The Net Generation goes to university?

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Abstract

This paper describes an attempt to take a snapshot of the latest generation of students entering tertiary education.

The higher education sector is one of the largest consumers of information technology in Australia. Universities invest massive amounts of money on technology based on what they believe students need, want, and already have. Coupled with a perception that emerging technology is the domain of the next generation, it becomes attractive to assume (or hope) that each intake of undergraduate students is more self-sufficient than its predecessors when it comes to digital media.

In 2005, Charles Sturt University surveyed its 1st year cohort of undergraduate Communication students in their first week on campus. The primary aim was to test perceptions that the new generation of students can be categorised as Digital Natives, Marc Prensky's term (2002) to describe what has variously been called the Games Generation, the Net Generation or the Millennial Generation.

Introduction

> Lucy is a first-year undergraduate Communication student at Charles Sturt University, in Bathurst. She plans to specialise in broadcast journalism. Like many of the people she has met in her first week at university, Lucy is 18 years old and grew up on the relatively affluent north shore area of Sydney. Looking around the lecture hall this week, she has noticed that most of the people studying Communication are young women about her age.
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> Lucy has completed her enrolment using the university's Web-based system. She has also paid her fees online. Looking through some of the information for the subjects she is studying this semester, she has noticed that most of them feature some online tools like discussion forums and electronic readings. This morning Lucy attended an information session on how to use the library's online database of journal articles and books.
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> Lucy feels she is well prepared to tackle her first year of university. She has a laptop computer that she will use for her assignments, as well as for keeping in touch with her family via e-mail. The university has provided an Internet connection in her dormitory room, so Lucy will be able to use her laptop to research her assignments. She prefers to use the Web to find out new information - in fact, that's how she planned what university course to study.
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> Lucy has a digital camera, and plans to e-mail her Mum and Dad some pictures of her new life in Bathurst as soon as she gets a chance. She keeps in contact with her friends mainly using SMS on her mobile phone. Occasionally she uses online chat at night to catch up with what's been happening with her

> school friends, some of who are travelling overseas while others have started studies at other universities.

Lucy is not a real person. She's a character sketch drawn from a survey of new students and their relationships with technology conducted at Charles Sturt University (CSU) in February 2005. In Australia, the higher education sector is one of the largest consumers of information technology (Philipson, 2005, p 10). Universities invest massive amounts of money on technology "based on what they believe students need, want, and already have" (Oblinger & Oblinger, 2005, p 1.3). It follows then, that as belts tighten across the sector it becomes more attractive to assume that new generations of students are more self-sufficient than their predecessors when it comes to digital media.

Similarly, in disciplines or courses with a vocational focus using digital tools it is also natural for staff to hope that students will arrive with some of the technical skills required for their intended career. In the School of Communication at CSU, for example, we are waiting for the day when first-year students consistently arrive with a base level of digital video editing skills. Yet despite our hope that each year brings an influx of more technology-savvy students, many still seem surprisingly ill-prepared to work with even domestic digital equipment (computers, scanners, video cameras). You can still hear the complaint "I hate computers" echoing throughout our campus computer labs.

Was the 2005 intake of students really the Net Generation we've heard so much about?

Attempts to place current students into a generational taxonomy have tended to focus on their relationship with technology. Students born in the early 1980s are the "Net Generation" (Tapscott, 1998; Oblinger & Oblinger, 2005), or even the "Nintendo Generation" (Green, Reid & Bigum, 1998). The "Millenial Generation" (Strauss & Howe, 1997) are characterised by their fascination with technology, ability to multitask, expectations of fast interaction with information and a desire for connectivity – both physically and virtually (Oblinger & Oblinger, 2005).

Regardless of age we are all – in the western world at least – surrounded by digital technology. So today's generation gap appears to be less about ideological or demographic differences, and more about demonstrated comfort and ability with the tools of everyday living. If you "get it", like most young people seem to, you are what US trainer Marc Prensky (2002) would call a Digital Native. Older people who use the same technology but in a less intuitive or instinctive way are Digital Immigrants. For example, if you still print out your email to read it you're definitely an immigrant.

