency? *Teaching with Technology/Emerging Technologies*, 31(4), 251-253.
- Smith, M. K. (1999). The social/situational orientation to learning. *The Encyclopedia of Informal Education*. Retrieved October 30, 2012 from www.infed.org/biblio/learning-social.htm
- Smith, M. K. (2001). David A. Kolb on experiential learning, *The Encyclopedia of Informal Education*. Retrieved October 30, 2012 from <http://www.infed.org/b-explrn.htm>
- Smith, M.K. (2002). Jerome S. Bruner and the process of education. *The Encyclopedia of Informal Education*. Retrieved January 30, 2010 from <http://www.infed.org/thinkers/bruner.htm>.
- So, H., Choi, H., Lim, W. & Xiong, Y. (2012). Little experience with ICT: Are they really the Net Generation student-teachers? *Computers & Education*, 59(4), 1234-1245.
- Song, J.A. (2000). The N-generation. *Far Eastern Economic Review*, 163(16), 46.
- Spencer, S. (2012). *Google guide: Making searching even easier*. Netconcepts. Retrieved November 9, 2012 from <http://www.googleguide.com/>
- Stake, R.E. (2003). Case studies. In Denzin, N.K. & Lincoln, Y.S. (eds). *Strategies of Qualitative Inquiry*, 2nd ed. London: Sage, 134-64.
- Stalder, F & Hirsh, J. (2002). Open source intelligence. *First Monday*, 7(6). Retrieved September 27, 2012 from <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/961/882>
- Steckler, A. & McLeroy, K. R. (2008). The im[portance of external validity. *American Journal of Public Health*, 98(1), 9-10.
- Steckler, A., McLeroy, K. R., Goodman, R. M., Bird, S. T., & McCormick, L. (1992). Toward integrating qualitative and quantitative methods: An introduction. *Health Education Quarterly*, 19(1), 1-8.
- Strauss, W. & Howe, N. (2000). *Millennials rising: The next great generation*. New York: Vintage Books.
- Stringer, E. (2008). *Action research in education*, (2nd ed.). New Jersey: Pearson/Merrill Prentice Hall.
- Stoeger, S. (2009). The digital melting pot: Bridging the digital native-immigrant divide. *First Monday*, 14(7).
- Sujansky, J.G. (2009). Spoiled, impatient & entitled: Why you need STRONG millennials in your workplace. *Supervision*, 70(10), 8-10.
- Susskind, A.M. & Stefanone, M.A. (2010). Internet apprehensiveness: An examination of on-line information seeking and purchasing behaviour. *Journal of Hospitality and Tourism Technology*, 1(1), 5 – 29.
- Sydenstricker-Neto, J. (1997). *Research design and mixed-method approach: A hands-on experience*. Retrieved December 6, 2010 from <http://www.socialresearchmethods.net/tutorial/Sydenstricker/bolsa.html#Why%20Mixed>

Tang, R., Shaw, W.M. & Vevea, J.L. (1999). Towards the identification of the optimal number of relevance categories. *Journal of the American Society for Information Science*, 50(3); 254-264.

Tanner, K. (2000). Ethnographic techniques. In Williamson, K. (2000). *Research Methods for Students, Academics and Professionals: Information Management and Systems*. (2nd Ed.). Wagga Wagga, NSW: Centre for Information Studies Charles Stuart University, 71-91.

Tapscott, D. (1998). *Growing up digital: The rise of the Net Generation*. McGraw-Hill, New York.

Tapscott, D. (2008). *Who is Don Tapscott?* Retrieved January 6, 2010 from <http://dontapscott.com/contact-don/>

Tapscott, D.(2009). *Grown up digital*. Retrieved September 28, 2012 from <http://dontapscott.com/books/grown-up-digital/>

Taylor, P. & Keeter, S. (Ed) (2010). *The Millenials, a portrait of Generation Next: Confident. Connected. Open to change*. PEW Internet and American Life Project. Retrieved September 30, 2010 from <http://pewsocialtrends.org/files/2010/10/millennials-confident-connected-open-to-change.pdf>

Taylor, D. & Strutton, D. (2010). Has e-marketing come of age? Modeling historical influences on post-adoption era Internet consumer behaviors. *Journal of Business Research*, 9-10(63), 950-956.

Technovelgy LLC. (2012). *Timeline of science fiction ideas, technology and inventions*. Retrieved September 30, 2012 from <http://www.technovelgy.com/ct/ctnlistPubDate.asp>

TechSmith. (2007). *Morae Version 2.0* [software]. Michigan, USA: TechSmith Corporation.

Thomas, M. (Ed.). (2011a). *Deconstructing digital natives: Young people, technology, and the new literacies*. New York: Routledge.

Thomas, M. (2011b). Technology, education and the discourse of the digital native: Between evangelists and dissenters. In Thomas, M. (Ed.) *Deconstructing digital natives: Young people, technology, and the new literacies*. New York: Routledge.

Trochim, W.M.K. (2006). *Research methods knowledge base*. Retrieved December 7, 2012 from <http://www.socialresearchmethods.net/kb/statdesc.php>

Tugend, A. (2012). The workplace benefits of being out of touch. *New York Times*. Retrieved November 5, 2012 from http://www.nytimes.com/2012/07/14/your-money/companies-see-benefit-of-time-away-from-mobile-devices.html?pagewanted=all&_r=0

Tulgan, B., & Martin, C.A. (2001). *Managing Generation Y: Global citizens born in the late seventies and early eighties*. Amherst, Mass.: HRD Press.

Tyler, K. (2008). Generation gaps. *HRMagazine*, 53(1), 69-72.

UNESCO (2011). *EDUsummIT 2011: International summit on information and communication technologies in education*. Retrieved September 14, 2012 from http://www.unesco.org/new/en/unesco/events/education-events/?tx_browser_pi1%5BshowUid%5D=3673&cHash=c8c5142f58

US Department of Education. (2004). *Toward a new golden age in American education: How the Internet, the law and today's students are revolutionizing expectations*. Retrieved September 20, 2012 from <http://www2.ed.gov/about/offices/list/os/technology/plan/2004/index.html>

US Department of Education. (2010). *Transforming American education: Learning powered by technology*. Retrieved September 20, 2012 from <http://www.ed.gov/edblogs/technology/netp-2010/>

Vicker, M. (2003). The blurring boundaries between people and technology. *Employment Relations Today*, 30(2), 1-13.

Wager, J.J. (2005). Support services for the Net Generation. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Waldman, M. (2003). Freshmen's use of library electronic resources and self-efficacy, *Information Research*. 8(2). Retrieved October 29, 2012 from <http://informationr.net/ir/8-2/paper150.html>

Weldon, J. (2012). Viva la digital revolution. *Sydney Morning Herald*. Retrieved September 9, 2012 from <http://www.smh.com.au/opinion/society-and-culture/viva-la-digital-revolution-20120627-212rc.html>

Werry, C. (2002). The rhetoric of commercial online education. *Workplace*, 5(10). Retrieved October 3, 2012 from <http://louisville.edu/journal/workplace/issue5p1/werry.html>

Wilcox, K. (1982). Ethnography as a methodology and its application to the study of schooling: A review. In Spindler, G. (ed.) *Doing the ethnography of schooling*, New York: CBS Publishing, p.456 – 488.

Wildemuth, B.M. (2002). Effective methods for studying information seeking and use. *Journal of the American Society for Information Science and Technology*, 53(14), 1218 – 1222.

Williamson, K. (2000). *Research methods for students, academics and professionals: Information management and systems*. (2nd Ed.). Wagga Wagga, NSW: Centre for Information Studies Charles Stuart University.

Windham, C. (2005a). Father Google and Mother IM: Confessions of a Net Gen learner. *EDUSAUSE Review*, 40(5), 42-59.

Windham, C. (2005b). The student's perspective. In D. Oblinger and J. Oblinger (Eds), *Educating the Net Generation*. Retrieved September 30, 2012 from <http://www.educause.edu/research-and-publications/books/educating-net-generation>

Woodhouse, M. (2005a). Using in-depth interviewing to evaluate deep learning in students who use online curriculum: A literature review. *Proceedings of TILC: Information Libraries and eLearning*, Edith Cowan University, Perth, p.214-225.

Woodhouse, M. (2005b). *Using In-depth interviewing to investigate deep learning in undergraduate Computer Science students who were involved with using a particular AI toolkit*. Unpublished Masters of Information Services, Perth, Western Australia: Edith Cowan University.

Worley, K. (2011). Educating college students of the Net Generation. *Adult Learning*, 22(3), 31-39.

Wray, R. & Jones, S. (2009). It's SO over: Cool cyberkids abandon social networking sites. *The Guardian*. Retrieved October 30, 2012 from <http://www.guardian.co.uk/media/2009/aug/06/young-abandon-social-networking-sites>

Yin, R. K. (2002). *Case study research: Design and methods* (3rd ed.). Newbury Park: Sage Publications.

Yin, R. K. (2003). *Applications of case study research* (Vol. 34). United States of America: Sage Publications.

Young, B.J. (2000). Gender differences in student attitudes towards computers. *Journal of Research on Computing Education*, 33(2), 204-216.

Zakon, R.H. (2011). *Hobbes' Internet timeline 10.2*. Retrieved September 27, 2012 from <http://www.zakon.org/robert/internet/timeline/>

Zemsky, R., & Massy, W. (2004). *Thwarted innovation: What happened to e-learning and why*. Retrieved 19 November, 2012 from <http://www.thelearningalliance.info/Docs/Jun2004/ThwartedInnovation.pdf>

Zickhur, K. (2010). *Generations 2010*. PEW Internet and American Life Project. Retrieved September 30, 2012 from http://pewinternet.org/~media/Files/Reports/2010/PIP_Generations_and_Tech10.pdf

Every reasonable effort has been made to acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.

Chapter 10 – Appendices

11.1. Appendix 1: Ethics Documentation

11.1.1. Invitation to participate

Dear First Year Student,

My name is Barbara Combes and I am a student at Curtin University of Technology. I am currently doing my PhD research on the use of the Internet and technology by young people. One of the key data collection tools for this research is a web-based survey of first year university students.

The survey will ask you questions about your use of the Internet and other technologies at home and for study purposes. If you choose to participate in this survey you will be making a valuable contribution to our overall knowledge of the way young people use the Internet and technology.

The survey is an anonymous web-based questionnaire and takes approximately fifteen minutes to complete. The responses to the survey are confidential and will be held in secure storage by the researcher at the School of XXXX, XXXX University. The data will be held for a period of five years for reference purposes, after which time it will be destroyed. Data will not be provided to other parties and only aggregated results will be published.

This research project has been approved by the XXXX University Human Research Ethics Committee. If you require any further information about this research or the ethics process please contact:

The Secretary, Ethics Committee
Office of Research and Development
XXXX University of XXXX
GPO Box U 1987
Perth Western Australia 6845

The researcher is Barbara Combes, Internet Studies, XXXX University of XXXX. Please feel free to contact me for further information by email at b.combes@XXXX.edu.au

If you would like to participate in this research please go to [web survey URL]

Many thanks for your participation.

Barbara Combes
School of Computer XXXX
XXXX University, Perth Western Australia
Email: b.combes@XXXX.edu.au

11.1.2. Cover letter: Tasks and interviews

Dear [name]

Thank you for volunteering to participate in the tasks and interview about your experiences and use of the Internet and technology.

I am conducting the interviews as part of a PhD in Internet Studies through Curtin University of Technology.

Your input will provide important data about how young people use a range of technologies for recreational and study purposes. It will also provide data about your feelings and your skill levels when using the Internet as a information seeking tool.

Please rest assured that your responses will be made in the utmost confidence. Your responses and the data collected from the task analysis will have no impact on your future studies. At no time will your identity be linked to any data. You are free to withdraw at any stage, without prejudice or any negative consequences.

I will be holding interviews:

Day and Date: _____

Where: _____

Time: The tasks and interview will begin on the hour and last approximately 60 mins. Please nominate a day and time.

I am grateful for your participation in this research.

Yours sincerely

Barbara Combes
Email: b.combes@XXXX.edu.au

11.1.3. Participant consent form: Task and interviews

I, _____, voluntarily agree to participate in this research project. I understand that this interview is being conducted by Barbara Combes, a Doctoral student enrolled at Curtin University of Technology as part of her PhD in Internet Studies and that the results of the tasks and interview will be used in a PhD research study.

I understand that the research method will involve completing:

- two (2) information seeking tasks using the Internet, where I will narrate how I am using the technology; and
- responding to questions about how I use the Internet for study and recreational purposes.

The tasks will be fifteen (15) minutes long and the interview will be between 20 – 30 minutes.

I grant permission for:

- the tasks to be monitored and my commentary recorded using a software product called *Morae*;
- the interview to be recorded and transcribed by Barbara Combes; and
- the evaluation data generated from the above methods to be published in the researcher's PhD dissertation and future publication(s).

I understand that:

- the recordings will be destroyed and the transcribed data collected from the tasks and the interviews will contain no identifying information.
- the de-identified data will be held in secure storage by the researcher at the School of Computer and Information Science, Edith Cowan University.
- the interview will preserve my anonymity and that no identifiable information in regard to my name or personal details will be listed in the dissertation or any future publication(s).
- my responses will be made in the utmost confidence and that my replies will have no impact on my future studies.
- I am free to withdraw at any stage if I feel uncomfortable about answering any of the questions.

Research Participant: _____

Date: _____

Researcher: B. Combes _____

Date: _____

11.2. Appendix 2: Web Questionnaire

The front page of the questionnaire contained an invitation to participate, information about privacy and confidentiality of data collected and a check box to signify agreement by the participants.

Each section heading in the Web survey below, indicates a new webpage and separate section in the survey. Scoring has been included in sections of the questionnaire used to develop the Index of Net Gen-ness (ING).

SECTION 1: HOW YOU HAVE PREVIOUSLY USED TECHNOLOGY

The four (4) questions in this section look at how you have used technology BEFORE attending university. Please select the response that **best** describes your experience.

- 1** Before attending university, and **NOT including your own personal use**, how much did you use the Internet for study?
- i Nothing that I studied involved using subject materials that were online.
 - ii One (1) or two (2) subjects I studied at school or TAFE involved using subject materials that were online.
 - iii Most of the subjects I studied at school or TAFE involved using subject materials that were online.
 - iv All of the subjects I studied at school or TAFE involved using subject materials that were online.
- 2** Before attending university, and **NOT including your own personal use**, how would you describe the extent of the online subject materials you may have used?
- i I did not use online subject materials.
 - ii Online subject materials were a minor part of my study experience.
 - iii Online subject materials were a major part of my study experience.
 - iv Online subject materials were an essential part of my study experience.
- 3** Thinking about your education before attending university, how would you describe **your own personal use of the Internet** for study? (ie. using the Internet for study at home, a friend's house or the local library.)
- i I did not use the Internet for study purposes.
 - ii Using the Internet for study purposes was a minor part of my study experience.
 - iii Using the Internet for study purposes was a major part of my study experience.
 - iv Using the Internet for study purposes was an essential part of my study experience.
- 4** Thinking about your education before attending university, where did you mainly use the Internet for study?
- i I did not use the Internet for study purposes.
 - ii All at school/TAFE.
 - iii Mostly at school/TAFE.
 - iv Fifty percent 50% at school/TAFE and fifty percent (50%) home.
 - v Mostly at home.
 - vi All at home.
 - vii Neither home nor school/TAFE. I used the Internet elsewhere.

SECTION 2: USING THE INTERNET

The next 5 questions look at your use of the Internet. Please select the response that **best** describes your experience.

5 When using the Internet and technology **to find information** I consider myself:
 Non-user Beginner Average Good Expert

6 During the last three (3) months and including all the places where you have used the Internet, **how often** have you used the Internet?
 Never Occasionally Sometimes Often V frequently

*Survey structure – when participants click on **never use the Internet**, they will go to **Survey B**.*

7 During the last three (3) months estimate **how many hours per week** you have actively used the Internet **for study**. (drop down box)

< 1 hour	<input type="text"/>
1 hour	<input type="text"/>
2-3 hours	<input type="text"/>
4-5 hours	<input type="text"/>
6-7 hours	<input type="text"/>
8-9 hours	<input type="text"/>
10-12 hours	<input type="text"/>
13-15 hours	<input type="text"/>
16-19 hours	<input type="text"/>
20 - 25 hours	<input type="text"/>
25+ hours	<input type="text"/>

8 During the last three (3) months estimate **how many hours per week** you are actively using the Internet **for personal use**. (drop down box)

< 1 hour	<input type="text"/>
1 hour	<input type="text"/>
2-3 hours	<input type="text"/>
4-5 hours	<input type="text"/>
6-7 hours	<input type="text"/>
8-9 hours	<input type="text"/>
10-12 hours	<input type="text"/>
13-15 hours	<input type="text"/>
16-19 hours	<input type="text"/>
20 - 25 hours	<input type="text"/>
25+ hours	<input type="text"/>

9 I have been using the Internet for: (drop down box)

< 1 year	<input type="text"/>
1 year	<input type="text"/>
2 years	<input type="text"/>
3 years	<input type="text"/>
4 years	<input type="text"/>
5 years	<input type="text"/>
6 years	<input type="text"/>
7 years	<input type="text"/>
8 years	<input type="text"/>
9 years	<input type="text"/>
> 10 years	<input type="text"/>

SECTION 3: WHAT DO YOU USE THE INTERNET FOR?

