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Digital natives: Everyday life versus academic study

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Abstract

Access to and use of technology by ‘digital native’ students studying in our universities has been an area of much speculation, though relatively little empirical research. This has led some pundits to call for a radical rethink of how higher education uses technology to deliver education. Others are more circumspect and think it is necessary to hear directly from these ‘digital natives’ about their actual technology practices before jumping to such conclusions. This paper reports on a study that aimed to do just that; the study comprised a survey of the technology access and practices in both everyday life and for academic study of first year university students. The findings suggest that, for the participants of this study, access and usage of technology does not neatly fit into the stereotype of the ‘digital native’. Access to and use of some technologies was found to be quite high whilst others have significant levels of non-adoption. A comparison was made between technologies and activities undertaken as part of students’ everyday life in contrast to their academic study and it was found that the usage rates were generally lower for academic study. Access to and use of different technologies for different purposes is variable and university teachers and policymakers need to take this variability into account when making changes at the course or institution levels. What is also required is more in-depth investigation of the technology practices of these ‘digital natives’ to understand how technology is transforming their social and academic lives and, importantly, how they are shaping technology to suit their lives.

Keywords

Digital Natives, Net Generation, Higher Education, Technology

Introduction

Over the last 15 years the emergence of a new generation of students in higher education has been reported in the literature. This generation is said to be comprised of ‘digital natives’ who have grown up surrounded by technology and are characterised by their ability to multitask, their dependence on technology to maintain social contact, their openness to share content, and their ability to rapidly understand and adopt new technologies (Oblinger & Oblinger, 2005; Prensky, 2001; Dede, 2005). Many generalisations have been made about this group of young people; however recent studies suggest that the homogeneity of this generation cannot be assumed and that in reality the technological characteristics of the digital natives are significantly diverse in nature, especially in relation to technology use as part of students’ academic study (Lang, 2007; Kennedy, 2006). This variance in technological experience and ability challenges many of the assumptions which currently form the basis of recent educational technology implementation strategies in higher education (McLoughlin & Lee, 2008).

The Evolving Digital Natives Debate

The origins of the digital natives debate can be found in the mid-1990s when commentary began to emerge about a technological disparity between the youth of the time and their parent and teachers. Essayist John Perry Barlow (1995) in his *Declaration of the Independence of Cyberspace* warned parents that “You are terrified of your own children, since they are natives in a world where you will always be immigrants” (¶. 12). The term ‘digital native’ was popularised by Prensky (2001) who claimed that technology had created a discontinuity, resulting in a radical change in the characteristics of the new generation of students entering our universities. This concept was based primarily on age and defined to include those born after 1980 when the personal computer became commonplace (Oblinger & Oblinger, 2005). This notion of generational technology homogeneity is similar to Tapscott’s (1998) idea of the ‘Net Generation’ and the ‘Millennials’ proposed by social commentators Howe and Strauss (2000).

Prensky (2001) expanded on this idea of a disparity between young people and the older generations by introducing the concept of 'digital immigrants' – those who were not born into the digital world and who, it is claimed, do not think learning and technology can be 'fun' and will ever be able to master the use of technology to support engaging education. This has remained a central idea in Prensky's work, despite some later concessions about the variance of technological experience of digital natives (Prensky, 2007). The supposed divide between students and academics has prompted arguments for radical changes in higher education teaching approaches and professional development in an attempt to bridge the gap (Oblinger & Oblinger, 2005). This is despite the fact that many of these claims have been largely based on anecdotal evidence with no solid foundation in research (Kennedy et. al., 2006; Bennett et. al., 2008). As Helsper & Eynon (2009, p.16) stated in their critique of current thinking about digital natives and digital immigrants, "We are not saying education should not change, but debates about change must be based on empirical evidence and not rhetoric".