Rupert Murdoch recently picked up on the Digital Native/Immigrant analogy to discuss the challenges this poses to the media industry. Speaking in April to the American Society of Newspaper editors – an audience one assumes would consist mostly of digital immigrants – he warned that "the next generation of people accessing news and information, whether from newspapers or any other source, have a different set of expectations about the kind of news they will get, including when and how they will get it, where they will get it from, and who they will get it from" (Murdoch, 2005). Whether you couch it in terms of the next generation of media consumers, or the Net Generation of students, media and academia will have to deal with similar challenges – and opportunities – posed by young people's relationships with digital media technology.

The origin of species: "Digital Natives"

Let's step back for a moment to the origins of the generation of students starting university in 2005. Most are younger than the first mass-marketed Personal Computers. Many were born in 1986 – just two years after the Apple Macintosh was launched. Beloit College in Wisconsin (www.beloit.edu) each year lists some "mindset" factors that separate each generation of first-year students from those that precede it, highlighting the speed with which evolving technology can become a transparent element of our worldview.

For instance, we can assume that to most students entering University this year:

- computers have always suffered from viruses;
- stores have always had scanners at the checkout;
- computers have always fit in their backpacks;
- beta is a preview version of software, not a video format; and
- cyberspace has always existed.

These students live in a world where they have always had a pin number and Iraq has always been a "problem". Fuel has always been unleaded. The British Royal family has always behaved badly (Beloit College, 2005).

One of the aims of the Beloit Mindset Lists is to remind staff that each new generation of students brings a unique set of social, historical and cultural reference points. It is a light-hearted but occasionally jarring means of highlighting the perceived generational gap between students and teachers, a gap that is in part widened by perceptions of and comfort with digital media. Green and Bigum (1993) suggest that new technologies, especially computer and video games, have impacted so greatly on young people that many teachers feel they are now confronted by "aliens in the classroom". Katz argues that new forms of popular culture, mostly involving computers, have developed so quickly that there has evolved "perhaps the widest gap – informational, cultural and factual - between the young and the old in human history" (Katz, 2000). Katz suggests that while many adults insist they have lessons to teach the next generation, all they have to offer are boring and outmoded educational systems.

Echoing some of the factors identified in Don Tapscott's *Growing up digital: The rise of the Net generation* (1998), Prensky argues that this generational chasm manifests itself in ten basic cognitive changes. The potential implications for teaching and learning are summarised below in Table 1.

Table 1: Ten learning preferences of Prensky's Digital Natives (from Cameron, 2004).

	Digital natives prefer:	Traditional training provides:	Learning implications:
1	"Twitch" speed	Conventional speed	Students desire faster interaction with information (game speed).
2	Parallel processing	Linear processing	Students desire multitasking, processing multiple data simultaneously.
3	Graphics first	Text first	Students desire graphic information with a text backup.

4	Random access	Step-by-step	Students prefer hyperlinking through materials, rather than reading from beginning to end.
5	Connectivity	Stand alone	Students prefer networking, and high level of electronic communication.
6	Activity	Passivity	Students have less tolerance for passive instructional situations - learn by doing.
7	Play	Work	Students see computers as toys as well as tools; prefer to learn in a fun environment.
8	Payoff	Patience	Students expect immediate and clear feedback or reward in return for efforts.
9	Fantasy	Reality	Students accept fantasy and play elements as part of "serious" work, e.g. informal work settings.
10	Technology-as-friend	Technology-as-foe	Students see technology as empowering and necessary.