On a scale from 1 - 4 where **1 = not important**, and **4 = essential**, please rate your use of the Internet for the following activities:

10 How important to you is the Internet for:

	NOT IMPORTANT	MINOR IMPORTANCE	MAJOR IMPORTANCE	ESSENTIAL
i studying	0	1	2	3
ii keeping in touch with friends and family	0	1	2	3
iii financial transactions (banking and bills)	0	1	2	3
iv buying and/or selling things	0	1	2	3
v organising and planning my life	0	1	2	3
vi entertainment	0	1	2	3
vii finding information	0	1	2	3

SECTION 4: TECHNOLOGY YOU USE

On a scale from 1 - 4 where **1 = not important**, and **4 = essential**, please rate your use of the following:

11 How important to you are the following:

	NOT IMPORTANT	MINOR IMPORTANCE	MAJOR IMPORTANCE	ESSENTIAL
i bulletin boards/discussion forums	0	1	2	3
ii library databases	0	1	2	3
iii Email	0	1	2	3
iv instant messaging and/or chat	0	1	2	3
v Internet telephony services eg Skype	0	1	2	3
vi Listservs	0	1	2	3
vii electronic newsletters	0	1	2	3
viii Web-based lookups eg. the White Pages	0	1	2	3
ix Peer-to-peer/file sharing eg. eDonkey, Kazaa and Bit Torrent	0	1	2	3
x MySpace	0	1	2	3
xi Web Blogs	0	1	2	3

On a scale from 1 - 4 where **1 = not important**, and **4 = essential**, please rate your use of the following:

12 How important to you are the following:

	NOT IMPORTANT	MINOR IMPORTANCE	MAJOR IMPORTANCE	ESSENTIAL
i ipod or portable music player	0	1	2	3
ii Webcam	0	1	2	3
iii thumb drive/ flash drive USB drive/ memory stick	0	1	2	3
iv mobile phone	0	1	2	3
v PDA	0	1	2	3
vi Computer	0	1	2	3
vii Laptop	0	1	2	3

viii	digital camera	0	1	2	3
ix	video camera	0	1	2	3
x	Scanner	0	1	2	3
xi	Printer	0	1	2	3
xii	CD/DVD burner	0	1	2	3

SECTION 5: HOW YOU LEARNT TO USE THE INTERNET

On a scale from 1 - 4 where **1 = no help**, and **4 = essential help**, please rate how people have helped you to use the Internet:

13 People who have helped me are:

	DOES NOT APPLY	NO HELP	MINOR HELP	MAJOR HELP	ESSENTIAL HELP
i	mother/female guardian	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii	father/male guardian	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii	sister	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv	brother	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
v	other relatives	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
vi	friends	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
vii	teachers at school	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
viii	school librarian	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ix	computer teacher at school	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
x	short courses not taken at school or TAFE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
xii	experimented by myself	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
xiii	learned myself by reading books/magazines	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

SECTION 6: HOW YOU FEEL ABOUT USING THE INTERNET

On a scale from 1 - 4 where **1 = not confident**, and **4 = very confident**, please rate your confidence for the following activities:

14 I am confident using the Internet for:

	NOT CONFIDENT	GAINING CONFIDENCE	CONFIDENT	VERY CONFIDENT	
i	study purposes	0	1	2	3
ii	keeping in touch with friends and family	0	1	2	3
iii	financial transactions (banking and bills)	0	1	2	3
iv	buying and/or selling things	0	1	2	3
v	organising and planning my life	0	1	2	3
vi	Entertainment	0	1	2	3
vii	finding information	0	1	2	3

On a scale from 1 - 4 where **1 = not important**, and **4 = essential**, please rate your confidence for the following:

15 I am confident in my ability:

	NOT CONFIDENT	GAINING CONFIDENCE	CONFIDENT	VERY CONFIDENT
i to find information using the Internet	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
ii to judge whether the information I have found is reliable	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
iii to collect the information I have found for later use	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
iv to organise the information I have found for later use	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
v to store the information I have found for later use	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
vi to find the information I have found for later use	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>

On a scale from 1 - 4 where **1 = strongly dislike**, and **4 = very enjoyable**, please rate your use of the Internet for the following activities:

16 How do you rate your enjoyment using the Internet:

	STRONGLY DISLIKE	DISLIKE	LIKE	VERY ENJOYABLE
i for study purposes	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
ii keeping in touch with friends and family	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
iii financial transactions (banking and bills)	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
iv buying and/or selling things	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
v organising and planning my life	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
vi entertainment	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>

SECTION 7: ABOUT YOU

17. Gender M F

18. Age <18 18 19 20 21 22 22+

19. Years at university 1st 2nd 3rd 4th 5th+

20. Are you a fulltime or part time student F/T P/T

21. How do you study at university?

- i All my units at university are online.
- ii All my units at university are on campus
- iii Some of my units are on campus, while some are online

22. I have used a web survey before Yes No

SECTION 8: FURTHER PARTICIPATION

23. Are you interested in participating in a follow-up research study, which will include face-to-face contact with the researcher?
If you would like to be a participant please type your email address below:

(Note: your email will be stored permanently.)

THANK YOU FOR YOUR CONTRIBUTION TO THIS RESEARCH

SURVEY B

SECTION 3: USING THE INTERNET

On a scale from 1 - 4 where **1 = strongly dislike**, and **4 = very enjoyable**, please rate your use of the Internet for the following:

7.	I don't use the Internet because:	STRONGLY DISLIKE	DISLIKE	LIKE	VERY ENJOYABLE
i	I dislike using it	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii	I don't have easy access to it	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii	I'm not confident using it	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv	I don't know how to use it	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

SECTION 4: ABOUT YOU

17. Gender M F

18. Age <18 18 19 20 21 22 22+

19. Years at university 1st 2nd 3rd 4th 5th+

20. Are you a fulltime or part time student F/T P/T

21. How do you study at university?

i	All my units at university are online	<input type="text"/>
ii	All my units at university are on campus	<input type="text"/>
iii	Some of my units are on campus, while some are online	<input type="text"/>

22. I have used a web survey before Yes No

THANK YOU FOR YOUR CONTRIBUTION TO THIS RESEARCH

11.3. Appendix 3: Cluster Analysis Report

Received February, 2008

Dear Barbara,

Thank you for the copy of the original data spreadsheet. I analysed the data using the open source machine learning software *Weka* (<http://www.cs.waikato.ac.nz/ml/weka/>). I used a number of the available techniques for cluster analysis, attribute selection, classification and visualization to try and discover pattern and/or clusters in the data.

The final results were inconclusive. There were no major clusters, correlations and/or associations evident in the dataset over and above those strong correlations you would normally expect between certain variables in a dataset like the one provided. While up to eleven very minor clusters were evident on initial inspection, these did not stand up to rigorous selection and testing and may be considered insignificant.

I wish you well in your PhD studies and look forward to hearing about the final results.

Yours sincerely,

Anna Rajander, BSc/BComm (ANU), MSc(IT) (UNSW).
Principal Project and Business Analyst
Requirements Assurance
The Health and Social Care Information Centre
tel: 0113 86 65728 (x65728)
mob: 07947184167
email: anna.rajander@ic.nhs.uk
<http://www.ic.nhs.uk>

11.4. Appendix 4: Sample notes of participant activity during task analysis

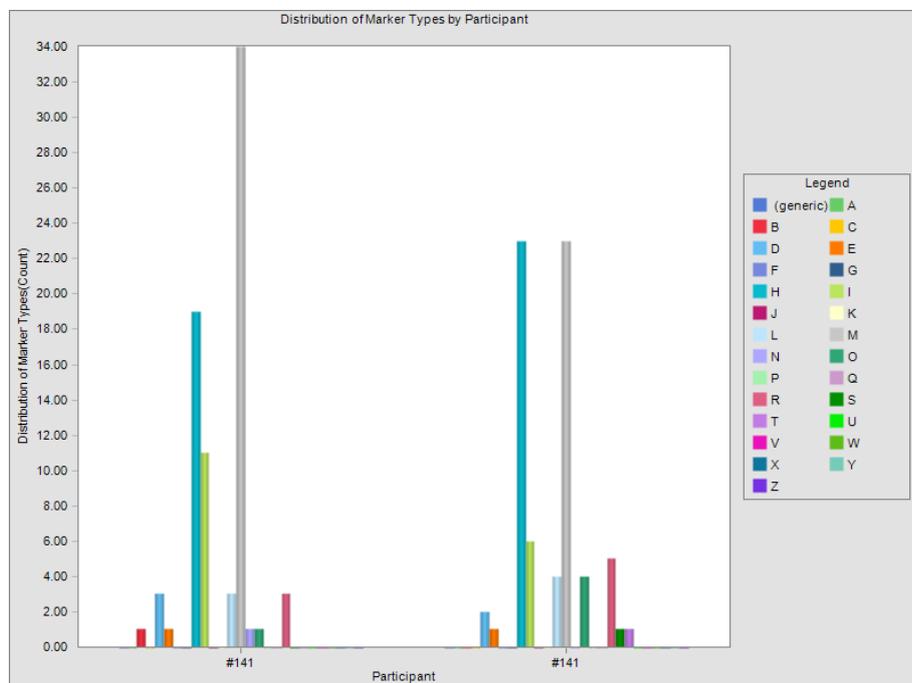
4.1 Participant #141 (HC/HU)

Background

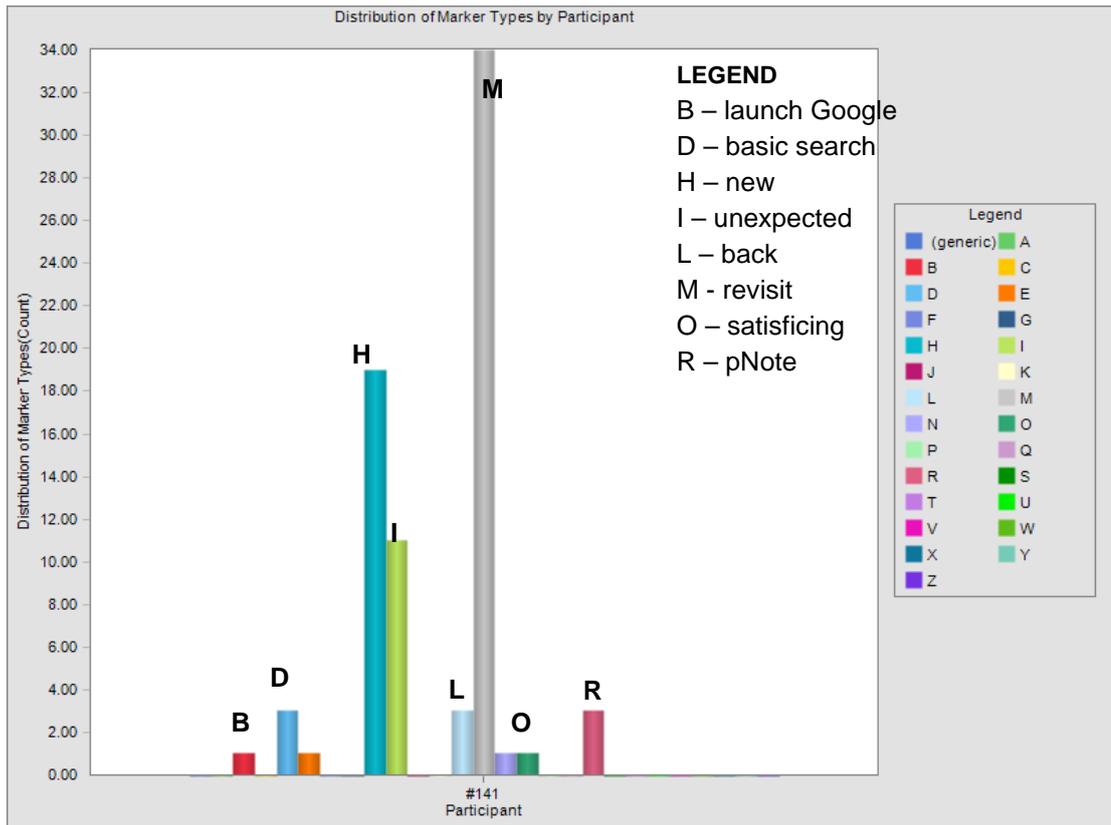
Age	22 (at time of task)
Gender	Female
Area of study	Fine Arts, Grad Dip Education
Year of study	Graduated
Skill rating	Average
Frequency of use	Often
Confidence	53 (-1 stdev = 29.6, mean = 39.5, 1 stdev =49.6)
Level of use	58 (-1 stdev = 32, mean = 44.8, 1 stdev =57.4)

Survey in Morae

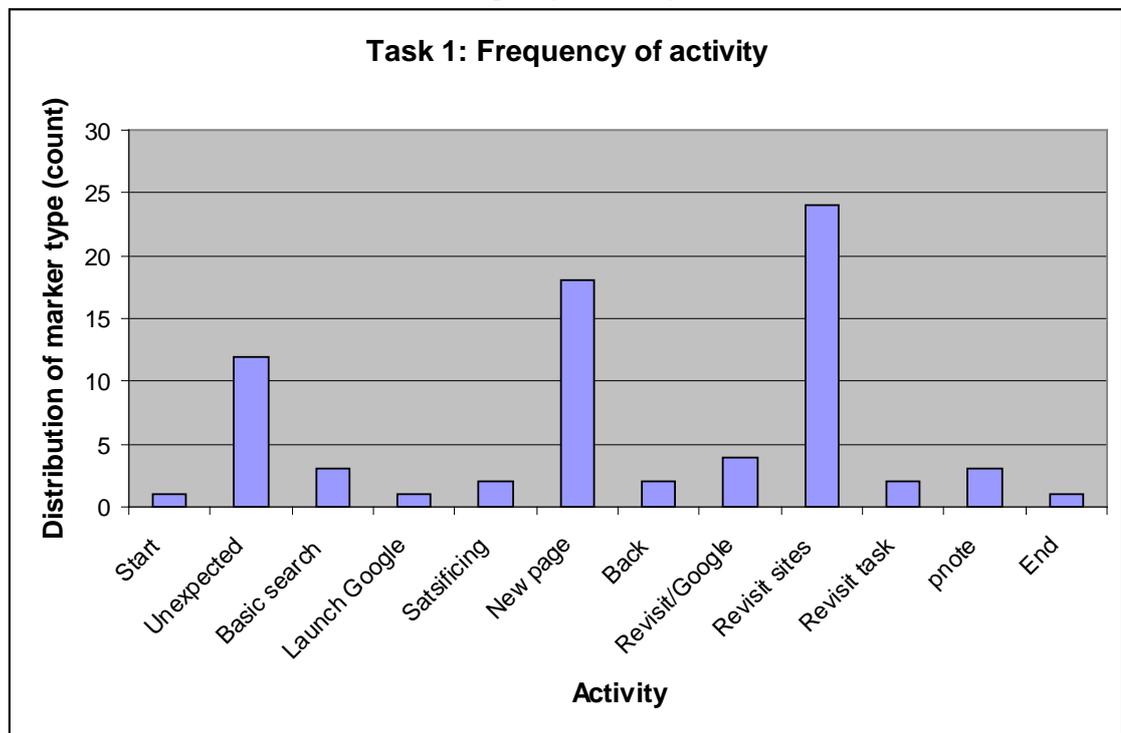
No	Question	SD	D	A	SA
1	I understood what was required in the first task.			X	
2	I found the first task easy to complete.		X		
3	Information on the first task was difficult to find.				X
4	I needed more time to complete the first task.				X
5	I understood what was required in the second task.				X
6	I found the second task easy to complete.			X	
7	Information on the second task was difficult to find.			X	
8	I needed more time to complete the second task.				X
9	I felt anxious during the tasks.		X		
10	At times I felt frustrated during the tasks.			X	