Regardless of the lack of empirical data, these ideas have led to the emergence of a significant body of literature describing the characteristics of digital natives. These characteristics generally include a high level of digital aptitude, the ability to multitask, literacy in multiple media, constant connectivity, the need for speed in delivery of information, a culture of sharing information and a unique attitude towards education (Barnes et. al., 2007; Prensky, 2004; Oblinger & Oblinger, 2005; Dede, 2005). Many of these proposed characteristics are based on anecdote and are yet to be empirically tested.

As the discussion of digital native characteristics developed, studies began to emerge which measured, usually by survey methods, students' ownership and general activities of use of technology (Kennedy et. al., 2007; Garcia & Qin, 2007). These studies found that ownership levels of technologies such as computers and mobile phones were increasing, as was students' participation in online activities such as writing blogs, using social networking sites or instant messaging with their friends (Oliver & Goerke, 2007). However, as more research-based studies have emerged, the debate has begun to move away from age as the main criteria for membership of a group that might fit the digital native label. The significant variance in the identified levels of digital activity across all ages has prompted authors to advocate usage levels and experience with technology as measures of whether a person can be considered a digital native, rather than their age (Dede, 2005; Bullen et. al. 2009). Although this proposition appears to make more sense because it acknowledges that people of any age can develop technological expertise, it still assumes a simple homogeneous notion of technological expertise.

However, there is still a lack of studies that go beyond ownership and pre-categorised general uses to examine how students have adapted technology to support their learning. Helsper & Eynon (2009) also suggest that the complexity and diversity in the ways young people use technology is often ignored in research supporting the concept of digital natives. The assumption that students are digital natives who adapt well to the introduction of new technologies has underpinned a number of technology-specific classroom implementation studies from podcasting to the use of virtual worlds such as Second Life (Lee & Chan, 2007; Skiba, 2007). What is unclear is whether the motivation for these implementations of new technologies in the classroom stems from the needs and abilities of the students or simply the emergence or availability of the technology. Kennedy et. al. (2007) argue that further research is needed to identify which technologies students are choosing to use in their everyday lives and how these technologies overlap with or can become 'learning technologies'. It is often assumed that the overlap between the two contexts is considerable, however several recent studies have found that student inclination to integrate common technologies, such as the Internet, into their studies has been less than expected (Selwyn, 2008). The study described in this paper goes some way to exploring the differences in the use of technology to support academic study in contrast to technology use as part of everyday life.

Methodology

The research reported in this paper involved the administration of an anonymous survey to first year students at an Australian university in the second semester of the 2008 academic year. The design of the survey was informed by the technologies and activities identified in previous digital native studies, in particular the studies of Kennedy et. al. (2007) and Trinder et. al. (2008). The first part of the survey collected demographic information about the respondents. In addition to the general demographics of age, gender and degree, more specific questions about enrolment (ie. domestic/international, full/part-time, year in program) and living arrangements were included in order to determine whether respondents fit within the target participant group. Several criteria were applied in the identification of the participant group to make the sample reflective of the average first year student. It was identified from the university's enrolment information that the majority of first year students were domestic, full time students. In regards to age, the participant group was restricted to those

students born from 1980 onwards. This criteria was applied for two reasons, firstly as the age group most commonly identified in the literature as being the generation most likely to be digital natives and secondly due to the fact that the number of respondents born before 1980 was very low (5.2%). The demographics section also collected data on the respondents' living arrangements, daily travel time to university and asked students to rate themselves in terms of their general level of ability with technology. This data was used to characterise the nature of the student population.

The next section of the survey collected data about students' access to technology. Students were presented with a list of common technologies and asked to indicate their level of access to the technology ranging from ownership or exclusive use, through shared or limited access, to no access at all. Due to the fact the study looked specifically at first year students it was decided to measure access rather than ownership as it is possible that some students may not be able to afford to purchase some of this equipment outright but can still access it, particularly if they were still living in the family home (71.7%). This list of technologies included those most commonly associated with use in academic contexts such as desktop/laptop computers, memory sticks and media devices, along with technologies generally associated with everyday life activities such as game consoles, GPS devices, and digital cameras.

