Techno Savvy and All-knowing or Techno-oriented? Information-seeking Behaviour and the Net Generation?

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During the last twenty years rapid developments in technology have led to changes in the way we work, play and learn. Technology has become an integral part of society's everyday landscape. Children growing up during what has been called the technological or digital revolution have never known a world without instantaneous communication and easy access to vast quantities of information delivered in multiple formats. For the 'Net Generation' of users and consumers, technology is transparent and a part of their social, economic and educational landscape. They are surrounded by information using a multitude of formats, text types, graphics and multimedia. Adult observers of these young people marvel at how they use and cope with a wide range of technologies, often seemingly oblivious to instruction manuals. The Net Generation already seem to have the skills to deal with the array of old and emerging technologies. The terms tech-savvy, web-savvy, Internet-savvy and computer-savvy are being used to describe young people in major educational policy documents and population studies worldwide. While educators recognise that their students have a different culture of use when using and seeking information delivered electronically, they struggle to come to terms with the changes the integration of technology brings to the teaching-learning environment. Teachers are continually being reminded that they are the ones who are being left behind a generation for whom the use of communications technologies appears to be intuitive. The question for researchers and educators is do students have an intuitive grasp of how to use electronic information or is this just an illusion borne of familiarity with the technology?

In 2004 two reports of a very different nature emerged from the American education system. On one level, the *Toward a New Golden Age in American Education: How the Internet, the Law and Today's Students are Revolutionising Expectations (*U.S. Department of Education/Office of Educational Technology, 2004), presents an overview for educational directions in American primary and secondary education. The report analyses current initiatives in American education, the use of technology and specifically the Internet as a learning tool, and outlines how educators can better adapt programs to reflect the changing information environment. The term tech savvy is used extensively in this latest National Technology Plan to describe students' technology skill levels and indicates a belief by system administrators that today's students already have a level of proficiency when seeking and using information found on the Internet and from electronic resources. The other report from the *Weatherstation Project* titled *Thwarted Innovation: What happened to elearning and why?* (Zemsky, & Massy, 2004), examines elearning initiatives across sixteen universities. Major findings from this study conclude that students do not view technology and electronic resources as learning tools. While students want to be connected to each other, they view elearning as a convenience at best and a

distraction at its worst. Their primary use for the Internet is for communication and entertainment.

These two reports represent divergent views and raise some interesting questions about students' skill levels and attitudes when using ICTs and electronic resources in educational contexts. They also provide an insight into the diverse nature of the current research and commentary on information-seeking behaviour in children and young adults. The term commentary is included here to distinguish between pure academic research conducted by universities and what appears to be observational or quasi research carried out by commercial educational corporations affiliated with universities or individuals. These studies are often disseminated free of charge on the Internet and have been included in this examination due to their widespread appeal and effect on popular public opinion, administrators and even educators.

The research and commentary on information-seeking behaviour in children and young adults using ICTs and electronic resources is diverse and covers a number of areas including generational commentaries and research, general population studies of both entire user groups across all ages and specifically young people; traditional information-seeking behaviour (ISB) studies and process models, Information-seeking behaviour in a variety of educational contexts ranging from early childhood through to university; scholarly discourse on changing cultures of information use; information-seeking behaviour and how it affects web and system design; and a range of Government and systemic education initiatives designed to cater for a new generation of students who are perceived to have different informational and learning needs. Major themes that emerge from this cumulative research and literature is the importance and effect of user perceptions and the skill levels of young people who have grown up in an environment where technology use is transparent and a part of their everyday informational landscape.

The term Net Generation was first coined by Donald Tapscott in his book *Growing up digital: The rise of the Net Generation* (1988). The Net Generation refers to children born after 1985 who have always experienced a world where digital media is a transparent feature of their everyday lives. This digital media is fundamentally different from previous communications innovations such as the printing press, radio and television, which are described as passive, inflexible and centralised hierarchical technologies. In contrast, the new media is characterised by interactivity, connectivity, malleability and distributed in control (Tapscott, 1998). The Net Generation are not intimidated by new technology and Tapscott maintains that they "are learning, playing, communicating, working, and creating communities very differently than their parents. They are a force for social transformation" (Tapscott, 1998).