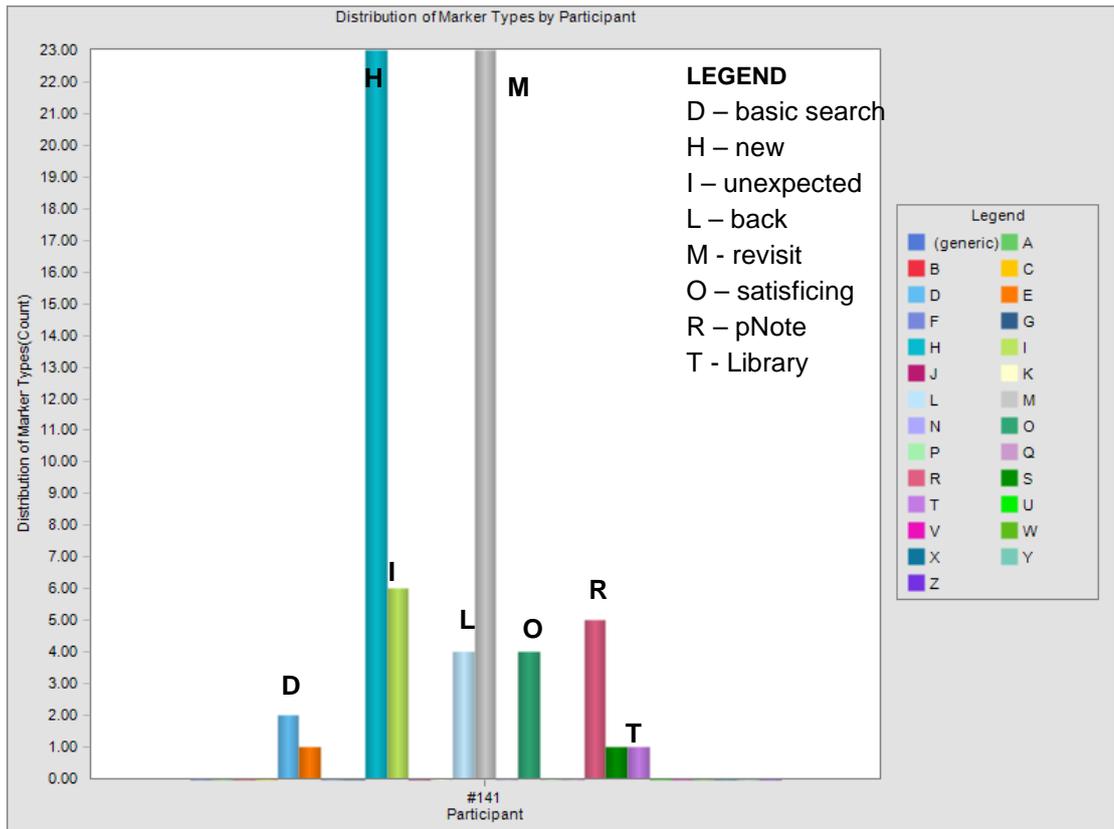
Tasks 1 & 2: Frequency of activity, comparison



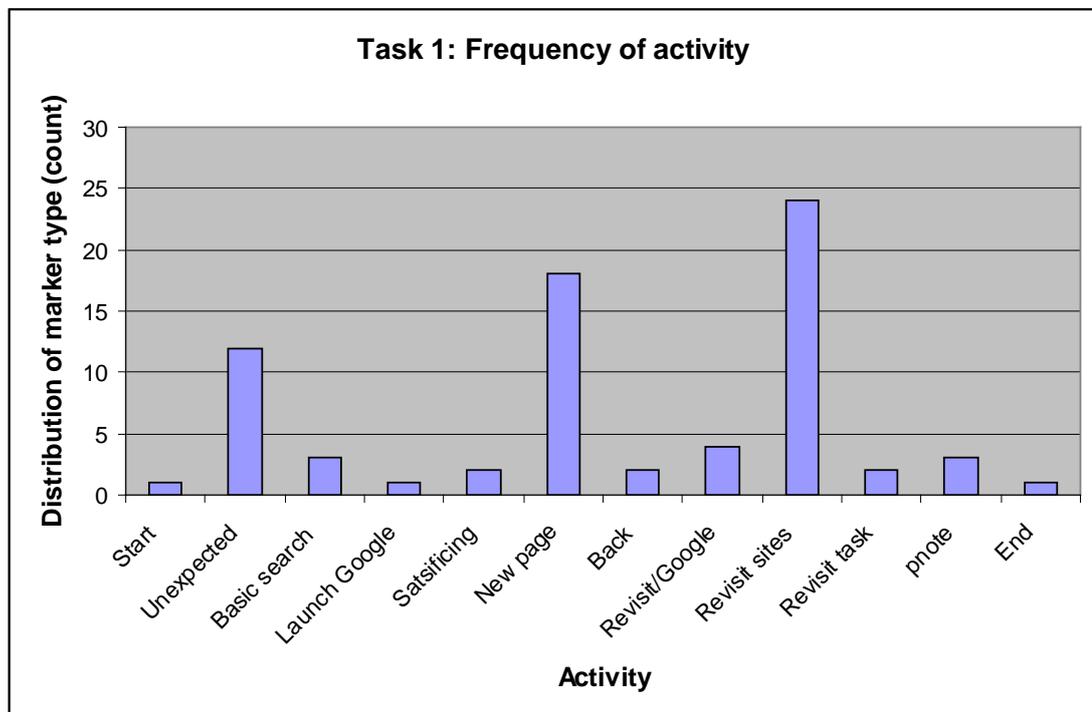
Task 1: Frequency of activity



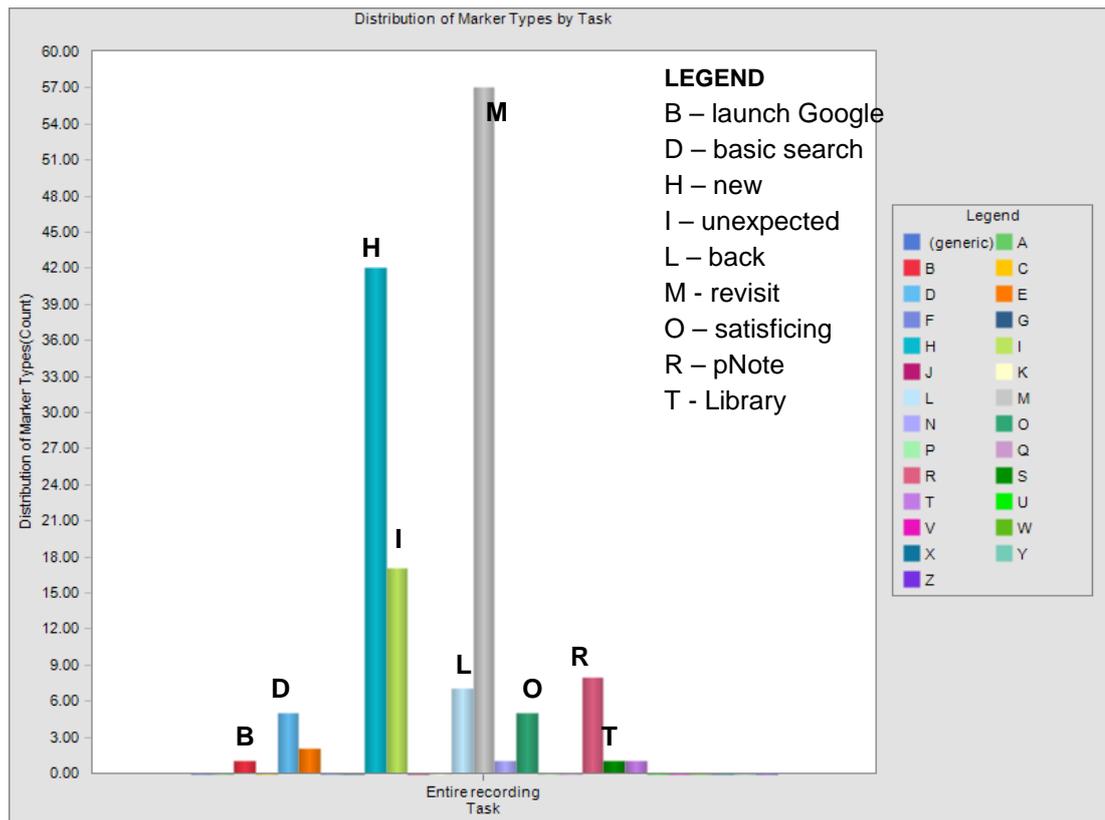
Task 1: Frequency of activity- revisit tag



Task 2: Frequency of activity



Task 2: Frequency of activity – revisit tag



Tasks 1 & 2: Frequency of activity, whole recording

Task 1

You and your partner have decided you would like to go on a famous train journey for your holidays. You need to find 3 famous train journeys. You want to know:

- the name of the train journey;
- the starting point;
- the end point;
- distance travelled;
- approximately how long it will take; and
- the approximate cost of a one way trip in Australian dollars.

You may record your findings any way you wish.

Task 1: Recreational - researcher notes

Student displayed some interesting search habits, like experimenting with URLs that she thought would work. Did not read the task correctly and was looking for train journeys instead of famous train journeys. Found a site and seemed reluctant to leave as if the information must be there if only she could find it. Not afraid to read the text on screen or change URL is the results did not seem promising from the abstracts on the results page – but rarely read more than the first 3 or scroll down page and did not go beyond first page. Occasionally uses cursor to guide line of sight on page. Refreshed pages when a page unavailable message was received, even when the result of an experimental URL. Based a lot of her searching on prior knowledge – put in currency conversion page URL

Did not complete task.

*** reading on screen – different literacy skills required, influence of HCI, lack of reading may also be due to the fact that previous experiences with screen viewing is mainly passive eg. television or visual click and point, linear games such as Mario Brothers and Grand Theft Auto. Is there a difference between online gamers – strategists who require really high level literacy skills across the spectrum – icon, visual discrimination, Internet and text literacy skills – to be

successful in the game. Where true multi tasking in a virtual environment is exhibited rather than task switching.

Marker	Description of actions
Start	
browser	Launch explorer – SCIS home
Launch Google	Begins typing URL, selects from drop down box, articulates what she is doing comprehensively
Basic search	Keywords – train Europe, voices – over 6 million sites, go another search
Basic search	Adds keywords – Paris, voices – heard about the Euro Star before – previous knowledge as a starting point
Satisficing	Selects first results with an abstract – doesn't appear to read, too fast
Unexpected	Uses right mouse button to open in a new window, voices – what she would usually do is open in a new window, so I can keep my original search. Reads screen using cursor as line of sight guide. Voices – looks like it is the same website for the first 3 searches – scrolls down page, quick – looking for keywords. Reaches end of page – voices – OK nothing so far so I'll go to this one because it seems like a comprehensive website – even though she hasn't actually read anything on screen yet
revisit	New window opened previously but not read – Rail Europe
Revisit/task	
revisit	Rail Europe – enters departure and destination data in form, selects dates for travel
new	Popup with travel info – closes immediately, voices – just realised I didn't put in my partner – certainly want him with me on the train
revisit	Rail Europe, adds another adult
new	Travel info popup (leaves small) – reads info on Rail Europe site looking for good deals
Revisit	Rail Europe – voices - still loading so I'll go back here so I can have a look at the ads – scrolls down page, reads in depth text highlighted in a box voices – sure it will open in the same window so I won't go to a new window
revisit	Travel popup – makes full screen, reads inform on screen using cursor as line of sight guide, clicks on link to move down page
Pnote	Takes down information in print
unexpected	Voices – just looking around on this website, doesn't look like there are any exchanges
Revisit	Rail Europe – voices so what I'll do is open another window back up – puts in new URL – error message appears, deals with it.
Pnote	Adds cost to notes in pounds
unexpected	Types in exchange URL – voices – this is an exchange website – previous knowledge, used the Internet for this activity before
new	Exchange rate site, completes conversion in form on site
new	Conversion result
pnote	Adds to notes
Revisit/G	Results page
Revisit	Rail Europe, checks to see if it a return trip, checks using drop down internal menu – one way. Voices – doesn't give me any information about how far we have travelled though – scrolls up and down page.
Back	Voices decision – could check another website for the distance but since I want to check 3 train journeys I might just go ...
revisit	Travel popup info page
back	Navigation up pages
Revisit/G	Switches to Google results page
Basic search	Keywords – train London Belfast
New	Results page
satisficing	Reads first results aloud – voices - seems all right – opens in new

	window
new	Switches back to results as new window opens
Revisit/G	
Unexpected	Clicks on Austn websites button in Google, voices – just see if we can get any Austn websites up – still in London to Belfast search
New	Results, voices – won't use the Lonely Planet website (first result) because that is more of a tourist guide one, I know that already – using prior knowledge to guide IS behaviour, using side bar to scroll, clicks on similar site links right hand side of Google results screen, opens in new window
Revisit	Previous window accessed but not viewed – London to Northern Ireland, enlarges window full screen, voices take a quick look because I don't think this will be the one I'll look at – scrolls fast and minimises window
new	Link access previously but not viewed, makes window full screen – Rail Plus –
unexpected	voices – because it has a .au I know it will probably have Australian prices – scans page, selects map tab
new	Asks for installation of software – closes, clicks to view map
new	Switches to English map,
unexpected	clicks around on map to see if it is interactive – isn't
new	Popup – zoom in map, enlarges to full screen, uses drag on map to move in map, closes, voices – not very helpful
revisit	Map
new	Rail Plus – BritRail
New	BritRail and Ireland pass, reads aloud from screen
Revisit	London to Northern Ireland, puts in new search URL
unexpected	Puts in what she thinks might be the URL for BritRail website
revisit	BritRail and Ireland pass
new	BritRail and Ireland pass – general information, scans page, using cursor as a guide
new	Popup - Voices - Looking at all the details
revisit	Switches back before new window loads - BritRail and Ireland pass – general information
revisit	Popup – map Britain and Ireland
revisit	BritRail and Ireland pass – general information Voices – thinking I want more direct
new	BritRail – from guessed URL, scans and uses internal page, interactive drop down boxes to get more info. Voices – that's not really giving me a lot of information that I really, really want.
unexpected	Tries a new URL – adds UK to end of URL
Revisit	Map – closes
revisit	BritRail home
revisit	BritRail and Ireland pass, reads page content in depth
new	Page cannot be displayed message – from experimental URL
unexpected	Tries a refresh
revisit	BritRail and Ireland pass
new	Page cannot be displayed message – from clicking on internal link on BritRail and Ireland pass page
unexpected	Tries a refresh of this page too
revisit	First Page cannot be displayed message – message repeated after refresh
revisit	Currency conversion page Voices – try closing off a few windows – closes page
revisit	First Page cannot be displayed message
revisit	Rail Europe info page closes page
Revisit	First Page cannot be displayed message
unexpected	Tries a refresh of this page again
revisit	Second Page cannot be displayed message
unexpected	Uses URL – deletes part of URL – Voices – OK track back to the parent website

Revisit/task	While waiting for page to load
Revisit/G	
End	

Task 2

You are leading an oral discussion group in class on how to write a good university assignment.

As part of the assessment brief to support your discussion you have to find three (3), quality, academic/scholarly resources on the topic of lifelong learning. The academic resources must be:

- a recently published, academic journal article;
- a website; and
- a book.

State aloud why you think the resources you have found are quality resources.

You may record your findings any way you wish.

Task 2: Academic - researcher notes

Study Skills Trekk program at uni has page containing small images with text as a menu – attempt to get past the fact that this generation do not read text on screen? Presents study process as linear. Student obviously knows her way around the catalogue page – no hesitation when checking holdings. Interestingly, does not note location of holdings – ie dewey numbers Student voices she tends more towards books because she feels if they are published then they are a more reliable resource – simplistic evaluation method – satisficing? Notes edition of resource as well as date of publication – part of her evaluation process – more sophisticated. While the student exhibited more sophisticated use of the library catalogue ie. seemed to know her way around, she did not go to the journal articles/databases search but the journal title search. Since at no time was the definition of the term questioned, she did not get the correct results. Students moves in and out of the library closed system and into the Web – unclear if she knows where she is.