The third section of the survey asked students to indicate how often they undertook certain technology-related activities. Identity theory (Stryker & Burke, 2000) informed the definition of the context in which these activities take place. Previous studies have concentrated on students' technology use in general, although very few have considered technology use across multiple contexts. Those that have found adoption of technology was more likely by those who had a strong identity as a student (Benson & Melolichick, 2007). Two lists of technology-related activities were presented to students, one for the context of everyday life and the other for the context of academic study. . Where possible similar activities between the contexts were included to allow for comparative analysis across everyday and academic life. In addition, several context-specific activities were included to further explore each area (ie. buy or sell items (everyday life), access the University's learning management system (academic study)).

Results

The survey was administered in lectures and tutorials for nine subjects across seven faculties of the university. The collection of data occurred over the first three weeks of the teaching session. Data was collected in the second session of the first year so that students had already had some experience of university study in their first session to be able to respond to questions about their technology use in relation to their study. A total of 547 responses were collected and of these 470 responses fell within the participant criteria. The resulting sample represents 16.5% of the total 2008 university enrolment of students who meet these criteria. The distribution of ages within the post-1980 criteria is skewed towards those students born between 1988 and 1990 as these ages represent students who have come either directly from secondary school to university or have done so after a 12 month break. In terms of gender, a higher proportion of the respondents were female (64%) opposed to 35.7% of male respondents. Whilst this ratio is slightly higher than the university average (52% female/48% male), this can be explained in part by a large number of respondents belonging to the Education faculty where the proportion of female students is significantly higher than males. Overall 44% of respondents came from Humanities and Social Science disciplines (Arts, Commerce, Creative Arts, Education, Informatics, and Law) and 56% came from science-based disciplines (Science and Health and Behavioural Science).

Students were asked to rate their own general level of ability with technology. Students could rate themselves as either beginner, intermediate or advanced. A majority of students in this study classified their ability with technology as intermediate (67%) with only 23.2% rating themselves as advanced users and 8.5% as beginners. This calls into question the popular assertion that all young people have a high level of digital literacy because of their exposure to technology (Prensky, 2001; Oblinger & Oblinger, 2005).

The findings relating to students' access to technology demonstrated a high level of access to certain technologies including computers, mobile phones, and portable music players, whilst other technologies, such as PDAs and GPS, showed significantly lower access rates (see Table 1). The ownership and/or access to computers showed that students in this group were more likely to use a laptop computer (73.4%) than a desktop computer (61.5%). Nearly half of all students surveyed (44.4%) indicated that they owned both a laptop and desktop computer. Almost all students indicated that they have some form of access to either a laptop or desktop computer and only 0.4% (two students) had only limited or restricted access to either.

Table 1: Access to Technology

Technology	n	it and/or have access to it at anytime	Shared access with other people	Limited or restricted access	No access
Desktop computer	466	289 (61.5%)	145 (30.9%)	24 (5.1%)	8 (1.7%)
Laptop/Notebook computer	470	345 (73.4%)	51 (10.9%)	33 (7%)	41 (8.7%)
Electronic organiser (PDA, Palm, Pocket PC)	467	26 (5.5%)	11 (2.3%)	38 (8.1%)	392 (83.4%)
Portable music player (i.e. iPod, MP3)	468	404 (86%)	12 (2.6%)	13 (2.8%)	39 (8.3%)
Digital camera (still and/or video)	470	339 (72.1%)	79 (16.8%)	17 (3.6%)	35 (7.4%)
Mobile phone	470	469 (99.8%)	1 (0.2%)	0	0
Video (3G) capable phone	462	201 (42.8%)	13 (2.8%)	35 (7.4%)	213 (45.3%)
Memory stick (flash drive, USB stick)	469	435 (92.6%)	19 (4%)	3 (0.6%)	12 (2.6%)
Video game console (xBox, Playstation, Nintendo Wii)	468	245 (52.1%)	86 (18.3%)	47 (10%)	90 (19.1%)
GPS Navigation	464	74 (15.7%)	63 (13.4%)	68 (14.5%)	259 (55.1%)
Dial-up Internet access	448	55 (11.7%)	27 (5.7%)	20 (4.3%)	346 (73.6%)
Broadband Internet access	469	392 (83.4%)	62 (13.2%)	7 (1.5%)	8 (1.7%)