This new generation has also been called a variety of names, an indication that society is trying to grapple with changing cultural values and how to describe and acknowledge a changing culture of information use by children and young adults. They have been called the Y Generation, Millennials, Echo Boomers, the Digital Generation and the Net Generation (Skiba, 2003). Other labels include N-Geners and Nesters (Net Generation learners) (Billings, 2004).

Advocates of the Net Generation label maintain that they have certain characteristics which set them apart from previous generations. Tapscott maintains that their increased access to information gives the Net Generation a greater knowledge base which leads to independence and

the ability to question and confront information (Tapscott, 1998). The Net Generation are preoccupied with free expression and have strong views, a result of being exposed to a lot of information on the Internet (Tapscott, 1998). They know what they want and have greater digital literacy skills (Oblinger & Oblinger, 2005). As a result the Net Generation are intuitive visual communicators, have strong visual-spatial skills and readily integrate the virtual with the physical world (Oblinger & Oblinger, 2005). They learn by discovery, investigation and experience which enables them to retain information and use it in innovative ways, and they are comfortable multi-tasking using a range of technologies (Skiba, 2003, Dorman, 2000, Oblinger & Oblinger, 2005). Since the Net Generation work and play in an environment where trust, authentication and the authority of information is fluid, they develop sophisticated information skills to enable them to secure authenticity (Dorman, 2000). "Students feel they know how to find valid information on the Net" (Oblinger & Oblinger, 2005). Connectivity and social engagement using technologies is very important to this generation of users. Global connectivity allows the Net Generation to communicate with a broad range of users and exposes them to a wide range of ideas and cultural differences, thus leading to a more socially inclusive outlook (Tapscott, 1998, Dorman, 2000).

Much of this literature appears to hinge on the work of one or two individuals and is observational rather than research based on rigorous academic method. Tapscott makes sweeping statements about the abilities of the Net Generation and gleefully recounts how children are showing adults how to use the Internet (Tapscott, 1998, Skiba, 2003). What is never discussed or examined is how the Net Generation are actually using ICTs and there is little or no reference to rigorous research data. *Educating the Net Generation* (Oblinger & Oblinger, 2005) is an Educause ebook that is the result of a partnership between a university and the Educause Center for Applied Research. This edited compilation of articles about education and the Net Generation also lacks academic rigour, contains few references to reliable research and relies on observation or personal testimony from students (Net Generation). While there is no doubt that technology has affected the way we live and influences nearly every aspect of our daily lives, this body of literature, while popular and often emotive, does not appear to be based on rigorous research and only describes what the Net Generation appear to be doing when they are using ICTs, rather than their actual achievements.

These studies imply that the Net Generation are socially active, responsible and discerning users of information technologies. Indeed the Net Generation as a group have been variously described as tech-savvy, Web-savvy and Internet-savvy in a number of major educational reports, including *A New Golden Age in American Education*, and *Voices & Views from Today's Tech-Savvy Students*, part of a national report sponsored by the nonprofit group NetDay (NetDay, 2004, Murray, 2004). The Australian Curriculum Corporation's report from the Le@rning Federation describes the current generation of students as being:

> …born into a highly technological world. They inhabit, navigate and communicate within a society which is both technologically-rich and information-rich. … Our students' worlds are increasingly being shaped by their abilities to acquire, communicate, access and manipulate information using ICT and to respond creatively to emerging technologies (Curriculum Corporation, 2005).

Throughout these reports it is assumed that young people have the necessary skills to locate information easily on the Internet, and are discerning and knowledgeable users who use ICTs to be innovative and creative, inclusive and politically aware. Is this actually the case or are these the observations of an older generation enthralled and perhaps a little bit wary of a younger generation who seem to be able to adopt and adapt a range of emerging technologies effortlessly? Is the Net Generation a 'real' phenomenon, or are we observing a generation of users who are simply used to a different informational landscape?