Student did not complete task

Marker	Description of actions
Start	Voices – how to write a good university assignment – begins at Google page from last task
unexpected	Types in Curtin URL at Google page in browser, voices – first place I would start off is the university.
new	Curtin homepage
Library	Library home
Unexpected	Clicks on study skills – hasn't read the task in depth
New	Student Learning support home – reads text on screen aloud
new	Opens new window – learning support
Revisit	Switches back to study skills home
New	Opens study trekk in new window, makes full size
Revisit/task	Checks task sheet – voices – OK lifelong learning – scans page containing small images with text – attempt to get past the fact that this generation do not read text on screen?
New	Goes into preparing for assignment link – still hasn't understood the task
pNote	Takes down notes – voices – so our first resource is the library website because that opens up a whole lot of things for us and because its directly considering university students and that's a good place for them to start really. – clicks and moves down page.
new	Uses side menu bar to navigate within study skills site
Revisit	Study Trekk home – program contains very brief information Voices – so really particularly the Study Trekk website would be a good place to start
pNote	Voices – so really particularly the Study Trekk website would be a good

	place to start – takes down notes
Revisit	Student Learning support home – reads text on screen aloud – voices – Power Plus Writing program, might have a bit more of a look at that.
back back	Navigation Navigation – voices - since we started in the library we'll just go hit the back button, was opened as a new tab so – closes window.
Revisit	Study Trekk home – voices – we're back to the library
Revisit	Library home – voices – so I want to go into the catalogue – uses side menu bar – see if I can find a book
new	Library catalogue home
Revisit/task	Checks task sheet
Basic search	Keywords – lifelong learning – voices – surely considering that we do have an education degree offered that we would have resources
new	Results page – reads abstract information aloud
unexpected	Notes aloud that the first entry is at Kalgoorlie campus and can't get her hands on it straight away, the title doesn't really appeal to her either because it doesn't seem to have exactly what I would want with this study in lifelong learning
satisficing	Only considering first 2-4 entries
new	Selects second entry, voices – open up in a new window so I can get more detail
Revisit	Results page, moves down page, reading aloud as she goes, selects number 17,
new	adult education and lifelong learning, opens in new window
revisit	Results page – does not go to next page – voices – OK so I'll have a look at the two catalogue ones we've brought up.
Revisit	Success skills – voices – think it would help if they were quite recent, reads abstract info from screen aloud
Pnote	Takes down author details – hasn't looked at other record yet
satisficing	First one that looks relevant = authority, good information
New	Checks holdings record – obviously knows her way around the catalogue page – no hesitation, closes down window
Revisit	Results page
Revisit	Second catalogue record, makes full screen, reads contents information
Revisit/task	Checks task sheet
unexpected	voices – I do tend more towards books because I feel if they are published seems like a more reliable resource so I'll tend to put down that one
satisficing	
pnote	Adds to notes, takes down bib details but not location details in the library,
unexpected	voices – third edition of that one so it is obviously constantly being revised.
new	Checks availability
new	Uses internal page navigation to go directly to journal search page
Basic search	Keywords – lifelong learning
new	Journal results page – journals not journal articles, 6 results, scans all six and reads information aloud, selects 5 th choice because it is about adult and continuing education (voices)
new	Catalogue record – journal from Assoc of adult and continuing education, checks record – voices – obviously still going because it says expected, I can read them in the library, so will take down the details for that
Pnote	Adds journal details to notes – not what the task is asking for, at no time has there been any query about definition of the term lifelong learning,
back	voices – can't get access to any of the particular articles from that one
Revisit	Journal results page
new	Clicks on electronic journal entry (no. 6)
new	Voices – 1996 that was eleven years ago but that was from

Revisit	Journal results page – download slow
new	Journal login info
revisit	Journal entry page
Revisit	Login page – completes login information, clicks each box of form to enter data, does not use the tab button
revisit	Journal entry page
Revisit	Login page – download slow, closes page – voices OK it won't let me through there – time elapsed is less than 20 secs, closes down login page
revisit	Journal entry page
unexpected	Highlights and copies name of publication and puts in browser window
new	Voices – see if I can do a search straight from , - results page
Satisficing	Selects first link
new	AAACE 2007 conference home, reads title aloud
new	Selects publications link
new	Voices have archived versions of their journal, 2006, so fairly recent, opens in new window
Revisit	Switches back to AAACE publications page
back	Navigating site
Revisit	AAACE home
End	

4.3 Participant #639 (HC/HU)

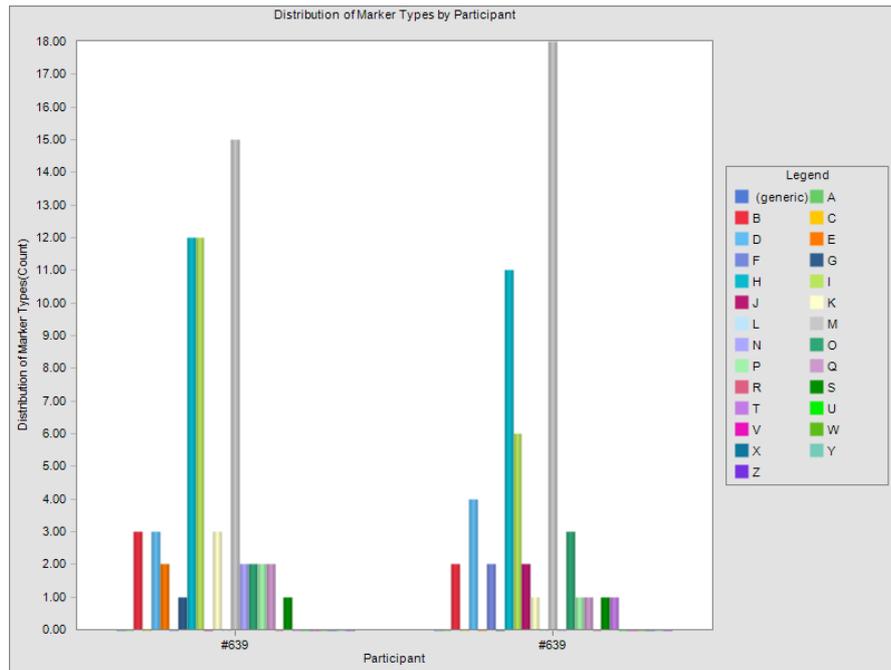
Background

Age	20 (at time of task)
Gender	Male
Area of study	Psychology
Year of study	2 nd
Skill rating	Good
Frequency of use	Very frequently
Years of use	>10 years
Confidence	54 (-1 stdev = 32.6, mean = 42.8, 1 stdev =53.6)
Level of use	58 (-1 stdev = 32, mean = 44.7, 1 stdev =57.4)

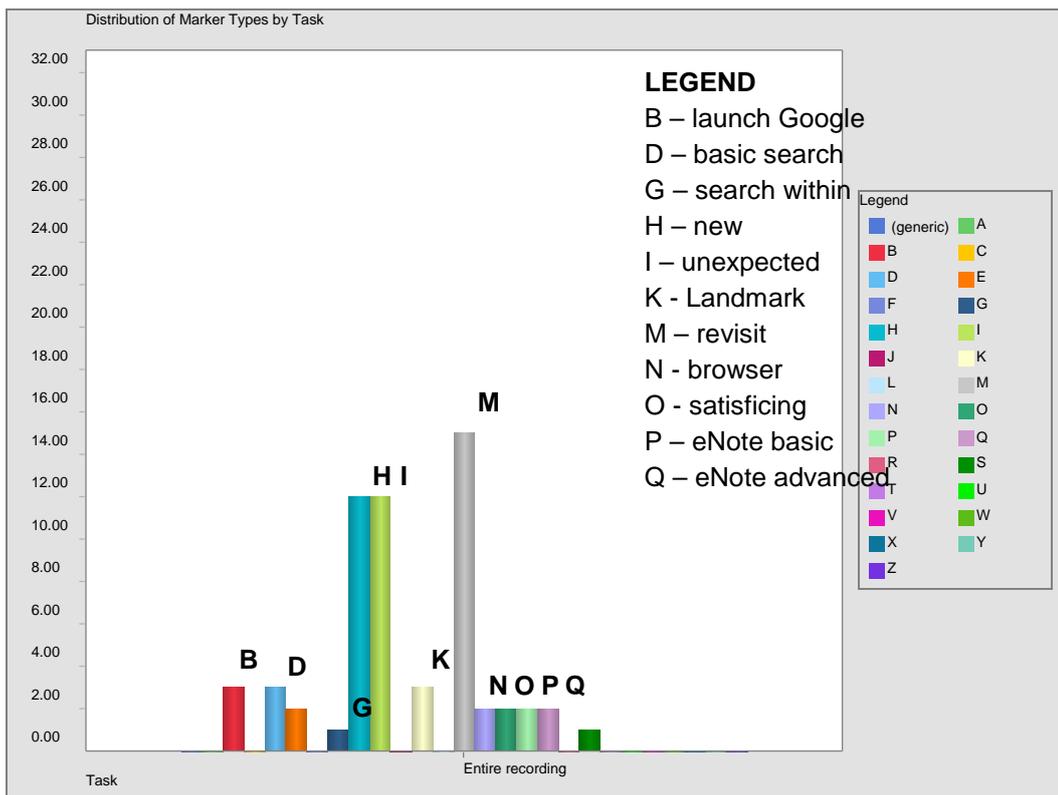
Survey in Morae

No	Question	SD	D	A	SA
1	I understood what was required in the first task.				x
2	I found the first task easy to complete.			x	
3	Information on the first task was difficult to find.		x		
4	I needed more time to complete the first task.				x
5	I understood what was required in the second task.				x
6	I found the second task easy to complete.			x	
7	Information on the second task was difficult to find.		x		
8	I needed more time to complete the second task.				x
9	I felt anxious during the tasks.			x	
10	At times I felt frustrated during the tasks.	x			

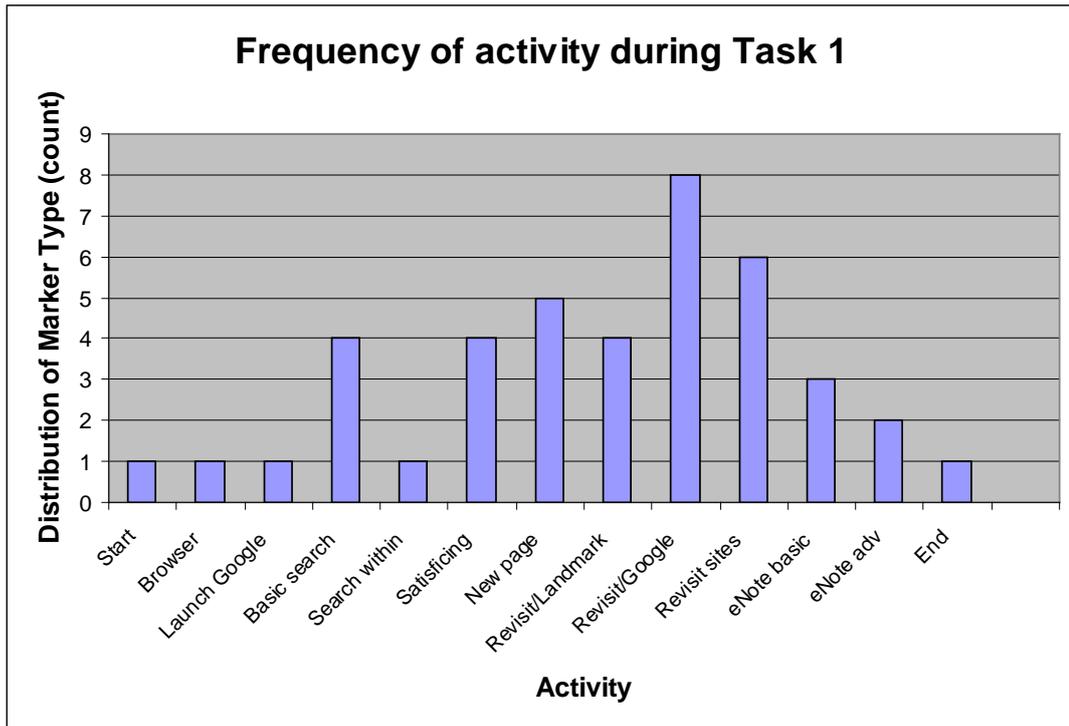
This student was identified as a highly confident, high user of technology (HC/HU). He also admitted to feeling anxious during the tasks.



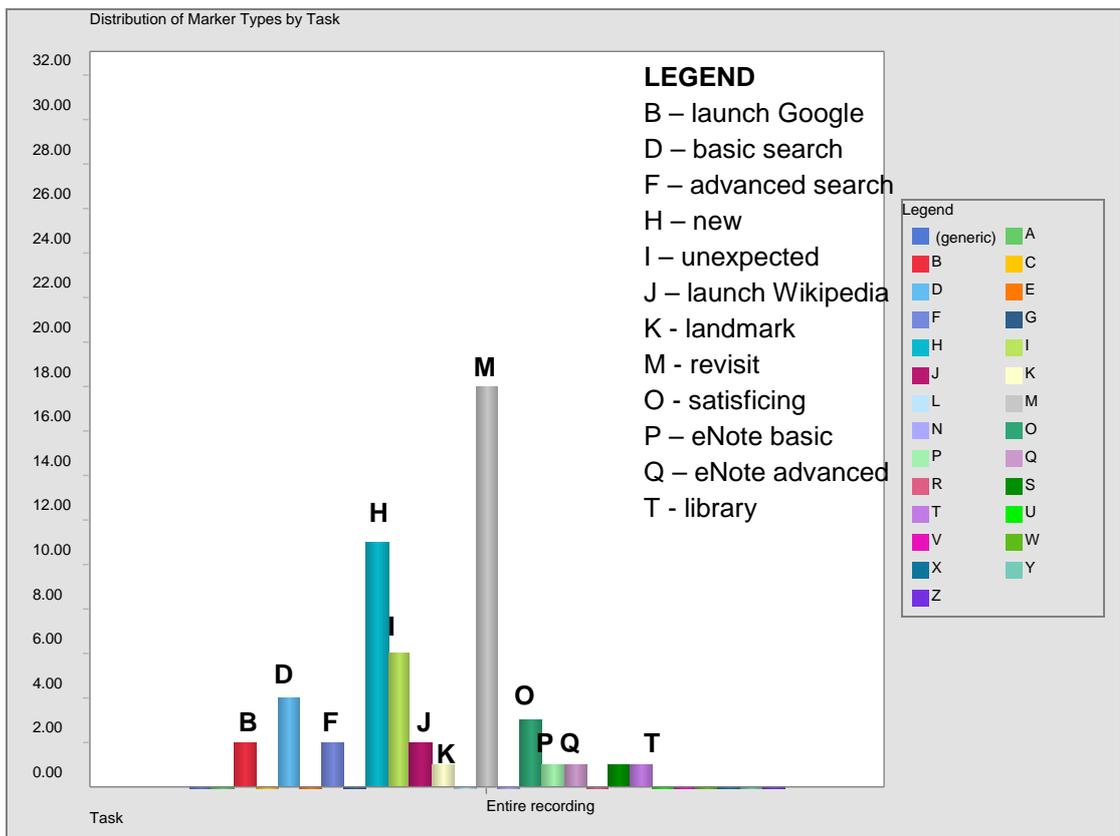
Tasks 1 & 2: Frequency of activity, comparison