The technology to which students had the highest level of access is the mobile phone, with 99.8% of students having full access to a mobile and only one respondent having shared access. A large proportion of participants (42.8%) claimed to have a 3G phone, which is notably higher than the Australian standard of 25% as reported in a survey of mobile phone usage conducted around the same time by the Australian Interactive Media Industry Association (AIMIA, 2008). In terms of connectivity, the transition from dial up Internet access towards broadband access is evident, with 96.6% of students having either full or shared access to broadband Internet.

The responses relating to the use of technology in everyday life (see Table 2) showed a significant variation in the frequency of the use of certain types of technology. The percentages of daily activity in activities such as writing a blog, building a website, and using RSS feeds are low, with a majority of students having never undertaken these activities. There were also a large percentage of students who have never used the Internet to buy or sell things or do banking transactions and pay bills. Conversely, communication-based activities were more likely to be undertaken on a frequent basis, especially mobile phone communication via text message (93%) or voice call (82.1%). Online communication activities facilitated by social networking sites and instant messaging services were generally undertaken on a daily or weekly basis; however it is interesting to note that around 10% of students reported that they had never used these communication channels. This finding contradicts the themes suggested in much of the digital natives' literature which emphasises the digital natives' need for constant connectivity and communication (Prensky, 2001; Philip, 2007).

Table 2: Use of Technology in Everyday Life

Activities	n	Daily	Weekly	Occasionally	Never
Use a computer to create or edit audio and/or video	469	27 (5.7%)	47 (10%)	212 (45.1%)	183 (38.9%)
Share photos online with friends and family	470	85 (18.1%)	150 (31.9%)	207 (44%)	28 (6%)
Write a blog	469	13 (2.8%)	21 (4.5%)	127 (27%)	308 (65.5%)
Build or maintain a website	465	44 (9.4%)	34 (7.2%)	60 (12.8%)	327 (69.6%)
Download and listen to podcasts	467	43 (9.1%)	74 (15.7%)	158 (33.6%)	192 (40.9%)
Read other people's blogs	468	41 (8.7%)	87 (18.5%)	187 (39.8%)	153 (32.6%)
Use RSS feeds	454	13 (2.8%)	15 (3.2%)	57 (12.1%)	369 (78.5%)
Use a computer/game console to play games	469	61 (13%)	96 (20.4%)	205 (43.6%)	107 (22.8%)

Activities	n	Daily	Weekly	Occasionally	Never
Use a computer/mobile phone/PDA as a personal organiser	468	230 (48.9%)	49 (10.4%)	94 (20%)	95 (20.2%)
Buy or sell items online	470	21 (4.5%)	21 (4.5%)	238 (50.6%)	190 (40.4%)
Do your banking and pay bills online	469	50 (10.6%)	142 (30.2%)	121 (25.7%)	156 (33.2%)
Send and/or receive emails	468	300 (63.8%)	134 (28.5%)	29 (6.2%)	5 (1.1%)
Use a mobile phone to make calls	470	386 (82.1%)	65 (13.8%)	16 (3.4%)	3 (0.6%)
Use a mobile phone to send text (SMS) messages	470	437 (93%)	26 (5.5%)	4 (0.9%)	3 (0.6%)
Use social networking websites (ie. MySpace, Facebook)	470	301 (64%)	81 (17.2%)	40 (8.5%)	48 (10.2%)
Use instant messaging or chat (ie. MSN, Yahoo Messenger)	470	218 (46.4%)	75 (16%)	118 (25.1%)	59 (12.6%)

In relation to academic study the percentages of daily and weekly use for a number of activities were generally low. However, unlike the self-directed use of technology in everyday life, a number of the activities listed in the academic study section of the survey would only be likely to occur if incorporated into coursework (ie. write a blog, build a website) and the fact that the usage rates were low for these types of activities suggest that they are not commonly being offered as learning activities. Despite the possible lack of directed activities, the figures do suggest that these students are not adopting and adapting these technologies as part of their personal study methods, contrary to findings reported elsewhere in the literature (Conole et. al., 2008).

