

Digital Literacy in the 21st Century: Fact or Fiction?

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Abstract: The world is becoming increasingly digital and this is affecting the way in which we learn and live. Learners who do not have access to technology and are unable to make use of technological resources are thus at a distinct disadvantage. Many South African school-leaving students who enroll for an ICT course at a university in South Africa struggle to bridge the gap between secondary and tertiary level. This results in a number of students failing to pass ICT courses at tertiary level. In this study, 266 students were asked about their access to and use of technology. Data was collected from 91 first year students enrolled for an ICT course at a university in South Africa in 2012 and then compared to 175 students who completed the same survey in 2008. The results portrayed varying levels of access to and use of most technology. Although digital literacy has improved over the last 4 years it is still not optimal. To this end, a teaching-and-learning intervention may be necessary to reduce the gap.

Introduction

In the 21st century, social activity has been mediated through digital facilities such as e-mail, newsgroups, message boards, internet telephony, chat rooms, instant messaging, and digital video conferencing, making digitally enabled communities a way of life. Not only have social communities grown, the Internet also offers limitless information. In this context, Martin writes that “out of all of the challenges offered by a digitally infused society, the question of how individuals can understand, and cope with, the digital world becomes a significant one” (2006:7). It can be deduced that being digitally literate is not only being proficient in the use of computers but also having the skills needed for reading and writing with them (Kope, 2006). Digital literacy can therefore be seen as more than mastering a specific skill; it is achieved when certain digital competences are thoughtfully deployed in authentic life situations in solving a problem or completing a task (Martin, 2006). In the context of life, work and education it is important for an individual to be aware of their own digital development and to realize that digital literacy is an ongoing process that depends on the needs of the situation. Those who are not digitally literate will be at a distinct disadvantage as the world is being significantly impacted on by digital technologies.

Mark Prensky in his much publicized article, *Digital Natives, Digital Immigrants*, identified two different groups of people, those who had grown up with technology and spent their entire lives surrounded by and using computers, videogames, cell phones, Internet and all the other tools of the digital age, known as *Digital Natives*, and those who were not born into the digital world but, at some later stage in their lives, adapted to most aspects of the new technology, known as *Digital Immigrants* (2001:1,2). Digital natives and digital immigrants are also referred to as ‘Generation Y’ and ‘Generation X’. Generation Y, offspring of the ‘baby boomers’ (children of the first post-war generation), were roughly born between 1980 and 2000 and Generation X 1979 and before. A study conducted by Saatchi and Saatchi, found that “digital media has collectively made Generation Y members more positive and optimistic than Generation X, instilling in the former greater confidence in mastering their destiny” (The New York Times, 1999). The study also found that digital media enhances Generation Y’s intellectual and social sophistication by increasing its access to information. It is thus clear that being digitally literate is a desirable state in modern society. However, an assumption is made that all students entering universities are ‘digital natives’ and therefore had a digital upbringing which is not the case, as it is clear that not all members of all societies are equally digitally

literate. In South Africa, a developing country, this state of affairs is particularly evident as unequal access to ICT's persists and has resulted in what is often referred to as the 'digital divide' (Czerniewicz *et al*, 2005).

Schooling between ethnic groups in South Africa differs vastly. This originated from an era in 1948 known as the whites-only apartheid rule (Boddy-Evans, 2001). During this era, funding allocated to schools varied greatly between the different ethnic groups. Schools catering for black children inevitably received far less resources than their white counterparts. This action further entrenched the policy of inequality. Disparities in unequal funding meant that there was a lack of facilities in schools as well as a lack of teachers, with many teachers being under-qualified for the positions that they held: "The 'liberation now, education later' stance taken during the years of the anti-apartheid struggle severely damaged the culture of learning and teaching in schools and universities" (du Plessis, Janse van Rensburg & van Staden, 2005:878).

Since the apartheid era (post-1994), many educational policies have changed to equalize educational inequalities. Although the South African Government is trying to rectify the imbalances in education, the apartheid legacy still remains in the poorer rural provinces such as Kwazulu-Natal and the Eastern Cape. The schools in wealthier provinces, such as the Western Cape and Gauteng, generally have better educational resources (South African Information Reporter, 2006). In order to rectify this situation, the government is identifying low income areas and giving the schools in those areas more funding than higher income areas (Ocampo, 2004). Rural schools face many challenges that are foreign to their urban counterparts, and these hurdles need to be overcome before any form of ICTs can be introduced to improve their access to quality education. This means that many South African first year students only gain exposure to computers when they first enroll at university.