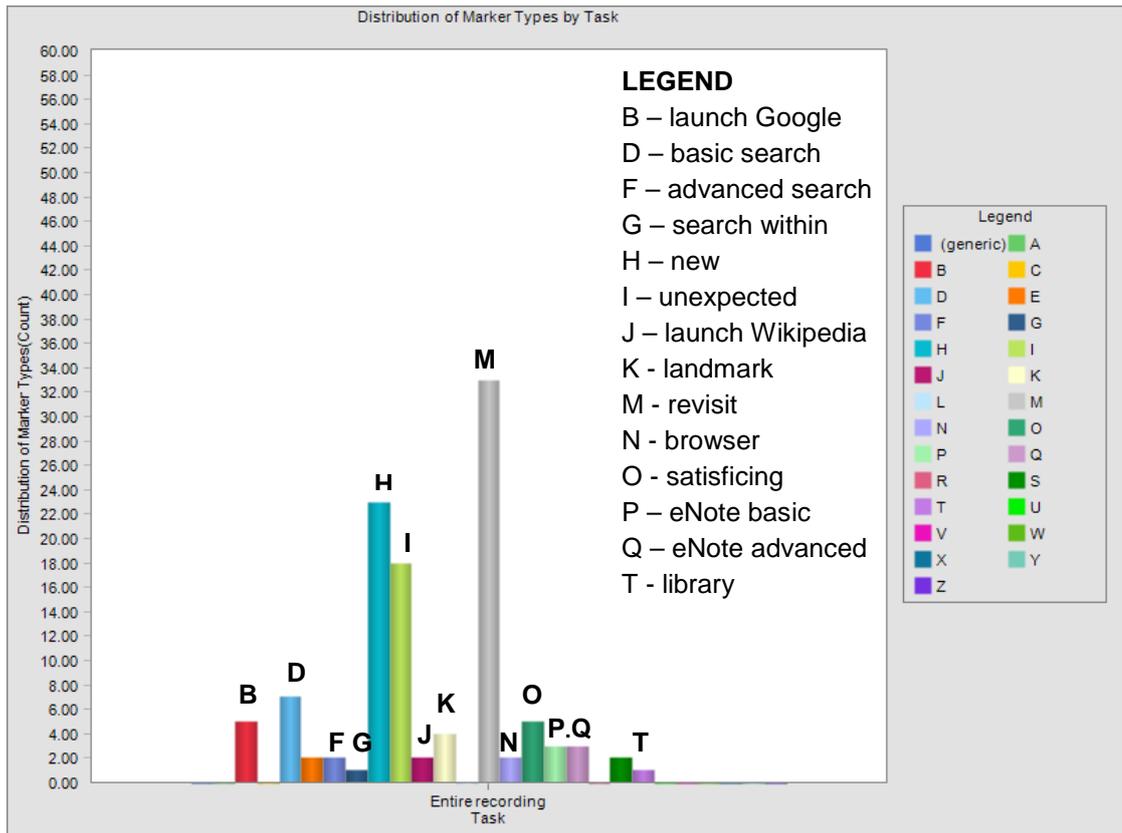
Task 1: Frequency of activity



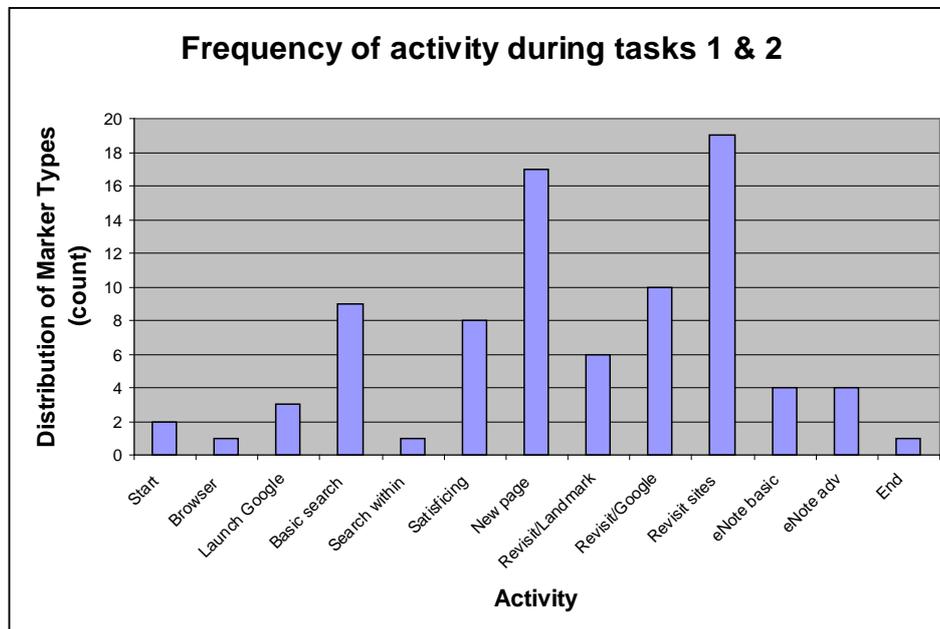
Task 1: Frequency of activity – revisit tag



Task 2: Frequency of activity



Tasks 1 & 2: Frequency of activity, whole recording



Information-seeking behaviour during tasks 1 & 2 – revisit tag

In this information-seeking behaviour profile, we can see the student has spent a lot of time opening new pages and revisiting sites. In this case the student revisited a landmark site (result of the original search), Google (search engine) and other open pages. In total, the student revisited Google 10 times, the landmark site 6 times and web sites already visited 19 times. He also launched Google 3 times and opened 17 new pages. Satisficing and basic search methodology (keywords) are also a characteristic of this participant’s information-seeking behaviour.

Task 1

You and your partner have decided you would like to go on a famous train journey for your holidays. You need to find 3 famous train journeys. You want to know:

- the name of the train journey;
- the starting point;
- the end point;
- distance travelled;
- approximately how long it will take; and
- the approximate cost of a one way trip in Australian dollars.

You may record your findings any way you wish.

Task 1: Recreational - researcher notes

At no time did the participant appear to be frustrated with the task, even though he had difficulty finding the information he required. Participant persisted with the task throughout. Student showed evidence of multi tasking in that he is moving between related tasks. When participant found a site that contained some of the required information, he tended to stay with it rather than initiate a new search.

Satisficing. Trusted search engine results – did not look further than the first 2 results in any of his searches. Tended to use the first site accessed from original search as a landmark site.

Task not completed.

Marker	Description of actions
Start Task	
Browser	Opens Internet Explorer
Launch Google	Types in URL, no planning
Basic search	Australia - train (not great train journeys)
Satisficing	Voices – ‘open up first one I find’. Opts for second site from search results
	<i>Scans page – very fast, looking for cues in headings. Voices – ‘looks for most interesting description’</i>
New	Opens new web page using menu in browser, first result from original Google search
	<i>Problem with new page, closes window</i>
Revisit/G	Original Google search screen
	<i>Limited vocalisation at this stage of task</i>
Revisit/G Revisit/L	Original search result gets there from Google search results screen
	<i>Multiple windows open</i>
	<i>Scans information on page - does not search it using browser edit mode or search facility</i>
	<i>Multiple windows open– uses browser functionality to go to other open windows</i>
New	Website from original search result page, scanning for visual cues/headings
Revisit/G	Original search result - Google
New	Website from original search result
New	Vocalises – ‘found a pretty good site, need to skim through it to see what it has to offer’.
	<i>Scans screen for information, uses menus to navigate site – finds Indian Pacific</i>
eNote Basic	Notes in Word. Types in heading
eNote Advanced	Cuts and pastes from website, includes URL first, navigates using menu bar/w Links to web pages on bottom of browser/screen
	<i>Uses mouse (right utton) to cut and paste instead of keyboard (more actions required)</i>

End Task	First part of task 1 – all information from single website. Time 5:09:65
	Uses bottom screen menu in browser to close windows he doesn't want – Australian train journeys all closed
Revisit/ Landmark	Original search result website
	<i>Scans text on screen – black background on this website with white text – difficult to read. Looking through country names/places</i>
	<i>Voices – 'looking for a country I wouldn't mind visiting'</i>
Revisit/G	Original Google search screen
Revisit/Landmark	Original search result website using bottom screen browser menu to navigate
	<i>Scans webpage looking for keywords and headings indepth reading limited, scrolling pages and moving between pages</i>
	<i>Voices – not finding what he wants so will now search the website using search facilities on the site</i>
Search within	Google search within website
Basic search	'United Kingdom France'
Satisficing	Selects first search result
	<i>Slow page download — looks for alternative site while loading, by name — time lapse 7:35:61 – 7:58:26 (23secs)</i>
Revisit/G	Original Google search screen
Basic search	Keywords - 'bullet train Japan'
Revisit	Checks slow download page while google search for bullet train in progress. Clicks on train link
Revisit/G	New Google search results - Japan
Satisficing	Selects first & second result in Google search
New	Opens both sites at once
	<i>Voices – 'first two sites have best description about Japan's railways'. Does not scroll down search page to check other results – decision based on descriptions about Japan railway provided in Google search result screen.</i>
Revisit	All three screens - France site, 2 Japan sites and travel cost info site, uses navigation bar at bottom of browser, voices - France site still loading, clicks to other sites
	<i>Scans page and navigates menus in site for information</i>
Revisit	search result (France) from landmark site found in original Google search
	<i>Voices – 'site from France no good'. Closes page – language = French</i>
Revisit/G	New Google search results - Japan
Basic search	Keywords - 'UK-France train'
Revisit	Japan sites while search in progress (2 different sites open)
Revisit/G	Google search results - UK-France train
Satisficing	Voices – found a good site for European train journeys – based on name of site – first site in search result
	<i>Waiting for download – 6 secs – moves back to one of the Japan sites</i>
eNote Basic	Types in title – links in new window to find cost, decides route – clicks to notepage to type in route
Revisit	2 pages downloading with costs of Japanese rail journey
eNote Basic	<i>Clicks on all pages (5) on Japan rail journeys looking for information re-length of journey</i>
	<i>Scans webpage for costs</i> <i>Voices – cost in yen, needs a currency converter</i>
eNote Advanced	Cuts and pastes cost information in yen
	<i>Using browser functionality to navigate between windows</i>
	<i>Scanning webpages – very fast – looking for headings of cues to information, not reading in depth</i>
Revisit/Landmark	Original search result website – very brief
Revisit	New European site from UK-France train search
	<i>Using menu structure to determine route – dismissed this previously on another site (in French), chooses dates and time for departure</i>

End Task	15 mins up, task incomplete
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Task 2

You are leading an oral discussion group in class on how to write a good university assignment.

As part of the assessment brief to support your discussion you have to find three (3), quality, academic/scholarly resources on the topic of lifelong learning. The academic resources must be:

- a recently published, academic journal article;
- a website; and
- a book.

State aloud why you think the resources you have found are quality resources.

You may record your findings any way you wish.

Task 2: Academic - researcher notes

Student did not use the library catalogue to find book title. Used library initially but gave up when his searches proved difficult. Used EBSCO Host – most used journal database in secondary schools so may be using due to prior familiarity.

Spent a lot of time moving between sites. Uses cursor to guide reading of blocks of text on screen. Multiple windows open at all times. Uses browser task bar at bottom of screen and mouse for navigation.

Checked task sheet 3 times. No prior planning. Confusion of lifelong learning with adult learning – definition in Wikipedia.

Task not completed. Satisficing evident – did not go beyond first 2 results in Google search, similar in journal databases – did not look deeper than first 4 articles.

Cut and pasted ephemeral URLs - result of a search. Indicates a lack of understanding about searches and their results.

Also uses cursor on page to guide reading of text on screen.

Check notes for bibliographic details.

Task not completed

Marker	Description of actions
	<i>Closes down all windows from task 1, goes to</i>
Start Task	No planning
New	Types in university URL last webpage open from previous task – selctes current students link, uses Quicklinks from side menu
New	Opens SCIS homepage using browser links
Library	Selects journal articles by Faculty, CHS, Psychology – searching for lifelong learning as keyword, selects EBSCO Host – most common database in secondary schools
Revisit/Landmark	SCIS homepage, checking new items while journal loads
	<i>Waits for journal page to download</i>
Advanced search	Selects fields for searching Voices – ‘start off with some broad terms to find common authors’ Using keywords but in different fields – Boolean operators Does not click fulltext or peer reviewed
eNote Basic	While journal search is loading, prepares note page in Word.
Satisficing	Scans first 4 journal articles, does not look at rest – 5 pages of results
Basic search	Search keyword ‘learning’
Satisficing	Scans first 4 journal articles
Revisit/Task	Checks/reads task sheet
Advanced search	Changes fields, adds keyword lifelong, does not change operators, may indicate that he doesn’t know what they mean or how they can be used.
Revisit/Landmark	SCIS homepage – types in Google URL from here. Time elapsed – 2:50:01 mins
Launch Google	Opens two google webpages, keywords ‘lifelong learning’

Launch Google	
New	Types in URL for Amazon.com in Google search page to find books on topic
Revisit	Library and journal search
Basic search	Changes second search term – ‘life’
Revisit	Amazon books, search
Basic search	Keywords ‘learning throughout life’
Revisit/G	Search results – lifelong learning
Launch Wikipedia	First result in Google search list
	<i>Voices – using Wikipedia to help with some search terms. Scans page and checks task sheet.</i>
Revisit/Task	Checks/reads task sheet
Revisit/Wikipedia	Wikipedia. Reading first paragraph in depth – uses cursor to guide reading of blocks of text on the screen
New	Clicks on link in Wikipedia – word pedagogy
Revisit	Journal keywords learning and life
Revisit/Wikipedia	Wikipedia
Revisit	Journal, new keywords
Basic search	New keyword – pedagogy – hasn’t found meaning yet
Satisficing	Scans first 4 journal articles
Revisit/Wikipedia	Wikipedia, voices – found few terms in Wkipedia going to look at these.
New	Wikipedia page – term pedagogy, quick scan
Revisit	Amazon books, search learning throughout life
	<i>Scans page, voices - found a good book on lifelong learning – going by title.</i>
New	Open new page to book in Amazon link from book title – keywords in title ‘lifelong learning’
Revisit	Journal search – pedagogy. Doesn’t check results
Basic search	New search terms – ‘learning and life span’. Doesn’t wait for search results
Revisit	Amazon link – now downloaded
	<i>Finds link to journal review of book in Amazon annotated bibliography</i>
Revisit	Briefly back to journal website, using task bar on bottom of screen
Revisit/Wikipedia	Wikipedia lifelong search result
Revisit	Amazon.com searching titles for search term lifelong learning, unsuccessful
Revisit	To original book title found on Amazon. Checks Editorial review information provided by Amazon – uses cursor guide reading of blocks of text on the screen
Revisit	Journal search screen – now checking results from ‘learning and life span’
New	Opens up PDF
Revisit	Journal results screen while PDF downloading, clicks on another file Voices – ‘found article on university study on effects of lifelong learning
	<i>Multiple windows open, requires menu window from task bar to find articles</i>
New	Fulltext article from journal search. Reads abstract in depth – still using cursor to guide reading on screen. Closes article after reading abstract.
New	Fulltext article from journal search. Reads abstract in depth
Satisficing	Chooses article based on abstract. Voices – ‘this one seems OK’ Reads abstract information aloud – equates lifelong learning with adult learning
eNote Advanced	Cut and pastes URL – ephemeral URL, result of a search & may be different next time. Cut and pastes title and author/s
End	Completes first part of task 2

Revisit/Task	Checks/reads task sheet, goes to article on screen Voices – ‘thinks article is a good one because it gives information about the effects a university education can have on learning throughout your life.’ Because it is about university students it will be interesting for participants to listen to.
Revisit/Task	Checks/reads task sheet Voices - Obviously since it is a peer-reviewed article [doesn't finish] – clicks to article
Revisit	Amazon book title information. Scans whole page (very quickly) halts briefly at citations information – doesn't appear to know what this means.
New	Goes back to bottom of Amazon page to search for similar titles – current title German
New	Finds new title opens new page - English title, Lifelong learning across the lifespan. Uses editorial reviews to check content of title. Looks at citations list. Voices – no reviews, but 96 other books that cite title. Looks at key phrases to make decision about including title. Voices – contents pretty broad, give an overview of lifelong learning
eNote Advanced	Cuts and pastes URL from Amazon – ephemeral, result of a search
Revisit/G	Search results – lifelong learning
Launches Wikipedia	Second result in search page, decides not to use it
New	Selects new site already open. Govt site Voices – OK govt site on lifelong learning, exec summary and link to PDF doc Scans content very fast – goes back to top of page and reads indepth – uses cursor to guide reading blocks of text, voices content
End task	Incomplete

11.5. Appendix 5: Anecdotal field notes post interview

5.1 Participant #409

- International student – Slovakia, Internet use – 6 years. Age 22.
- Student in upper end of age group.
- Used database for academic task – Multimedia School drums into students that they are not to use anything else.
- Personal task – used prior knowledge. Just returned from travelling in Europe, did not ‘read’ the task – ‘great’ train journeys, so went to a booking site for 3 journeys by train. Therefore could find all the information required for the task except the distance travelled.
- Self-effacing, especially about ability to use the Internet to find information in comparison to peers. Used Yahoo originally but now Google after being told by a friend it was the best search engine. Came out as mean/HU but rates herself as a beginner. Using Internet mainly for communication.