The notable exceptions to low usage in the academic context were the use of the University's elearning environment and the ability to access information online, which both showed high percentages of daily use (see Table 3). The continuous nature of course activities and assessments would seem to account for this trend which could be considered, at least to some extent, part of the directed nature of the course. However the use of communication tools, which are more likely to be adapted by students to suit their individual needs, showed that students use mobile technologies daily, weekly or occasionally to send text messages (87.7%) at a level only slightly lower than email (98.7%). For the purposes of academic study, regular use of social networking and instant messaging technology for communication was much lower than mobile phone and email communication.

Table 3: Use of Technology in Academic Study

Activities	n	Daily	Weekly	Occasionally	Never
Use a computer to create or edit audio and/or video	469	8 (1.7%)	22 (4.7%)	131 (27.9%)	308 (65.5%)
Share photos online	468	9 (1.9%)	27 (5.7%)	105 (22.3%)	327 (69.6%)
Write a blog	469	5 (1.1%)	6 (1.3%)	53 (11.3%)	405 (86.2%)
Build or maintain a website	464	6 (1.3%)	6 (1.3%)	35 (7.4%)	417 (88.7%)
Use a computer to create presentations (ie. PowerPoint)	465	22 (4.7%)	80 (17%)	315 (67%)	48 (10.2%)
Access information online	465	300 (63.8%)	133 (28.3%)	29 (6.2%)	3 (0.6%)
Download and listen to podcasts	465	23 (4.9%)	35 (7.4%)	129 (27.4%)	278 (59.1%)
Read other people's blogs	465	8 (1.7%)	22 (4.7%)	86 (18.3%)	349 (74.3%)
Use RSS feeds	455	5 (1.1%)	6 (1.3%)	31 (6.6%)	413 (87.9%)
Use a computer/game console to play games	463	4 (0.9%)	17 (3.6%)	32 (6.8%)	411 (87.4%)
Use a computer/mobile phone/PDA as a personal organiser	463	147 (31.3%)	68 (14.5%)	83 (17.7%)	165 (35.1%)
Access eLearning space (the University's online learning website)	465	381 (81.1%)	76 (16.2%)	6 (1.3%)	2 (0.4%)
Send and/or receive emails	466	238 (50.6%)	156 (33.2%)	66 (14%)	6 (1.3%)
Use a mobile phone to make calls	465	192 (40.9%)	89 (18.9%)	111 (23.6%)	73 (15.5%)
Use a mobile phone to send text (SMS) messages	464	229 (48.7%)	74 (15.7%)	103 (21.9%)	58 (12.3%)

Use social networking websites (ie. MySpace, Facebook)	465	87 (18.5%)	64 (13.6%)	131 (27.9%)	183 (38.9%)
Use instant messaging or chat (ie. MSN, Yahoo Messenger)	465	74 (15.7%)	47 (10%)	118 (25.1%)	226 (48.1%)

Much of the discussion around digital natives implies that the high levels of technology use in a young person's everyday life should translate directly into their use of technology for their academic purposes. In order to investigate this idea a comparison was made between similar activities across the everyday and academic contexts. Table 4 combines this data to allow easy comparison (where 'EL' refers to everyday life and 'AS' to academic study). A number of activities including the creation of audio/video, writing a blog, building websites, listening to podcasts, using RSS feeds, using technology as a personal organiser, and using email show similar patterns in relation to frequency of use, however with each the frequency is slightly higher in the context of everyday life. Inconsistent patterns of frequency of use were found in relation to reading other people's blogs, playing games, and use of mobile phones for calling and messaging. Inverse relationships were evident for the activities of sharing photos online, using social networking sites and the use of instant messaging.