While detailed, longitudinal research studies on the Internet and information-seeking behaviour are still sparse, several large scale population studies have been conducted in the United Kingdom and America. "The UK Children Go Online (UKCGO) project aims to offer a rigorous and timely investigation of 9-19 year olds' use of the Internet" (Livingstone & Bober 2004). This is an ongoing, large scale population study that examines a variety of themes including Internet literacy levels and self perception, safety and parental intervention, and usage by young people across the United Kingdom. Findings from these studies indicate that while Internet access and use is popular, there are still significant inequalities, especially with home access. While young people use it for a wide range of purposes, many are not socially acceptable. These members of the Net Generation also report that they still spend more time watching TV or with the family (Livingstone & Bober 2004). The findings suggest a generation of users who are confident in their abilities and claim greater online skills than their parents, but who also admit that 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. In two small scale studies Branch (2003) discovered that students require specific instructional intervention to develop effective information skills. Students were often confused and they found the amount of information on the Internet daunting. As a result they often experienced significant levels of frustration. One UKCGO study reports:

> 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. … These skills are variably, and unequally, distributed across the population, with age, gender and socio-economic status all associated with differences in literacy (Livingstone, Bober & Helsper, 2005).

According to the UKCGO studies young people in the UK are not critical or discerning users, they have poor Internet literacy skills, trust the authority of information they find on the Internet and rarely question authenticity or authority (Livingstone, Bober & Helsper, 2005). They communicate mostly with their peers and rarely participate in civic, global or political activities online. A small percentage of the users surveyed are innovative and create web sites, but a general lack of skills and technical knowledge is a major hindrance to these types of activities (Livingstone, Bober & Helsper, 2004). While these current members of the Net Generation use the Internet, they do not quite match up with the attributes as outlined by Tapscott and others.

Major ongoing studies are also being undertaken by the UK Joint Information Systems Committee (JISC), which "seeks to predict, monitor and characterize the information seeking

behaviour of UK students in relation to electronic information services" (Griffiths & Brophy, 2002). The JUBILEE project (JISC User Behaviour in Information seeking: Longitudinal Evaluation of EIS) 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). This study found that both students and academics use 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 is recognised, variable skill levels in how to use the Internet and electronic resources efficiently and effectively inhibits widespread usage. The study reports an overwhelming reliance by academics and students on Internet search engines rather than using specialised electronic information services. Students rarely use even simple Boolean logic to refine their search strategies and seem 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 was also posited as a major difficulty for the researchers when collecting data for the project (Banwell,& Gannon-Leary, 2000). This reliance on the Internet, coupled with poor search skills and a lack of critical information evaluation skills compounds the problem of poor Internet or 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).

The JUSTEIS project (JISC Usage Survey Trends: 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, 2003, Griffiths & Brophy, 2002). Students tended to navigate web sites by clicking on links rather than utilising sophisticated or complex search strategies. This finding is also supported by a number of other studies. Martzoukou (2004) and Fidel (1999) found that students used 'landmarks' or favourite web sites as starting points for a search, and regularly used the back button to navigate. Sandvig and Baiwa (2004) found that university students "have a significant preference for using browsing methods (hyperlinks) over search (via search features) and hybrid (combination) methods." 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 UKCGO studies. Many students do not have the cognitive skills to navigate hypertext (Scott, & O'Sullivan, 2005). They browse or surf the Internet or use Google to get quick, easy results.

In traditional ISB studies the phenomenon of making do with information retrieved, even though may not be the most complete, detailed or accurate, is called satisficing (Case, 2002). This tendency of being satisfied or 'near enough is good enough', has also been observed when the Net Generation use the Internet or electronic information sources. Students are easily satisfied and research findings "indicated a student infatuation with information; any information is attributed to be good information, and the more of it, the better" (Scott, & O'Sullivan, 2005). Another population study in the UK using weblogs to track ISB, concluded that "today's information consumer is a 'flicker' or a 'bouncer' [where] even those who penetrate the sites, rarely go beyond the home page or wander very far (Nicholas et al., 2003). Like the JISC research studies, this population study found that usage patterns were remarkably similar across age groups, consumers were unaware of where they were in virtual space and access and speed

of delivery appeared to be more important than quality of information (Nicholas et al., 2003). These results support findings from the *UKCGO Surveying the experiences of young people and their parents* and other studies which concluded that information-seeking behaviour and associated expertise is dependent on the experience of the user rather than age (Livingstone & Bober, 2004, Waldman, 2003).