This outline of the generational differences between the teaching and learning generations is supported by Fromme (2001, p. 2), who also argues that "parents and teachers tend to address the media cultures of the younger from their own generational perspective" while ignoring the digital media literacy of children and young adults. Table 1 clearly illustrates potential obstacles to learning that may arise from the use of teaching methods that do not account for generational differences in changing media cultures. Educators and trainers "ignore or slight the Nintendo generation, or indeed demonize them, at their own peril" (Green, Reid & Bigum, 1998).

However, there's still a chance for our digital immigrant generation of teachers to connect with their digital native students: because we use technology in our professional and personal lives, many of us take on some characteristics of the Net Generation (Oblinger & Oblinger, 2005).

For example, ask yourself:

- Do you prefer to use a word processor to writing in longhand?
- Is your mobile phone always with you? Is it on now?
- Are you always connected to the Internet at home or at work?
- Have you turned your "remembering" (phone numbers, appointments, birthdays) over to technology like your mobile phone or PDA?
- Can you effectively engage in a number of activities at once?

Being able to say yes to even one or two of those means perhaps all is not yet lost. The gap that digital technology creates between students and teachers may not be so much generational as it is experiential. While we may not be as fluent as the digital natives, many of us have enough experience, knowledge and foresight to act as translators or to build the bridges between learning and teaching generations.

A snapshot of the survey results

The 2005 1st year cohort of Communication students at Charles Sturt University in Bathurst was surveyed during an enrolment information session in their first week. The Communication degree includes students who will specialise in advertising, theatre/media, public relations, commercial radio, and print or broadcast journalism.

Acknowledging the pervasive nature of digital technologies throughout contemporary media, information and entertainment industries, all of these courses include or share subjects with at least some elements of training in digital media production. This ranges from basic multimedia presentation tools through to desktop video editing.

The primary aim of the survey was to test staff perceptions that the new generation of students can be categorised as Digital Natives. The survey gathered some basic data about the student's ownership of digital technology, and their skill level with a range of software applications. The instrument also included some general questions about media usage and attitudes towards technology.

There were 210 responses to the multiple-choice survey. The survey group consisted of 162 females and 48 males, with an average age of 18 years. Almost half (49.5 percent) are from the greater Sydney metropolitan area, almost 5 percent are overseas students, and the remainder are drawn from other regional centres and rural areas around New South Wales.

PC ownership
79 percent of the students in the study own a computer. Desktop computers are owned by 39 percent. Laptop computers are owned by 28 percent. A further 12 percent own both a desktop and laptop computer.

Charles Sturt University provides centralised laboratories for students on its Bathurst campus, presently a mix of Windows and Apple OS machines (including a 24-hour access lab and library workstations). The School of Communication also spends a large part of its equipment budget maintaining its own Macintosh laboratories, with some 36 machines used mainly for desktop video editing. This reflects the emphasis in the communication industries on digital media production. The School therefore has a particular vested financial and educational interest in assessing the levels of PC ownership amongst its students, and their initial skill level with software applications and peripheral equipment.

The ownership figures indicated in the survey equate roughly with a 2003 estimate that 66 percent of Australian homes had access to a personal computer, with that figure rising to 85% for homes with children under the age of 15 years (ABS, 2005). In 2000 the University of Melbourne's Households Research Unit predicted that 68 percent of all Australian households would own a personal computer by 2005, with an even greater penetration (78 percent) for households with children (Ironmonger, Lloyd-Smith & Soupournas, 2000, p.14).

However, 21 percent of the respondents indicated that they do not own a personal computer. Although the survey did not attempt to match ownership of a computer with access to that computer in Bathurst, the indication that 1 in 5 students do not own a PC in itself suggests that there remains a need for centralised facilities.

Ownership of other digital devices
Personal Digital Assistants, for example Palm Pilots, are owned by just 4 percent of students. This will possibly not surprise educators who bemoan the lack of time management and planning exhibited by a majority of their students, although research has suggested that our brains may not be physically capable of planning ahead until we reach our early 20s (Smith, 2004). 30 percent of the surveyed students own a portable mp3 player, such as an Apple iPod. 29 percent own a portable USB storage device.