Table 4: Comparison of Everyday and Academic Use of Technology

Activities	EL/AS	n	Daily	Weekly	Occasionally	Never
Use a computer to create or edit audio and/or video	EL	469	27 (5.7%)	47 (10%)	212 (45.1%)	183 (38.9%)
	AS	469	8 (1.7%)	22 (4.7%)	131 (27.9%)	308 (65.5%)
Share photos online	EL	470	85 (18.1%)	150 (31.9%)	207 (44%)	28 (6%)
	AS	468	9 (1.9%)	27 (5.7%)	105 (22.3%)	327 (69.6%)
Write a blog	EL	469	13 (2.8%)	21 (4.5%)	127 (27%)	308 (65.5%)
	AS	469	5 (1.1%)	6 (1.3%)	53 (11.3%)	405 (86.2%)
Build or maintain a website	EL	465	44 (9.4%)	34 (7.2%)	60 (12.8%)	327 (69.6%)
	AS	464	6 (1.3%)	6 (1.3%)	35 (7.4%)	417 (88.7%)
Download and listen to podcasts	EL	467	43 (9.1%)	74 (15.7%)	158 (33.6%)	192 (40.9%)
	AS	465	23 (4.9%)	35 (7.4%)	129 (27.4%)	278 (59.1%)
Read other people's blogs	EL	468	41 (8.7%)	87 (18.5%)	187 (39.8%)	153 (32.6%)
	AS	465	8 (1.7%)	22 (4.7%)	86 (18.3%)	349 (74.3%)
Use RSS feeds	EL	454	13 (2.8%)	15 (3.2%)	57 (12.1%)	369 (78.5%)
	AS	455	5 (1.1%)	6 (1.3%)	31 (6.6%)	413 (87.9%)
Use a computer/game console to play games	EL	469	61 (13%)	96 (20.4%)	205 (43.6%)	107 (22.8%)
	AS	463	4 (0.9%)	17 (3.6%)	32 (6.8%)	411 (87.4%)
Use a computer/mobile phone /PDA as a personal organiser	EL	468	230 (48.9%)	49 (10.4%)	94 (20%)	95 (20.2%)
	AS	463	147 (31.3%)	68 (14.5%)	83 (17.7%)	165 (35.1%)
Send and/or receive emails	EL	468	300 (63.8%)	134 (28.5%)	29 (6.2%)	5 (1.1%)
	AS	466	238 (50.6%)	156 (33.2%)	66 (14%)	6 (1.3%)
Use a mobile phone to make calls	EL	470	386 (82.1%)	65 (13.8%)	16 (3.4%)	3 (0.6%)
	AS	465	192 (40.9%)	89 (18.9%)	111 (23.6%)	73 (15.5%)
Use a mobile phone to send text (SMS) messages	EL	470	437 (93%)	26 (5.5%)	4 (0.9%)	3 (0.6%)
	AS	464	229 (48.7%)	74 (15.7%)	103 (21.9%)	58 (12.3%)
Use social networking websites (ie. MySpace, Facebook)	EL	470	301 (64%)	81 (17.2%)	40 (8.5%)	48 (10.2%)
	AS	465	87 (18.5%)	64 (13.6%)	131 (27.9%)	183 (38.9%)
Use instant messaging or chat (ie. MSN, Yahoo Messenger)	EL	470	218 (46.4%)	75 (16%)	118 (25.1%)	59 (12.6%)
	AS	465	74 (15.7%)	47 (10%)	118 (25.1%)	226 (48.1%)

Discussion

The analysis of the responses from the survey indicates that, for these students, access and usage of technology does not neatly fit into the stereotype of the 'digital native'. The wide variance of use, especially between everyday and academic contexts, suggest that first year university students do not form a homogenous group in relation to experience, ability and adoption of technology. This highlights the 'mismatch' that is reported in the literature between how institutions perceive students' use of technology and their actual use (Conole et. al., 2008). While general ownership and usage rates of some technologies have increased slightly in comparison with similar studies (e.g. Kennedy et. al., 2007), there are still a significant number of students who are not participating in activities which are typically associated with being a member of the digital native generation.