5.2 Summary notes

Participants: #689 (Av/LU) Male; #861 (HC/LU) Female; #87 (LC/LU) Female, #638 (Av/HU) Male; #754 (Av/Av), Male; #322 (Av/Av), Male

- Use of the word relevant by a number of students. Students equate a recognition of relevance with authority. If the information appears to be relevant to the topic then it must be authoritative.
- Australian Govt site on lifelong learning – authority also accepted without question. Do not appear to search for different meanings – satisficing – satisfied with first piece of information.
- Older students who have been at uni longer and had the Wikipedia message instilled in them don’t use it for uni work – specify the distinction. Whilst in the closed system where expectations demand they don’t use it, then they tend not to. Some still admit to using it as a landmark site – almost like a browsable search engine rather than a landmark. Use the links in Wikipedia to search – why? Because they feel the information is more focussed? Too much in the search engine results. Older students are aware of the lack of authority on the Web, but few seem to distinguish between the Deep Web and the Public Domain Web.
- Method of searching in the open system – recreational task – google – keywords. Only one student has talked so far about search strings (#861) – will be interesting to see if he actually used search strings and sophisticated search methods.
- Students are using the technology a lot but only certain technologies. All use a mobile phone and the Internet for communication first and entertainment second. Some use ipods but for music not for study. Some use digital cameras, few use PDAs. They do not use the Net for political interaction. Only one student has used the Net to contact strangers overseas and followed up this contact with a physical visit while travelling. This student admitted to getting into trouble when he was 15/16 – creating fake credit cards on the Web with people he met (#638) through the Web. This doesn’t seem to be common as they are sticking very much to people they know. Some have MySpace and FaceBook, but mainly to keep in contact with people they already know.
- Most consider that their world would be much harder especially study without the Internet.
- Only one student had an idea of what a reference librarian is and none had really used one in their study.

5.3: Participant #872 (HC/HU), Female

- Post interview discussion. Revealed that she has a refined sense of how to scan information in articles and use information in a refined way for university work. Credits the 6 month University Preparation course. Also a third year at university.
- Again – learned by herself and by watching her brother.
- Does use Wikipedia and probably more that she would like to admit – as a jumping off site. Kids seem to be using it to get keywords and other references.
- Equates multi-tasking with having things on, rather than doing several things at once, but she probably doing this as well.

5.4: Participant #402 (HC/HU), Male

- Admitted that it was often very difficult to find information on the Internet and he often resorted to print. Uses the printer lots due to difficulties reading on screen for long periods. Interesting – high user but very specific. iPod only for music and is loathe to change his culture of use – ie entertainment to use it form lecture materials.

5.5: Participant #302 (LC/LU), Female

- Female – 2nd year medical student. Overwhelmed when I told her what the databases at University and Endnote could do. Wanted to know why no one had given her this information. Sent her off to the library to find a reference librarian.

5.6: Participant #313 (HC/HU), Female

- 4th year honours student. Knew what a reference librarian is, very reticent in interview, very sure of her own worth, only using the databases. However, failed to follow instructions and combined the 2 tasks into one recording.

5.7: Participant #313 (LC/LU), Female

- Very nervous, altered her answers to the small survey at the end of the tasks. Qualified answers to make them sound better. Very self-effacing.

5.8: Participant #817 (Mean/LU), Male

- Difficulty finding information in his area of agriculture esp. on the Web – when subject is specific. Difficulty in management and economics subjects because amount of information is so broad. Appears confident and competent.

5.9: Participant #319 (HC/Av), Female

- Only found out about online databases and endnote at the beginning of her 4th year of study. Says she had heard about Endnote but did not know what it meant. University does have a compulsory communication unit, but she missed out because she is doing an Arts degree – Humanities students do not have to do the unit. Says it would have saved her so much time.

5.10: Participant #423 (Av/LU), Female

- Low confidence and low use, frightened of technology, not being able to keep up and being dependent on it. Drama student wants to engage with people. Internet is convenient.

5.11: Participant #41 (Av/Av), Male

- Chemical engineering, confident user, first year, still using Google and keyword searching. Difficulty finding specific information
- Specificity, volume of information, authority, relevance = authority, trusting the search engine, not understanding how the search works or where they are in virtual space, not questioning authority (govt sites), satisficing, lots of specific use and confidence in the technology and themselves recurring themes.
- Culture of use – experimentation, little formal learning, same culture of use in both open and closed systems.

5.12: Participant #141 (HC/HU), Female

- Completed fine arts degree (photography), coming back to do an Edu degree PG. Prefers books and print – clarity of pictures and design related to what she does. Uses digital photography but also has several traditional cameras. Very articulate and confident. Uses the Internet in complex ways in her job – building company where she does the conveyancing and tender documentation.

5.13: Participant #231 (Av/Av), Male

- Father a university lecturer – shown son how to use the databases. Still uses simple keyword searching. Completed University Preparation course – maintains he wouldn't have survived first year without it. Rural campus.

5.14: Participant #200 (LC/Av), Female

- Computer Science student doing programming. Very frustrated at not being able to find information. Sent her off to see the Faculty Librarian to do some courses on locating information and using Endnote.

5.16: Participant #322 (Av/Av), Male

- Records in Word, uses Firefox browser, uses history & bookmarks, 8/9 pages at a time.

5.15: Discussion Third year IT students

Information Services Management 3rd year IT students discussion – students not part of the research, but in the right age bracket. I asked them where they had learnt their search skills. All three students replied – by experimenting themselves. All were long time users (10, 10 & 11 years) and began using the Internet in year 5 (10years of age). All admitted that they had had little instruction in how to use the Internet at school. All used Wikipedia for recreational use and study use but didn't use it as a reference. When asked whether they thought they would transfer skills learnt in the university environment to the environment when they left, all admitted that they would probably still use Google and their previous search strategies. Previous week we had been up to the library to do some serious searching. All students also admitted that their first year unit Communicating in an IT Environment was their first real taste of explicit instruction in information seeking and management.

11.6. Appendix 6: Interview Checklist

- | No | Questions and probes |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>As an Internet user, how would you describe yourself?</p> <p>Probes:</p> <ul style="list-style-type: none">• Do you use it often?• How much would you say you use it?• What do you use it for mainly?• What other things do you use it for? (entertainment, diarising, downloading music/movies, communication, political/social conscience activities)• How do you feel about using technology at university for study?• How many times have you been to the library physically in the last semester?• How often would you say you use the electronic resources provided by the Library?• Would you use /have you used a reference librarian? Do you know what one is? |
| 2 | <p>Did you find the tasks easy or difficult? Please explain.</p> <p>Probes:</p> <ul style="list-style-type: none">• How do you rate your ISB skills? Expert/Good/Average/Beginner/Nonuser• How do you rate the ISB skills of your peers (compared to you)?• How do you rate the skills of your generation (compared to you)?• How long have you been using the Internet?• Where/from whom did you acquire your skills?• What do you find easy about using the Internet to find information?• What do you find difficult about using the Internet to find information?• Do you always find what you are looking for when using the Internet to find information?• Do you find it easy to find information again on the Internet?• Once you've found information on the Internet, say for an assignment, how would you rate your ability to use it effectively?• Why do you think this is so? |
| 3 | <p>Do you plan or think about how you are going to find information on the Internet?</p> <p>Probes:</p> <ul style="list-style-type: none">• Please explain how you get started. Where do you begin your searching?• Do you always do the same thing (use the same method)?• Why do you think this is so? |
| 4 | <p>Would you say the Internet is a major part of your life? Please explain.</p> <p>Probes:</p> <ul style="list-style-type: none">• Why do you think this is so?• Could you live without it?• How do you think your life would be different? Please explain.• Do financial constraints influence the technology you use? |
| 5 | <p>What types of other technologies do you use regularly?</p> <p>Probes:</p> <ul style="list-style-type: none">• Why are these technologies important to you and your lifestyle?• Could you live without them?• How do you think your life would be different? Please explain.• Are you a multi-tasker? Do you use several technologies at any one time? Why do you think this is so? |

11.7. Appendix 7: Follow-up participants – Courses of study

Males

#ID	ING		Age	Study Area	Study Year
#699	LC/LU	33:30	20	Information Technology, 1 yr in Commerce	1 st
#688	LC/Av	31:44	19	Education & Art	2 nd
#53	Av/LU	42:26	21	Economics	4 th Hons
#689	Av/LU	40:32	21	Sports Science	1 st
#817	HC-Av/Av-LU	48:36	18	Agriculture	1 st
#231	Av/Av	38:48	20	Middle School Education, UPS course	1 st
#322	Av/Av	38:38	22	Computer Security	3 rd
#41	Av/Av	44:38	18	Chemical Engineering	1 st
#377	Av/Av	42:47	20	Environmental Management, 6 months in Performing Arts	1 st
#629	Av/Av-HU	41:52	18	Biomedical Science	1 st
#753	Av/Av-HU	42:49	20	Security Management & Engineering (Maths)	2 nd
#946	HC-Av/Av	49:43	19	Economics & Finance	3 rd
#638	Av/HU	45:57	21	Sports Science	1 st
#519	Av/HU	46:64	18	Business (Accounting) & Film Video	1 st
#845	HC/LU	50:32	18	Software Engineering	2 nd
#922	HC-Av/Av	49:40	20	Computer Science (Games Programming)	3 rd
#92	HC/HU	54:54	19	Primary Education	1 st
#639	HC/HU	54:58	20	Psychology	2 nd
#402	HC/HU	55:59	18	Information Technology/Library & Information Science	1 st
#736	HC-Av/HU	47:57	19	Management & Electronic Commerce	2 nd

Females

#ID	ING		Age	Study Area	Study Year
#572	LC/LU	16:13	18	Exercise & Sports Science	1 st
#87	LC/LU	19:30	18	Business	1 st
#32	LC/LU	26:27	18	Medical Science	2 nd
#615	LC/HU	32:52	20	Primary Education, other study Psychology & Business	1 st
#336	LC-Av/LU	34:31	21	Design, 3 yrs in Art	3 rd
#423	LC-Av/LU	34:32	20	Biology/Conservation	3 rd
#99	LC-Av/LU	34:29	22	Communication & Culture	2 nd
#200	LC-Av/Av	34:44	22	Computer Science - Programming	2 nd
#142	Av/HU	47:56	22	Journalism	3 rd
#17	Av/HU	40:59	21	Occupational Therapy	3 rd
#861	HC-Av/LU	49:32	18	Justice Studies	2 nd
#687	HC/LU	52:31	20	Secondary Education - Maths	3 rd
#319	HC-Av/Av-HU	49:50	21	Environmental Biology/Asian Studies	4 th
#443	HC-Av/Av	49:40	19	Secondary Education (Drama)	1 st
#312	HC/Av	50:45	21	Molecular Biotechnology Hons	Graduated
#559	HC/Av	56:46	21	Environmental Health, 2 yrs in Biology	3 rd
#313	HC/HU	51:57	20	Molecular Genetics	4 th Hons
#872	HC/HU	54:64	19	Forensic Investigation, 2 yrs in Psychology & Criminology	1 st
#141	HC/HU	53:58	22	Fine Arts, Grad Dip Ed	Graduated
#698	HC-Av/HU	48:63	20	Law & Business	3 rd

11.8. Appendix 8: Results of the Web questionnaire

Total survey group Males & Females (Gp) = 533

Total followup students = 229 or 42.964% of the total group

Males – total = 162 or 30.393% of total survey group

Followup males (FUp M) = 85 or 52.469% of all males or 15.947% of the total group

Females – total = 371 or 69.606%

Followup females (FUp F) = 144 or 38.814% of all females or 27.016% of the total group

HOW YOU HAVE PREVIOUSLY USED TECHNOLOGY

The four (4) questions in this section look at how you have used technology BEFORE attending university. Please select the response that **best** describes your experience.

- 1 Before attending university, and **NOT including your own personal use**, how much did you use the Internet for study?

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
i Nothing that I studied involved using subject materials that were online.	27 31.764%	45 27.777%	106 28.571%	36 25%	151 28.330%
ii One (1) or two (2) subjects I studied at school or TAFE involved using subject materials that were online.	32 37.647%	60 37.037%	160 43.126%	64 44.444%	220 41.275%
ii Most of the subjects I studied at school or TAFE involved using subject materials that were online.	20 23.529%	42 25.925%	79 21.293%	34 23.611%	121 22.701%
iv All of the subjects I studied at school or TAFE involved using subject materials that were online.	6 7.058%	15 9.259%	26 7.008%	11 7.638%	41 7.692%

- 2 Before attending university, and **NOT including your own personal use**, how would you describe the extent of the online subject materials you may have used?

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
i I did not use online subject materials.	25 29.411%	40 24.691%	90 24.258%	29 20.138%	130 24.390%
ii Online subject materials were a minor part of my study experience.	38 44.705%	75 46.296%	181 48.787%	70 48.611%	256 48.030%
iii Online subject materials were a major part of my study experience.	18 21.176%	35 21.604%	77 20.754%	34 23.611%	112 21.013%
iv Online subject materials were an essential part of my study experience.	4 4.705%	12 7.407%	23 6.199%	11 7.638%	35 6.566%

- 3 Thinking about your education before attending university, how would you describe your own personal use of the Internet for study? (ie. using the Internet for study at home, a friend's house or the local library.)

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
i I did not use the Internet for study purposes.	4 4.705%	7 4.320%	39 10.512%	13 9.027%	46 8.630%
ii Using the Internet for study purposes was a minor part of my study	50 58.823%	81 50%	199 53.638%	71 49.305%	280 52.532%

iii	experience. Using the Internet for study purposes was a major part of my study experience.	20 23.529%	50 30.864%	88 23.719%	35 24.305%	138 25.891%
iv	Using the Internet for study purposes was an essential part of my study experience.	11 12.941%	24 14.814%	45 12.129%	25 17.361%	69 12.945%

4 Thinking about your education before attending university, where did you mainly use the Internet for study?

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
i	4 4.705%	7 4.320%	25 6.738%	11 7.638%	32 6.003%
ii	2 2.352%	2 1.234%	15 4.043%	6 4.166%	17 3.189%
iii	8 9.411%	16 9.876%	19 5.121%	9 6.25%	35 6.566%
iv	9 10.588%	30 18.518%	76 20.485%	32 22.222%	106 19.887%
v	50 58.823%	83 51.234%	183 49.326%	70 48.611%	266 49.906%
vi	11 12.941%	23 14.197%	50 13.477%	15 10.416%	73 13.696%
vii	1 1.176%	1 0.617%	3 0.808%	1 0.694%	4 0.750%

USING THE INTERNET

The next 5 questions look at your use of the Internet. Please select the response that best describes your experience.

5 When using the Internet and technology **to find information** I consider myself a:

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
i	5 5.882%	10 6.172%	30 8.086%	10 6.944%	40 7.504%
ii	14 16.470%	23 14.197%	72 19.407%	28 19.444%	95 17.823%
iii	27 31.764%	51 31.481%	148 39.892%	51 35.416%	199 37.335%
iv	23 27.058%	53 32.716%	96 25.876%	39 27.083%	149 27.954%
v	16 18.823%	25 15.432%	25 6.738%	16 11.111%	50 9.380%

6 During the last three (3) months and including all the places where you have used the Internet, **how often** have you used the Internet?

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
i	0	0	0	0	0
ii	2 2.352%	6 3.703%	15 4.043%	4 2.777%	21 3.939%
iii	4 4.705%	10 6.172%	17 4.582%	5 3.472%	27 5.065%
iv	17 20%	26 16.049%	75 20.215%	36 25%	101 18.949%
v	62 72.941%	120 74.074%	264 71.159%	99 68.75%	384 72.045%

7 During the last three (3) months estimate **how many hours per week** you have actively used the Internet **for study**.

	FUp M 85	M 162	F 371	FUpF 144	Gp 533
< 1 hour	3 3.529%	4 2.469%	14 3.773%	1 0.694%	18 3.377%
1 hour	4 4.705%	13 8.024%	18 4.851%	5 3.472%	31 5.816%
2-3 hours	18 21.176%	32 19.753%	72 19.407%	32 22.222%	104 19.512%
4-5 hours	15 17.647%	32 19.753%	73 19.676%	28 19.444%	105 19.699%
6-7 hours	12 14.117%	21 12.962%	46 12.398%	20 13.888%	67 12.570%
8-9 hours	6 7.058%	10 6.172%	40 10.781%	20 13.888%	50 9.380%
10-12 hours	12 14.117%	23 14.197%	37 9.973%	16 11.111%	60 11.257%
13-15 hours	5 5.882%	6 3.703%	30 8.086%	9 6.25%	36 6.754%
16-19 hours	2 2.352%	4 2.469%	24 6.469%	10 6.944%	28 5.253%
20 - 25 hours	5 5.882%	9 5.555%	7 1.885%	2 1.388%	16 3.001%
25+ hours	3 3.529%	8 4.938%	10 2.695%	1 0.694%	18 3.377%

7. Summary

Internet use - study					
< 3 hrs/wk	FUp M = 25 29.411%	M = 49 30.246%	F = 104 28.032%	FUp F = 38 26.388%	Gp = 153 28.705%
< 7 hrs/wk (1 hr/day)	FUp M = 52 61.176%	M = 102 62.962%	F = 223 60.107%	FUp F = 86 59.722%	Gp = 325 60.975%
< 20 hrs/wk (3 hr/day)	FUp M = 8 9.411%	M = 17 10.493%	F = 17 4.582%	FUp F = 3 2.083%	Total Gp = 3 6.378%

8 During the last three (3) months estimate **how many hours per week** you are actively using the Internet **for personal use**.