22 percent of the survey participants own a digital video camera, while 49 percent own a digital still camera. The ownership of still cameras is higher among females (53 percent) than males (37 percent). This was one of the most dramatic gender differences noted in the responses concerning technology ownership. 37 percent of students own a digital scanner.

Ownership of video games consoles is reasonably high, at 41 percent. 35 percent of female students indicated ownership of a console, compared with 55 percent of males. Although games have traditionally been viewed as the domain of teenage boys, research indicates that the gender gap is closing. One study reported 43 percent of gamers are women (Oser, 2004).

Level of skills
When the students were asked to rate their skills levels in regard to a number of applications and tools, they rated themselves highly in the use of online communication, word processing, presentation software and digital still cameras. They were less confident with spreadsheet applications, and unskilled at basic desktop video editing and desktop publishing. The poorest skills were in Web design and advanced video editing software.

Table 2: Self-assessed software/device skill levels

Application	**Mean***	**Std. Deviation**
Word processing (eg Word)	4.11	.631
Email	4.05	.674
Web surfing	3.93	.618
Instant messaging software (eg. MSN Messenger)	3.79	1.070
Digital still camera	3.70	1.026
Presentation software (eg. PowerPoint)	3.36	1.123
Spreadsheet (eg Excel)	3.08	.987
Basic digital video editing (eg. Movie Maker, iMovie)	2.38	1.319
Desktop publishing	2.12	1.138
Advanced digital video editing (eg. Final Cut Pro, Premiere)	1.85	1.168
Web design software	1.80	1.074

* Scale = 1 (do not use), 2 (very unskilled), 3 (unskilled), 4 (skilled), 5 (very skilled)

Connectivity
Perhaps not surprisingly, 99 percent of the respondents own a mobile telephone. Carroll (2005) identifies the mobile phone as a key device in the lives of students, for whom interactive technologies 'are entertainment, identity maintenance and communication devices all at the same time'. These are the core consumers of a "reality" television genre that demands audience response via Short message Service (SMS) voting. When asked how they most keep in contact with their friends, the survey respondents overwhelmingly nominated SMS as their primary choice (55 percent), ahead of voice calls (30 percent), online chat (11 percent), and email (4 percent). Printed text like letters or faxes did not score at all. There were no significant distinctions between the genders, though a higher percentage of females were likely to use SMS (57 percent compared to 48 percent), while almost twice as many males were likely to use online chat as their primary means of maintaining contact with friends (16 percent compared to 9 percent of females).

The overall use of instant messaging (IM) software such as MSN Messenger is high among this group, with 71 percent reporting some time spent using the technology each week. 98 percent of the students report spending some time creating and reading email each week. Recent research from the Pew Internet & American Life Project indicates a preference among US teenagers towards using IM to communicate with their peers, while email is used to talk to "older people" and institutions or to share complex information with large groups (Lenhart, Madden & Hitlin, 2005, p ii).

While the concept of the Digital Native generation presupposes a high level of electronic communication, it is clear that personal communication remains important, particularly in the educational setting. When asked what they felt was the *most* enjoyable way to learn, 38 percent of students rated personal meetings as the preferred option, followed by reading (30 percent). Electronic communication rated relatively poorly as an enjoyable learning method, with 18 percent nominating surfing the Internet as their preference. Lectures were considered the most enjoyable method by 10 percent, while online chat was preferred by just 4 percent of students.

When asked to indicate the *least* enjoyable way to learn, 43 percent indicated online chat, with the other options scattered evenly after that. There was little difference between genders, though more females rejected online chat as an enjoyable way to learn, while more males disliked reading.

Multitasking and graphical information

When asked how the form in which they prefer to receive information, 47 percent selected written text, followed by graphical information (29 percent) and then verbal instruction (24 percent). This is at odds with Prensky's (2001) description of a generation that prefers graphics over text, but it also possibly reflects the fact that the educational setting remains a text-biased environment. Also, even screen-based media like the World Wide Web rely heavily on text.