In examining the relationship between students' everyday life and academic study uses of technology again the variances are significant in relation to a number of activities. This research indicates that generally the frequency of use of technology for study activities is lower than everyday life usage for these students. It is unclear if this is caused by a lack of integration of technology into teaching or if students are not motivated to use technology to support their learning. Opinion on this issue diverges between those who claim that students are actively adopting and personalising technologies to support their learning (Conole et. al., 2008) and those who warn that students' inclination to adopt technology for use in their studies cannot be assumed (Selwyn, 2008). Oliver and Goerke (2008) suggested that bridging the gap between usage in academic and everyday life contexts needs to be supported by academics both in design and rationale of teaching and learning activities. In light of the differences in access and use of technology it is important to recognise that decisions about educational strategies need to be supported by empirical evidence. As Guo et. al. (2008, p.237) suggest, it is dangerous to apply generational titles to large groups of students because it may encourage academics to overlook "the intricacies of how individuals engage [with] digital media". The adoption and usage rates of certain technologies indicate that there are potential opportunities for a larger role for technology in learning and teaching in higher education (Kennedy et. al., 2008); however generational assumptions should not be the driver for such change.

The findings of this survey highlight the differences in students' access to and usage rates of technology, however it has been suggested in the literature that research into this area needs to specifically examine student perspectives of how and why they use technology in the way they do (Hargittai, 2007; Siemans, 2007; Fitzgerald, 2006; Lei, 2009). The survey upon which this research is based forms the first part of a larger PhD study into students' use of technology which investigates more specifically usage and students' adoption and adaptation of technology to support their learning needs using a case study approach incorporating interviews, experience sampling and online observation. When analysis of this data is complete it is anticipated that the findings will provide a better understanding of students' perspectives and use of technology to support learning so that policy-makers and academics can be better placed to make more effective decisions about the use of technology in higher education.

Conclusion

Generational supposition has been a key underlying theme of a large proportion of the literature around the use of technology in higher education in recent times. The findings reported in this paper show that not all students meet the reported criteria as members of this generation ('digital natives') in terms of access to and usage of technologies. Instead there is a wide variance of experiences and ownership and a significant proportion of non-adoption. In comparing the use of technology between the contexts of everyday life and academic study it was also seen that students who participated in this study were less likely to use technology to support their study. These are important considerations for educators implementing technology as part of academic study and in the development of policies and strategies for learning and teaching in higher education. While these results help inform the debate, future research is needed to investigate how and why students adopt technologies to support their academic study and examine the implications for the use of technology in higher education.

References

- AIMIA Mobile Industry Group (2008). *Australian Mobile Phone Lifestyle Index*, http://www.aimia.com.au/news/events/AMPLI%202008/AIMIA_ReportAugust2008_FULL_Final.pdf. [viewed 12 Oct 2009].
- August 2008 Barlow, J.P. (1996). *Declaration of the Independence of Cyberspace*. <http://homes.eff.org/~barlow/Declaration-Final.html>. [Viewed 13 Oct 2009].