The Study

In view of the fact that many schools in South Africa do not have ICT access, first-year programming students studying at the University of Johannesburg, South Africa, come from diverse educational backgrounds. Many of these students are on the 'wrong side' of the digital divide when embarking on their computer studies. This could be one of the reasons why they are not successful in passing their first year. Barraket and Scott argue that "poor information literacy limits students' motivations and capacity to access available resources" (2001:4). Therefore, it would seem that the students on the 'wrong side' of the digital divide would always be catching up and their peers on the 'right side' of the digital divide would always be at an advantage. In addition, as "ICT is particularly important for the social inclusion of those who are marginalized" (Warschauer, 2003:28), students may feel that they are being socially excluded. This means that many students who envisaged becoming IT specialists when they embarked on their studies will follow a different career path from the one they imagined.

Most research that has been published on 'digital literacy' comes from developed countries and very little focus has been placed on developing countries. The aim of this paper is thus to measure whether these first year programming students' access to and use of technology has improved from 2008 to 2012. Furthermore, to determine whether 'digital natives' are in fact a worldwide phenomenon or if they are only part of the developed world.

The questionnaire developed by Kennedy *et al* (2008) was adapted for this survey to identify first year programming students' access to and use of technology. Data was collected from the students enrolled for the National Diploma: Business Information Technology in 2012 and then compared to students who completed the same survey in 2008. One hundred and seventy five students completed the survey in 2008 and 91 in 2012. Students repeating subjects were omitted from the study. All of the students who completed the survey were born between 1980 and 1995, which means that they can be categorized as 'digital natives'. The average age of the students was 20 years of age. Of the 266 collective students who participated in the study 63% were male and 37% female. The majority of the students' home language was 20% Zulu, 17% Tswana and 15% Sotho with only 11% of the students speaking English as a first language. Most of the students were South African (91%) with the remaining students coming from neighboring countries: Democratic Republic of Congo (3%), Angola (2%), Zimbabwe (1%), Zambia (1%), Kenya (1%) and Swaziland (1%).

Findings

The first year students were asked to indicate their access to 12 different technologies, excluding campus access. As illustrated in Table 1 the number of students who had access to a desktop computer in 2008 has decreased by 6% in 2012. This could be due to the fact that more students now have access to portable computers than they did in 2008 as indicated by the increase of portable computers by 54%. Internet access has increased remarkably with a 35% increase in wireless Internet access. Access to PDA's, MP3 and MP4 players is marginally down and digital cameras, and video games consoles marginally up. Access to memory sticks and web cams is significantly higher. This could be due to the fact that in 2008 students were still using stiffy disks as a storage media and web cams were not built into portable computers as they are today.

Types of Technology	2008		2012	
	Yes	No	Yes	No
Desktop computer	59%	41%	53%	47%
Portable computer	27%	73%	81%	19%
Electronic organizer (e.g. PDA)	17%	83%	8%	92%
MP3 Player (e.g. iPod)	58%	42%	38%	62%
MP3/4 Player with video capabilities	34%	66%	32%	68%
Digital camera	53%	47%	58%	42%
Memory stick (e.g. flash drive, USB stick)	66%	34%	98%	2%
Dedicated video games console (e.g. Playstation)	42%	58%	45%	55%
Web cam	6%	94%	62%	38%
Dial-up internet access	17%	83%	27%	73%
Broadband internet access	11%	89%	32%	68%
Wireless internet access	22%	78%	57%	43%

Table 1: Access to Technology

The first year students were also asked to indicate how often they used certain technologies. Students were asked a series of questions, broken into two categories namely (1) Internet usage, and (2) mobile phone usage. The data indicates the amount of time students used these technologies. Students were asked to rank their usage as either: once a day or more; once/twice a week; once/twice a month; once twice a year or never. For the purpose of this paper, these classifications have been grouped as either daily, weekly, monthly, less than monthly or not used. Due to space limitations we have only considered the percentage of students who do not use the technology.