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
< 1 hour	4 4.705%	5 3.086%	25 6.738%	8 5.555%	30 5.628%
1 hour	3 3.529%	3 1.851%	20 5.390%	8 5.555%	23 4.315%
2-3 hours	4 4.705%	7 4.320%	59 15.902%	21 14.583%	66 12.382%
4-5 hours	7 8.235%	13 8.024%	46 12.398%	20 13.888%	59 11.069%
6-7 hours	5 5.882%	12 7.407%	32 8.625%	11 7.638%	44 8.255%
8-9 hours	5 5.882%	9 5.555%	28 7.547%	13 9.027%	37 6.941%
10-12 hours	6 7.058%	16 9.876%	31 8.355%	12 8.333%	47 8.818%
13-15 hours	11 12.941%	18 11.111%	35 9.433%	16 11.111%	53 9.943%
16-19 hours	4 4.705%	11 6.790%	23 6.199%	5 3.472%	34 6.378%
20 - 25 hours	5	11	17	6	28

	5.882%	6.790%	4.582%	4.166%	5.253%
25+ hours	31	57	55	24	112
	36.470%	35.185%	14.824%	16.666%	21.013%

8. Summary

Internet use – personal					
< 3 hrs/wk	FUp M = 23 – 27.058%	M = 15 9.259%	F = 104 28.032%	FUp F = 37 25.694%	Gp = 119 22.326%
< 7 hrs/wk (1 hr/day)	FUp M = 52 61.176%	M = 40 24.691%	F 182 49.056%	FUp F = 68 47.222%	Gp = 222 41.651%
< 20 hrs/wk (3 hr/day)	FUp M = 36 42.352%	M = 68 41.975%	F = 72 19.407%	FUp F = 30 20.833%	Gp = 140 26.266%

9. I have been using the Internet for:

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
< 1 year	1 1.176%	1 0.617%	7 1.886%	2 1.388%	8 1.500%
1 year	1 1.176%	1 0.617%	2 0.539%	0	3 0.562%
2 years	0	1 0.617%	5 1.347%	0	6 1.125%
3 years	1 1.176%	4 2.469%	10 2.695%	5 3.472%	14 2.626%
4 years	3 3.529%	4 2.469%	24 6.469%	6 4.166%	28 5.253%
5 years	9 10.588%	17 10.493%	63 16.981%	26 18.055%	80 15.009%
6 years	12 14.117%	30 18.518%	66 17.789%	19 13.194%	96 18.011%
7 years	12 14.117%	24 14.814%	53 14.285%	21 14.583%	77 14.446%
8 years	18 21.176%	30 18.518%	60 16.172%	28 19.444%	90 16.885%
9 years	8 9.411%	11 6.790%	31 8.355%	13 9.027%	42 7.879%
> 10 years	20 23.529%	39 24.074%	50 13.477%	24 16.666%	89 16.697%

9. Summary

Internet use – length of time					
< 3 years	FUp M = 3 3.529%	M = 7 4.320%	F = 24 6.469%	FUp F = 7 4.861%	Gp = 27 5.065%
> 7 years	FUp M = 58 68.235%	M = 104 – 64.197%	F 194 53.291%	FUp F 85 59.722%	Gp = 222 41.651%
>10 years	FUp M = 20 23.529%	M = 39 24.074%	F = 50 13.477%	FUp F = 24 16.666%	Gp = 89 16.697%

10. How important to you is the Internet for:

i studying

FUp M	M	F	FUp F	Gp
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	85	162	371	144	533
Not	0	0	11	1	11
			2.964%	0.694%	2.063%
Minor	18	31	43	16	74
	21.176%	19.135%	11.590%	11.111%	13.883%
Major	39	68	135	57	203
	45.882%	41.975%	36.388%	39.583%	38.086%
Essential	28	63	182	70	245
	32.941%	38.888%	49.056%	48.611%	45.966%

ii keeping in touch with friends and family

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	4	10	27	6	37
	4.705%	6.172%	7.277%	4.166%	6.941%
Minor	14	38	101	39	139
	16.470%	23.456%	27.223%	27.083%	26.078%
Major	34	53	128	49	181
	40%	32.716%	34.501%	34.027%	33.958%
Essential	33	61	115	50	176
	38.823%	37.654%	30.997%	34.722%	33.020%

iii financial transactions (banking and bills)

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	21	40	109	36	149
	24.705%	24.691%	29.380%	25%	27.954%
Minor	20	40	107	36	147
	23.529%	24.691%	28.840%	25%	27.579%
Major	29	45	94	43	139
	34.117	27.777%	25.336%	29.861%	26.078%
Essential	15	37	61	29	98
	17.647%	22.839%	16.442%	20.138%	18.386%

iv buying and/or selling things

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	34	70	215	75	285
	40%	43.209%	57.951%	52.083%	53.470%
Minor	30	61	135	60	196
	35.294%	37.654%	36.388%	41.666%	36.772%
Major	13	18	17	7	35
	15.294%	11.111	4.582%	4.861%	6.566%
Essential	8	13	4	2	17
	9.411%	8.024%	1.078%	1.388%	3.189%

v organising and planning my life

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	37	72	206	70	278
	43.529%	44.444%	55.525%	48.611%	52.157%
Minor	35	65	125	56	190
	41.176%	40.123%	33.692%	38.888%	35.647%
Major	5	14	37	17	51
	5.882%	8.641%	9.973%	11.805%	9.568%
Essential	8	11	3	1	14
	9.411%	6.790%	0.808%	0.694%	2.626%

vi entertainment

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	9 10.588%	15 9.259%	64 17.250%	20 13.888%	79 14.821%
Minor	14 16.470%	34 20.987%	171 46.091%	68 47.222%	205 38.461%
Major	27 31.764%	58 35.802%	94 25.336%	34 23.611%	152 28.517%
Essential	35 41.176%	55 33.950%	42 11.320%	22 15.277%	97 18.198%

vii finding information

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	0	0	6 1.617%	1 0.694%	6 1.125%
Minor	9 10.588%	16 9.876%	32 8.625%	9 6.25%	48 9.005%
Major	31 36.470%	68 41.975%	171 46.091%	63 43.75%	239 44.840%
Essential	45 52.941%	78 48.148%	162 43.665%	71 49.305%	240 45.028%

TECHNOLOGY YOU USE

On a scale from 1 - 4 where **1 = not important**, and **4 = essential**, please rate your use of the following:

11. How important to you are the following:

i bulletin boards/discussion forums

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	20 23.529%	39 24.074%	151 40.700%	64 44.444%	190 35.647%
Minor	37 43.529%	72 44.444%	139 37.466%	50 34.722%	211 39.587%
Major	18 21.176%	34 20.987%	63 16.981%	24 16.666%	97 18.198%
Essential	10 11.764%	17 10.493%	18 4.851%	6 4.166%	35 6.566%

ii library databases

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	7 8.235%	17 10.493%	36 9.703%	15 10.416%	53 9.943%
Minor	32 37.647%	64 39.506%	84 22.641%	29 20.138%	148 27.767%
Major	32 37.647%	51 31.481%	131 35.309%	49 34.027%	182 34.146%
Essential	14 16.470%	30 18.518%	120 32.345%	51 35.416%	150 28.142%

iii email

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	0	1 0.617%	12 3.234%	3 2.083%	13 2.439%
Minor	5	17	27	11	44

	5.882%	10.493%	7.277%	7.638%	8.255%
Major	22	43	96	37	139
	25.882%	26.543%	25.876%	25.694%	26.078%
Essential	58	101	236	93	337
	68.235%	62.345%	63.611%	64.583%	63.227%

iv instant messaging and/or chat

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	15	25	92	39	117
	17.647%	15.432%	24.797%	27.083%	21.951%
Minor	12	36	98	34	134
	14.117%	22.222%	26.415%	23.611%	25.140%
Major	19	34	89	30	123
	22.352%	20.987%	23.989%	20.833%	23.076%
Essential	39	67	92	41	159
	45.882%	41.358%	24.797%	28.472%	29.831%

v Internet telephony services eg Skype

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	53	101	279	102	380
	62.352%	62.345%	75.202%	70.833%	71.294%
Minor	19	34	59	24	93
	22.352%	20.987%	15.902%	16.666%	17.448%
Major	9	18	20	11	38
	10.588%	11.111%	5.390%	7.638%	7.129%
Essential	4	9	13	7	22
	4.705%	5.555%	3.504%	4.861%	4.127%

vi listservs

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	67	130	313	120	443
	78.823%	80.246%	84.366%	83.333%	83.114%
Minor	13	27	47	18	71
	15.294%	16.666%	12.5%	12.5%	13.320%
Major	3	3	10	5	13
	3.529%	1.851%	2.695%	3.472%	2.439%
Essential	2	2	1	1	3
	2.352%	1.234%	0.617%	0.694%	0.562%

vii electronic newsletters

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	42	86	219	79	305
	49.411%	53.086%	59.029%	54.861%	57.223%
Minor	35	63	122	47	185
	41.176%	38.888%	32.884%	32.638%	34.709%
Major	6	10	20	11	30
	7.058%	6.172%	5.390%	7.638%	5.628%
Essential	2	3	10	7	13
	2.352%	1.851%	2.695%	4.861%	2.439%

viii Web-based lookups eg. the White Pages

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	23	42	88	37	130
	27.058%	25.925%	23.719%	25.694%	24.390%

Minor	29 34.117%	61 37.654%	183 49.326%	65 45.138%	244 45.778%
Major	25 29.411%	46 28.395%	70 18.867%	25 17.361%	116 21.763%
Essential	8 9.411%	13 8.024%	30 8.086%	17 11.805%	43 8.067%

ix Peer-to-peer/file sharing eg. eDonkey, Kazaa and Bit Torrent

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not	23 27.058%	43 26.543%	183 49.326%	65 45.138%	226 42.401%
Minor	12 14.117%	23 14.197%	101 27.223%	41 28.472%	124 23.264%
Major	22 25.882%	47 29.012%	53 14.285%	20 13.888%	100 18.761%
Essential	28 32.941%	49 30.246%	34 9.164%	18 12.5%	83 15.572%

x MySpace

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not	53 62.352%	96 59.259%	203 54.716%	78 54.166%	299 56.097%
Minor	16 18.823%	36 22.222%	67 18.059%	26 18.055%	103 19.324%
Major	7 8.235%	17 10.493%	50 13.477%	18 12.5%	67 12.570%
Essential	9 10.588%	13 8.024%	51 13.746%	22 15.277%	64 12.007%

xi Web Blogs

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not	51 60%	104 64.197%	242 65.229%	92 63.888%	346 64.915%
Minor	24 28.235%	41 25.308%	101 27.223%	40 27.777%	142 26.641%
Major	5 5.882%	11 6.790%	19 5.121%	6 4.166%	30 5.628%
Essential	5 5.882%	6 3.703%	9 1.688%	6 4.166%	15 2.814%

On a scale from 1 – 4 where **1 = not important**, and **4 = essential**, please rate your use of the following:

12. How important to you are the following:

i ipod or portable music player

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not	20 23.529%	39 24.074%	101 27.223%	37 25.694%	140 26.266%
Minor	21 24.705%	39 24.074%	95 25.606%	37 25.694%	134 25.140%
Major	23 27.058%	39 24.074%	88 23.719%	34 23.611%	127 23.827%
Essential	21 24.705%	45 27.777%	87 23.450%	36 25%	132 24.765%

ii Webcam

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	54 63.529%	113 69.753%	282 76.010%	101 70.138%	395 74.108%
Minor	23 27.058%	38 23.456%	73 19.676%	32 22.222%	111 20.825%
Major	6 7.058%	8 4.938%	15 4.043%	10 6.944%	23 4.315%
Essential	2 2.352%	3 1.851%	1 0.269%	1 0.694%	4 0.750%

iii thumb drive/flash drive/USB drive/memory stick

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	10 11.764%	16 9.876%	42 11.320%	13 9.027%	58 10.881%
Minor	22 25.882%	45 27.777%	47 12.668%	17 11.805%	92 17.260%
Major	22 25.882%	42 25.925%	86 23.180%	31 21.527%	128 24.015%
Essential	31 36.470%	59 36.419%	196 52.830%	83 57.638%	255 47.842%

iv mobile phone

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	6 7.058%	12 7.407%	24 6.469%	4 2.777%	36 6.754%
Minor	7 8.235%	13 8.024%	24 6.469%	7 4.861%	37 6.941%
Major	21 24.705%	31 19.135%	70 18.867%	26 18.055%	101 18.949%
Essential	51 23.529%	106 65.432%	253 68.194%	107 74.305%	359 67.354%

v PDA

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	62 72.941	119 73.456%	299 80.592%	110 76.388%	418 78.424%
Minor	14 16.470%	29 17.901%	48 12.938%	27 18.75%	77 14.446%
Major	5 5.882%	6 3.703%	17 3.189%	5 3.472%	23 4.315%
Essential	4 4.705%	8 4.938%	7 1.886%	2 1.388%	15 2.814%

vi computer

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	2 2.352%	6 3.703%	30 8.086%	9 6.25%	36 6.754%
Minor	7 8.235%	12 7.4078%	34 9.164%	9 6.25%	46 8.630%
Major	13 15.294%	24 14.814%	72 19.407%	30 20.833%	96 18.011%
Essential	63	120	235	96	355

74.117%	74.074%	63.342%	66.666%	66.604%
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vii laptop

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	16 18.823%	35 21.604%	89 23.989%	32 22.222%	124 23.264%
Minor	10 11.764%	25 15.432%	51 13.746%	21 14.583%	76 14.258%
Major	19 22.352%	32 19.753%	72 19.407%	25 17.361%	104 19.512%
Essential	40 47.058%	70 43.209%	159 42.857%	66 45.833%	229 42.964%

viii digital camera

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	26 30.588%	53 32.716%	57 15.363%	21 14.583%	110 20.637%
Minor	27 31.764%	54 33.333%	99 26.684%	33 22.916%	153 28.705%
Major	21 24.705%	36 22.222%	140 37.735%	58 40.277%	176 33.020%
Essential	11 12.941%	19 11.728%	75 20.215%	32 22.222%	94 17.636%

ix video camera

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	53 62.352%	106 65.432%	199 53.638%	71 49.305%	305 57.223%
Minor	23 27.058%	44 27.160%	118 31.805%	51 35.416%	162 30.393%
Major	7 8.235%	9 5.555%	35 9.433%	13 9.027%	44 8.255%
Essential	2 2.352%	3 1.851%	19 5.121%	9 6.25%	22 4.127%

x scanner

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	37 43.529%	81 50%	155 41.778%	57 39.583%	236 44.277%
Minor	33 38.823%	58 35.802%	144 38.814%	59 40.972%	202 37.898%
Major	10 11.764%	15 9.259%	44 11.859%	16 11.111%	59 11.069%
Essential	5 5.882%	8 4.938%	28 7.547%	12 8.333%	36 6.754%

xi printer

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not	5 5.882%	14 8.641%	15 4.043%	2 1.388%	29 5.440%
Minor	14 16.470%	27 16.666%	23 6.199%	13 9.027%	50 9.380%
Major	33 38.823%	60 37.037%	99 26.684%	39 27.083%	159 29.831%

Essential	33 38.823%	61 37.654%	234 63.072%	90 62.5%	295 55.347%
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xii CD/DVD Burner

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not	10 11.764%	23 14.197%	67 18.059%	25 17.361%	90 16.885%
Minor	28 32.941%	53 32.716%	136 36.657%	50 34.722%	189 35.459%
Major	21 24.705%	40 24.691%	91 24.528%	36 25%	131 24.577%
Essential	26 30.588%	46 28.395%	77 20.754%	33 22.916%	123 23.076%