- Barnes, K., Marateo, R.C. & Ferris, S.P. (2007). Teaching and learning with the net generation. *Innovate*, 3(4). <http://www.innovateonline.info/index.php?view=article&id=382> [viewed 1 April 2007].
- Bennett, S., Maton, K. & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence, *British Journal of Educational Technology*, 39(5), pp. 775-786.
- Benson, D.E. & Makolichick, J. (2007). Conceptions of Self and the Use of Digital Technologies in a Learning Environment, *Education*, 127(4), 498-510.
- Bullen, M., Morgan, T., Belfer, K., & Qayyum, A. (2009). The Net Generation in Higher Education: Rhetoric and Reality. *International Journal of Excellence in e-Learning*, 2(1),
- Conole, G., de Laat, M., Dillon, T. & Darby, J. (2008). 'Disruptive technologies', 'pedagogical innovation': What's new? Findings from an in-depth study of students' use and perception of technology. *Computers and Education*, 50, 511-524.
- Dede, C. (2005). Planning for Neomillennial Learning Styles. *EDUCAUSE Quarterly*, 28(1).
- Fitzgerald, R.N. (2005). Understanding informal learning with technology: Insights for ICT integration. In P. Kommers & G. Richards (Eds.), *Proceedings of EdMedia* (pp. 948-954). Chesapeake, VA: AACE.
- Garcia, P. & Qin, J. (2007). Identifying the Generation Gap in Higher Education, *Innovate*, 3(4). <http://innovateonline.info/index.php?view=article&id=379> [viewed 5 April 2007].
- Guo, R.X., Dobson, T. & Petrina, S. (2008). Digital Natives, Digital Immigrants: An analysis of age and ICT competency in teacher education. *Journal of Educational Computing Research*, 38(3), 235-254.
- Hargittai, E. (2007). A Framework for Studying Differences in People's Digital Media Uses. In N. Kutscher & H. Otto, *Cyberworld Unlimited*, (pp. 121-137). VS Verlag fur Sozialwissenschaften/GWV Facverlage.
- Helsper, E. & Eynon, R. (2009). Digital natives: where is the evidence?. *British Educational Research Journal*, iFirst Article, doi:10.1080/01411920902989227
- Howe, N. & Strauss, W. (2000). *Millennials rising: the next great generation*, New York: Vintage.
- 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. In *Who's learning? Whose technology? Proceedings ascilite 2006* (pp. 413-417). Sydney: Sydney University Press.
- 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*. <http://www.ascilite.org.au/conferences/singapore07/procs/kennedy.pdf> [viewed 31/03/2008].
- Kennedy, G., Judd, T.S., Churchward, A. & Gray, K. (2008). First year students' experiences with technology: Are they really digital natives?. *Australasian Journal of Educational Technology*, 24(1), 108-122.
- Lang, J. M. (2007). A Brain and a Book. *The Chronicle of Higher Education*, 53, C.2.
- Lee, M.J.W & Chan, A. (2007). Pervasive, life-style-integrated mobile learning for distance learners: an analysis and unexpected results from a podcasting study, *Open Learning*, 22(3), 201-218.
- Lei, J. (in press). Quantity versus quality: A new approach to examine the relationship between technology use and student outcomes. *British Journal of Educational Technology*.
- McLoughlin, C. & Lee, M. J. W. (2008). Mapping the digital terrain: New media and social software as catalysts for pedagogical change. In *Proceedings ascilite Melbourne 2008*.
- Oblinger, D., & Oblinger, J. (2005). Is it Age or IT: First Steps Toward Understanding the Net Generation. In *Educating the Net Generation*. EDUCAUSE (pp. 2.1-2.20).
- 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.
- Philip, D. (2007). The Knowledge Building paradigm: A model of learning for Net Generation Students. *Innovate*, 3(5).
- Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, 9(5).
- Prensky, M. (2004). *The emerging online life of the digital native: What they do differently because of technology, and how they do it*. <http://www.marcprensky.com/writing/default.asp> [Viewed 13 May 2007].
- Selwyn, N. (2008). An investigation of differences in undergraduates' academic use of the internet. *Active Learning in Higher Education*, 9(11), 11-22.
- Skiba, D. J. (2007). Nursing education 2.0: second life, *Nursing Education Perspectives*, 28(3), 156-157.
- Stryker, S. & Burke, P. (2000). The Past, Present, and Future of an Identity Theory, *Social Psychology Quarterly*, 63(4), 284-297.
- Tapscott, D. (1998). *Growing Up Digital: The Rise of the Net Generation*. New York: McGraw-Hill.
- Trinder, K., Guiller, J., Margaryan, A., Littlejohn, A., & Nicol, D. (2008). *Learning from Digital Natives: Integrating formal and informal learning*. Final project report. Higher Education Academy, UK. <http://www.academy.gcal.ac.uk/ldn/LDNFinalReport.pdf> [viewed 30 May 2008].