A Yahoo and Carat Interactive study (2003) found that young people use the Internet as a primary media "hub", using other media as a starting point for the online experience. Today's teens and young adults are not overwhelmed by the abundance of media choices but rather feel empowered by it and are able to multitask - using more than one form of media at a time - more than any other generation.

Students in the CSU survey were asked about their preference for multiple sources of information, such as the current trend in some TV news programs of providing split screens of information or rolling news tickers. 41 percent indicated their preference for this style of content, while 24 percent did not like it. The remaining 35 percent reported that they did not have strong feelings either way. When questioned further about their television viewing habits, 15 percent reported that they watched several programs at once by constantly flicking through channels. The majority 73 percent were likely to browse across channels during commercial breaks, but tended to return to their chosen program. Only 12 percent reported that they watched TV for a selected program and tended not to channel surf.

Twitch speed and random access

One of Prensky's (2001) main arguments for a new digital game-based approach to learning and teaching is that the Games Generation work at "twitch speed", a description of a hectic approach to information gathering that equates with the pace of playing many computer and video games. This is why he and others (for example Gee, 2003) argue in favour of games as a model for instructional tools. Respondents were asked about their preference for learning by quickly scanning through multiple

sources of information. 50 percent agreed this was their preferred method, with 18 percent disagreeing. The remainder (32 percent) were neutral. As indicated in Table 3 below, the Internet is overwhelmingly their information source of choice.

Table 3: preferred source when researching a new topic

Preferred source	**% of respondents**
Internet/World Wide Web	70.5
Books	20.5
Videos or DVDs	5.2
Talking with friends/family	2.9
Magazines/newspapers	1

Prensky (2001) also argues that there is a tendency among Digital Natives to prefer random access to information sources, as opposed to step-by-step learning. As shown in Table 4, when asked to describe how they learn to use new software or equipment, 53 percent acknowledged that they only refer to the manuals if they reach a dead end. Only 11 percent indicated that they go step-by-step, using instructions or a manual. This reflects the way many people engage with computer and video games, where players rely on the game itself to teach them how it should be played rather than resorting to the manual (Cameron & Carroll, 2004).

Table 4: Usual approach to learning new software or equipment

Method	**% of respondents**
I can usually work it out, only using the instructions if I get confused	53
I just play with it until it does what I need	19
If I can't do what I want, I ask someone to show me	16
I go step-by-step, using the instructions or manual	11
I get someone else to do it for me	1

Technology as a friend

The study found that 84 percent of students rejected the notion that technology is a negative force in society. The cohort was more evenly divided on whether technology gave them greater control over their lives. 58 percent agreed that it does.

Digital natives?

This survey serves as a pilot study into some of the issues surrounding the emergence of a generation of students that poses significant challenges to traditional educational approaches. There have probably always been generational differences between learners and teachers, but it is the speed with which digital media and their applications pervade popular culture that makes them such a hot topic for educators.

The 2005 intake of students certainly match our expectations in many areas. Most own computers, and are confident using a range of software applications. They connect and maintain their relationships via mobile telephone, email and online chat. The Internet is their preferred source of information, and they can engage with multiple source of information at once.

However they are still not the complete Digital Natives we are waiting for. Some digital devices, for example mp3 players, are yet to achieve the high penetration in this group that we might expect. There remains some resistance to online learning. In some areas they remain relatively unskilled, such as Web design and digital video editing.

Of course one of the difficulties in surveying students about technology is that many of them see the devices and applications under review not as "technology", but as an everyday part of life. In one of his last public appearances before his death in 2001, popular science fiction author Douglas Adams suggested that civilizations often don't know what to make of new technology:

> "anything that's invented after you're 35 is against the natural order of things. … Anything that's in the world when you're born is considered ordinary and normal" (in Cassel, 2001).

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