HOW YOU LEARNT TO USE THE INTERNET

13. On a scale from 1 - 4 where 1 = no help, and 4 = essential help, please rate how people have helped you to use the Internet:

i mother/female guardian

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not apply	23 27.058%	38 23.456%	57 15.363%	17 11.805%	95 17.823%
No help	44 51.764%	88 54.320%	194 52.291%	72 50%	282 52.908%
Minor help	13 15.294%	26 16.049%	71 19.137%	26 18.055%	97 18.198%
Major help	4 4.705%	6 3.703%	28 7.547%	14 9.722%	34 6.378%
Essential help	1 1.176%	4 2.469%	21 5.660%	15 10.416%	25 4.690%

ii father/male guardian

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not apply	20 23.529%	35 21.604%	67 18.059%	22 15.277%	102 19.136%
No help	41 48.235%	76 46.913%	139 37.466%	60 41.666%	215 40.337%
Minor help	17 20%	31 19.135%	87 23.450%	25 17.361%	118 22.138%
Major help	4 4.705%	15 9.259%	53 14.285%	24 16.666%	68 12.757%
Essential help	3 3.529%	5 3.086%	25 6.738%	13 9.027%	30 5.628%

iii Sister

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not apply	35 41.176%	74 45.679%	167 45.013%	59 40.972%	241 45.215%
No help	39 45.882%	66 40.740%	100 26.954%	39 27.083%	166 31.144%
Minor help	10 11.764%	19 11.728%	79 21.293%	33 22.916%	98 18.386%
Major help	1 1.176%	3 1.851%	18 4.851%	7 4.861%	21 3.939%

Essential help	0	0	7 1.886%	6 4.166%	7 1.313%
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iv brother

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not apply	37 43.529%	71 43.827%	152 40.970%	56 38.888%	223 41.838%
No help	29 34.117%	57 35.185%	81 21.832%	34 23.611%	138 25.891%
Minor help	13 15.294%	23 14.197%	80 21.563%	37 25.694%	103 19.324%
Major help	5 5.882%	9 5.555%	43 11.590%	11 7.638%	52 9.756%
Essential help	1 1.176%	2 1.234%	15 4.043%	6 4.166%	17 3.189%

v other relatives

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not apply	30 35.294%	62 38.271%	135 36.388%	54 37.5%	197 36.960%
No help	37 43.529%	67 41.358%	151 40.700%	56 38.888%	218 40.900%
Minor help	15 17.647%	28 17.283%	69 18.598%	24 16.666%	97 18.198%
Major help	3 3.529%	5 3.086%	13 3.504%	8 5.555%	18 3.377%
Essential help	0	0	3 0.808%	2 1.388%	3 0.562%

vi friends

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not apply	13 15.294%	24 14.814%	36 9.703%	9 6.25%	60 11.257%
No help	12 14.117%	19 11.728%	42 11.320%	14 9.722%	61 11.444%
Minor help	32 37.647%	69 42.592%	155 41.778%	66 45.833%	224 42.026%
Major help	23 27.058%	43 26.543%	118 31.805%	49 34.027%	161 30.206%
Essential help	5 5.882%	7 4.320%	20 5.390%	6 4.166%	27 5.065%

vii teachers at school

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not apply	18 21.176%	32 19.753%	54 14.555%	13 9.027%	86 16.135%
No help	25 29.411%	45 27.777%	63 16.981%	32 22.222%	108 20.262%
Minor help	29 34.117%	57 35.185%	171 46.091%	64 44.444%	228 42.776%
Major help	10 11.764%	22 13.580%	64 17.250%	24 16.666%	86 16.135%
Essential help	3 3.529%	6 3.703%	19 5.121%	11 7.638%	25 4.690%

viii school librarian

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not apply	28 32.941%	54 33.333%	87 23.450%	28 19.444%	141 26.454%
No help	36 42.352%	68 41.975%	141 38.005%	58 40.277%	209 39.212%
Minor help	15 17.647%	30 18.518%	110 29.649%	42 29.166%	140 26.266%
Major help	6 7.058%	10 6.172%	25 6.738%	12 8.333%	35 6.566%
Essential help	0	0	8 2.156%	4 2.777%	8 1.500%

ix computer teacher at school

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not apply	22 25.882%	42 25.925%	105 28.301%	33 22.916%	147 27.579%
No help	19 22.352%	32 19.753%	46 12.398%	22 15.277%	78 14.634%
Minor help	26 30.588%	53 32.716%	124 33.423%	48 33.333%	177 33.208%
Major help	15 17.647%	27 16.666%5	62 16.711%	23 15.972%	89 16.697%
Essential help	3 3.529%	8 4.938%	34 9.164%	18 12.5%	42 7.879%

x short courses not taken at school or TAFE

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not apply	51 60%	106 65.432%	276 74.393%	100 69.444%	382 71.669%
No help	19 22.352%	32 19.753%	40 10.781%	17 11.805%	72 13.508%
Minor help	6 7.058%	13 8.024%	34 9.164%	14 9.722%	47 8.818%
Major help	8 9.411%	9 5.555%	16 4.312%	10 6.944%	25 4.690%
Essential help	1 1.176%	2 1.234%	5 1.347%	3 2.083%	7 1.313%

xi experimented by myself

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not apply	1 1.176%	4 2.469%	15 4.043	1 0.694%	19 3.564%
No help	1 1.176%	2 1.234%	4 1.078%	2 1.388%	6 1.125%
Minor help	1 1.176%	6 3.703%	34 9.164%	10 6.944%	40 7.504%
Major help	11 12.941%	22 13.580%	142 38.274%	48 12.938%	164 30.769%
Essential help	71 83.529%	128 79.012%	176 47.439%	83 57.638%	304 57.035%

xii learned myself by reading books/magazines

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533

Not apply	17 20%	36 22.222%	153 41.239%	56 38.888%	189 35.459%
No help	8 9.411%	21 12.962%	62 16.711%	23 15.972%	83 15.572%
Minor help	29 34.117%	47 29.012%	96 25.876%	36 25%	143 26.829%
Major help	9 10.588%	22 13.580%	44 11.859%	21 14.583%	66 12.382%
Essential help	22 25.882%	36 22.222%	16 4.312%	8 5.555%	52 9.756%

HOW YOU FEEL ABOUT USING THE INTERNET

14. On a scale from 1 - 4 where 1 = not confident, and 4 = very confident, please rate your confidence for the following activities:

i study purposes

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	1 1.176%	2 1.234%	14 3.773%	2 1.388%	16 3.001%
Gaining confidence	5 5.882%	10 6.172%	38 10.242%	13 9.027%	48 9.005%
Confident	27 31.764%	57 35.185%	146 39.353%	52 36.111%	203 38.086%
Very confident	52 61.176%	93 57.407%	173 46.630%	77 53.472%	266 49.906%

ii keeping in touch with friends and family

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	0	3 1.851%	19 5.121%	5 3.472%	22 4.127%
Gaining confidence	0	1 0.617%	12 3.234%	3 2.083%	13 2.439%
Confident	18 21.176%	30 18.518%	65 17.520%	24 16.666%	95 17.823%
Very confident	67 78.823%	128 79.012%	275 74.123%	112 77.777%	403 75.609%

iii financial transactions (banking and bills)

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	12 14.117%	27 16.666%	102 27.493%	29 20.138%	129 24.202%
Gaining confidence	11 12.941%	18 11.111%	60 16.172%	22 15.277%	78 14.634%
Confident	24 28.235%	41 25.308%	82 22.102%	37 25.694%	123 23.076%
Very confident	38 44.705%	76 46.913%	127 34.231%	56 38.888%	203 38.086%

iv buying and/or selling things

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	20 23.529%	40 24.691%	163 43.935%	47 32.638%	203 38.086%
Gaining confidence	17 20%	31 19.135%	88 23.719%	41 28.472%	119 22.326%

Confident	21 24.705%	45 27.777%	76 20.485%	34 23.611%	121 22.701%
Very confident	27 31.764%	46 28.395%	44 11.859%	22 15.277%	90 16.885%

v organising and planning my life

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not confident	19 22.352%	43 26.543%	135 36.388%	50 34.722%	178 33.395%
Gaining confidence	12 14.117%	21 12.962%	76 20.485%	31 21.527%	97 18.198%
Confident	26 30.588%	53 32.716%	107 28.840%	36 25%	160 30.018%
Very confident	28 32.941%	45 27.777%	53 14.285%	27 18.75%	98 18.386%

vi entertainment

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not confident	2 2.352%	4 2.469%	40 10.781%	15 10.416%	44 8.255%
Gaining confidence	5 5.882%	11 6.790%	36 9.730%	15 10.416%	47 8.818%
Confident	19 22.352%	39 24.074%	150 40.431%	48 33.333%	189 35.459%
Very confident	59 69.411%	108 66.666%	145 39.083%	66 45.833%	253 47.467%

vii finding information

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not confident	2 2.352%	3 1.851%	19 5.121%	8 5.555%	22 4.127%
Gaining confidence	3 3.529%	10 6.172%	27 7.277%	11 7.638%	37 6.941%
Confident	26 30.588%	46 28.395%	158 42.587%	55 38.194%	204 38.273%
Very confident	54 63.529%	103 63.580%	167 45.013%	70 48.611%	270 50.656%

15. On a scale from 1 - 4 where 1 = not confident, and 4 = very confident, please rate your confidence for the following:

i to find information using the Internet

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
Not confident	2 2.352%	3 1.851%	12 3.234%	2 1.388%	15 2.814%
Gaining confidence	3 3.529%	5 3.086%	32 8.625%	14 9.722%	37 6.941%
Confident	21 24.705%	46 28.395%	147 39.622%	54 37.5%	193 36.210%
Very confident	59 69.411%	108 66.666%	180 48.517%	74 51.388%	288 54.033%

ii to judge whether the information I have found is reliable

	FUp M 85	M 162	F 371	FUp F 144	Gp 533
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Not confident	1 1.176%	6 3.703%	27 7.277%	7 4.861%	33 6.191%
Gaining confidence	14 16.470%	29 17.901%	98 26.415%	38 26.388%	127 23.827%
Confident	37 43.529%	72 44.444%	172 46.361%	70 48.611%	244 45.778%
Very confident	33 38.823%	55 33.950%	74 19.946%	29 20.138%	129 24.202%

iii to collect the information I have found for later use

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	4 4.705%	9 5.555%	29 7.816%	10 6.944%	38 7.129%
Gaining confidence	13 15.294%	28 17.283%	63 16.981%	26 18.055%	91 17.073%
Confident	36 42.352%	71 43.827%	172 46.361%	63 43.75%	243 45.590%
Very confident	32 37.647%	54 33.333%	107 28.840%	45 31.25%	161 30.206%

iv to organise the information I have found for later use

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	5 5.882%	14 8.641%	36 9.703%	10 6.944%	50 9.380%
Gaining confidence	18 21.176%	41 25.308%	74 19.946%	32 22.222%	115 21.575%
Confident	30 35.294%	54 33.333%	161 43.396%	65 45.138%	215 40.337%
Very confident	32 37.647%	53 32.716%	100 26.954%	37 25.694%	153 28.705%

v to store the information I have found for later use

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	6 7.058%	12 7.407%	30 8.086%	7 4.8615	42 7.879%
Gaining confidence	8 9.411%	15 9.259%	33 8.894%	18 12.5%	48 9.005%
Confident	31 36.470%	64 39.506%	162 43.665%	59 40.972%	226 42.401%
Very confident	40 47.058%	71 43.827%	146 39.353%	60 41.666%	217 40.712%

vi to find the information I have found for later use

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Not confident	5 5.882%	13 8.024%	32 8.625%	8 5.555%	45 8.442%
Gaining confidence	12 14.117%	22 13.580%	52 14.016%	14 9.722%	74 13.883%
Confident	28 32.941%	59 36.419%	162 43.665%	68 47.222%	221 41.463%
Very confident	40 47.058%	68 41.975%	125 33.692%	54 37.5%	193 36.210%

16. On a scale from 1 - 4 where 1 = strongly dislike, and 4 = very enjoyable, please rate your use of the Internet for the following activities:

How do you rate your enjoyment using the Internet:

i for study purposes

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Strongly dislike	2 2.352%	5 3.086%	18 4.851%	3 2.083%	23 4.315%
Dislike	14 16.470%	25 15.432%	57 15.363%	18 12.5%	82 15.384%
Like	54 63.529%	104 64.197%	242 65.229%	98 68.055%	346 64.915%
Very enjoyable	15 17.647%	28 17.283%	54 14.555%	25 17.361%	82 15.384%

ii keeping in touch with friends and family

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Strongly dislike	2 2.352%	6 3.703%	21 5.660%	9 6.25%	27 5.065%
Dislike	4 4.705%	6 3.703%	11 2.964%	5 3.472%	17 3.189%
Like	25 29.411%	58 35.802%	118 31.805%	41 28.472%	176 33.020%
Very enjoyable	54 63.529%	92 56.790%	221 59.568%	89 61.805%	313 58.724%

iii financial transactions (banking and bills)

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Strongly dislike	14 16.470%	28 17.283%	81 21.832%	23 15.972%	109 20.450%
Dislike	12 14.117%	19 11.728%	54 14.555%	21 14.583%	73 13.696%
Like	41 48.235%	77 47.530%	179 48.247%	77 53.472%	256 48.030%
Very enjoyable	18 21.176%	38 23.456%	57 15.363%	23 15.972%	95 17.823%

iv buying and/or selling things

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Strongly dislike	17 20%	33 20.370%	117 31.536%	39 27.083%	150 28.142%
Dislike	8 9.411%	24 14.814%	81 21.832%	30 20.833%	105 19.699%
Like	45 52.941%	78 48.148%	150 40.431%	70 48.611%	228 42.776%
Very enjoyable	15 17.647%	27 16.666%	23 6.199%	5 3.472%	50 9.380%

v organising and planning my life

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Strongly dislike	15 17.647%	32 19.753%	95 25.606%	35 24.305%	127 23.827%
Dislike	16 18.823%	32 19.753%	89 23.989%	31 21.527%	121 22.701%
Like	41	77	168	69	245

	48.235%	47.530%	45.283%	47.916%	45.966%
Very enjoyable	13	21	19	9	40
	15.294%	12.962%	5.121%	6.25%	7.504%

vi entertainment

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Strongly dislike	5	7	32	11	39
	5.882%	4.320%	8.625%	7.638%	7.317%
Dislike	1	2	18	9	20
	1.176%	1.234%	4.851%	6.25%	3.752%
Like	21	49	182	69	231
	24.705%	30.246%	49.056%	47.916%	43.339%
Very enjoyable	58	104	139	55	243
	68.235%	64.197%	37.466%	38.194%	45.590%

ABOUT YOU

17. Gender

	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
	15.82%	30.58%	69.45%	27.47%	100%

18. Age

Years	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
18	34	63	196	76	258
	40%	38.888%	52.830%	52.777%	48.405%
19	19	33	42	20	75
	22.352%	20.370%	11.320%	13.888%	14.071%
20	15	27	50	18	77
	17.647%	16.666%	13.477%	12.5%	14.446%
21	12	27	55	16	82
	14.117%	16.666%	14.824%	11.111%	15.384%
22	5	12	28	14	40
	5.882%	7.407%	7.547%	9.722%	7.504%

19. Years at university

Years	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
1st	36	68	169	70	237
	42.352%	41.975%	45.552%	48.611%	44.465%
2nd	26	45	87	34	132
	30.588%	27.777%	23.450%	23.611%	24.765%
3rd	14	26	66	22	92
	16.470%	16.049%	17.789%	15.277%	17.260%
4th	8	16	38	14	54
	9.411%	9.876%	10.242%	9.722%	10.131%
5th	1	7	11	4	18
	1.176%	4.320%	2.964%	2.777%	3.377%

20. Are you a fulltime or part time student?

Study	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
F/T	76	150	346	136	496
	89.411%	92.592%	93.261%	94.444%	93.058%
P/T	9	12	25	8	37

10.588%	7.407%	6.738%	5.555%	6.941%
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21. How do you study at university?

Study mode	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
All online	14 16.470%	32 19.753%	69 18.598%	27 18.75%	101 18.949%
All on campus	79 92.941%	150 92.952%	328 88.409%	132 91.666%	478 89.681%
Mixed mode	22 25.882%	39 24.074%	91 24.528%	34 23.611%	130 24.390%

22. I have used a web survey before

Web survey use	FUp M	M	F	FUp F	Gp
	85	162	371	144	533
Yes	74 87.058%	141 87.037%	307 82.749%	116 80.555%	448 84.052%
No	11 12.941%	21 12.962%	64 17.250%	28 19.444%	85 15.947%