When seeking information friends, colleagues and fellow students were also important sources (Livingstone & Bober, 2003). This finding is also supported by research conducted by Shenton (2004) who found that students were heavily reliant on other people and their interaction with electronic sources of information diminished when significant others were used as information sources. Traditional ISB studies using the print environment report that we tend to use personal networks and easily available sources of information first (friends and colleagues) (Case, 2002). Emerging research studies in how people use people as information sources, however, suggests that complex social relationships and networks are used in this context. This is not necessarily the easiest path to finding information as the best advice is not usually the most readily available (Johnson, 2004, Borgatti, & Cross 2003).

Students also exhibit confusion about the quality of academic resources and regularly failed to find information using the Internet or electronic information services. The JISC project concluded that "further work needs to be done to equip students with the awareness and skills to use a much wider range of academic information resources and services" (Griffiths, 2003). These studies are ongoing and provide an important snapshot of how students at university level in the UK seek and use information. Current university students are the first graduates of the Net Generation and while they like being connected, their information-seeking behaviour in a tertiary educational context and their ability to use electronic resources is an issue.

Another major study of teenage use of the Internet has been conducted by the PEW Internet & American Life Project. This project has conducted studies on Americans' use of the Internet and how teens use technology. These studies produced similar findings to the UK studies. While users feel comfortable using search engines and are satisfied with their search results, few users know much about them or use sophisticated search strategies. They trust search engines and the information provided (Fallows, 2005). Even though users admit to knowing little about search engines they are confident in their ability to use search engines to find information. Teens in these studies also stop searching once they think they have found the answer and have a tendency to rely on single sources of information (Fallows, 2005). The PEW studies also concluded that teens prefer to spend face-to-face time with their friends and use landline telephones to keep in touch. They do not prefer to communicate with friends or others they don't know using the Internet.

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 *Teens use of technology* study only included students who were considered to be Internet-savvy, thus equating time spent using technology with a degree of expertise (Everhart, & Valenza, 2004). In this study students were not asked to describe how they located, evaluated or critically analysed information. "In fact, their expectation was that the Internet should do [the] work for them" (Everhart, & Valenza, 2004). 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. Students demonstrated "a serious lack of understanding of the limits of the free Web" (Everhart, & Valenza, 2004).

Self perception of their skill levels is an important attribute of the Net Generation and may affect how young people approach learning new skills. The UK studies found that students were reluctant to admit to a lack of knowledge and skill when using the Internet and electronic resources (Banwell,& Gannon-Leary, 2000). Children and teens in the UK and the PEW studies felt they were more skilled than their parents, even though they reported regular frustration and an inability to find information on the Internet. One university study found that students with low self perceptions also tended to have poor computer literacy skills, used fewer electronic resources and experienced lower academic success (Waldman, 2003).

All of these research studies and commentaries point to a changing culture of information use amongst the young people born into the Net Generation. Determining the significance and the various facets of the developing culture of use that surrounds the Internet and how it affects the ISB of young adults is an important objective of this research. It would appear that while young adults exhibit some of the information-seeking behaviours outlined in traditional ISB theory, they also demonstrate a different culture of use, first observed by Tapscott and the Net Generation theorists. The large population studies conducted during the last five years in the United Kingdom 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 over the use of the Internet as an information resource. While Tapscott's Net Generation theory describes the culture of use that surrounds how young adults interact with the Internet and electronic resources, it does not provide an insight into how they are using it to satisfy their information needs. The traditional ISB models and research examine information-seeking behaviour in a print environment, but do not appear to take into account the complexities of the online information environment or the culture of use that surrounds it.

If the descriptions of the Net Generation are accurate then the question for educators is how do we adapt education and learning programs to meet their needs? The emerging body of research suggests that young people still have a long way to go before they meet the criteria of the Net Generation. For young adults entering tertiary studies and the workplace for the first time, the ability to access information via the Internet and electronic resources is becoming an essential skill as more resources are made available in electronic form. In order to change the information-seeking behaviour of young adults so they make better use of the Internet and electronic services as information sources, we need to understand the current culture of use and how this influences information-seeking behaviour in the online environment. There is no question that young people today inhabit a world where a range of convergent, digital technologies are a transparent part of their information landscape. It is therefore vitally important that educators discover just how young people are using technologies to ensure they have the skills to be truly techno-savvy, rather than techno-oriented.

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