Table 2 represents the results of students' Internet usage. The data illustrates that 40% more students use the Internet to look up information for study purposes and 32% more students use the Internet to browse for general information. Students on the whole use the Internet more than they did in 2008 for leisure activities, from downloading podcasts to reading blogs. In 2008, 50% of students did not use the Internet to send or receive emails whereas in 2012 this percentage is only 2%. Social networking is also more popular, with only 7% of students not using it as opposed to 55% in 2008. Worth noting is that 83% of students do not have their own websites, 79% of students do not keep their own blogs/vlogs and 65% of students do not use the Internet to Skype. This may be due to students not finding them useful.

Internet Usage	How Often									
	Daily		Weekly		Monthly		Less than Monthly		Not Used	
	2008	2012	2008	2012	2008	2012	2008	2012	2008	2012
	%	%	%	%	%	%	%	%	%	%
Use the web to look up information for study purposes	11	44	23	34	15	17	8	2	43	3
Use the web to browse for general information	14	52	21	32	20	11	10	2	35	3
Use the web to listen to sound recordings	10	25	10	29	13	20	9	4	58	22
Use the web for other pastimes	12	33	14	26	13	9	9	7	52	25
Use the web to buy or sell things	0	0	2	2	2	12	3	13	93	73
Use the web/internet to send or receive email	10	52	19	36	13	7	8	3	50	2
Use the web/internet for instant messaging / chat	14	48	9	20	9	4	6	7	62	21
Use the web to build and maintain a website	1	2	2	1	2	7	5	7	90	83

Use social networking software on the web	10	70	9	18	17	5	9	0	55	7
Use the web to download podcasts	2	23	4	13	8	17	4	12	82	35
Use the web to publish podcasts	0	9	1	3	1	7	1	6	97	75
Use the web to download and/or share music/video files	12	36	12	35	23	14	11	5	42	10
Use the web to share photographs or other digital material	5	22	3	23	7	17	8	10	77	28
Use the web to make phone calls e.g. Skype	1	4	1	8	3	12	3	11	92	65
Use the web for webconferencing	1	2	1	3	2	7	1	11	95	77
Use the web to read RSS feeds	3	5	1	11	6	14	6	11	84	59
Use the web to keep your own blog or vlog	0	7	2	6	1	2	1	6	96	79
Use the web to read other people's blogs or vlogs	1	8	4	15	4	18	7	13	84	46
Use the web to comment on blogs or vlogs	1	10	3	11	2	12	6	8	88	59
Use the web to contribute to the development of a wiki	1	7	1	0	2	7	2	13	94	73

Table 2: Internet Usage

Table 3 represents the results of students' mobile phone usage. The data illustrates a remarkable increase in mobile phone usage on the whole. More students use mobile phone features in 2012 than they did in 2008 with an astounding increase of 56% of students using their mobile phone to send and receive emails, 43% using the GPS feature and 48% using the instant messaging service. In 2008, 30% of students did not use their mobile phone to access information on the Internet whereas in 2012 this percentage is only 6%.

Mobile Phone Usage	How Often									
	Daily		Weekly		Monthly		Less than Monthly		Not Used	
	2008	2012	2008	2012	2008	2012	2008	2012	2008	2012
	%	%	%	%	%	%	%	%	%	%
Use a mobile phone to call people	70	89	17	9	4	0	2	0	7	2
Use a mobile phone to text / SMS people	73	91	15	6	4	3	2	0	6	0
Use a mobile phone to take digital photos or movies	48	66	23	19	15	7	3	7	12	1
Use a mobile phone to send pictures or movies to others	36	59	20	18	20	13	7	6	17	4
Use a mobile phone to make video calls	7	17	6	7	8	12	9	15	70	49
Use a mobile phone as an MP3 player	60	81	11	11	5	2	4	1	20	5
Use a mobile phone as a personal organiser	44	50	17	18	13	16	5	5	21	11
Use a mobile phone to access information/services on the web	31	67	16	18	18	8	5	1	30	6
Use a mobile phone to send or receive email	9	54	5	15	12	19	8	2	66	10
Use a mobile phone or GPS to navigate	9	29	8	13	7	20	9	14	67	24
Use a mobile phone to access to instant messaging services	16	54	4	8	5	11	4	4	71	23
Use a mobile phone to post entries in blog	2	5	1	12	4	6	3	6	90	71

Table 3: Mobile Phone Usage

The findings illustrate that although students' access to and use of technology has improved over the last four years, as seen in Figures 1 and 2, the improvement is not at optimal levels when compared with the rest of the world as seen in Figures 3 (Stats SA, 2012 & Internet World Stats, 2012) and 4 (CIA, 2012).

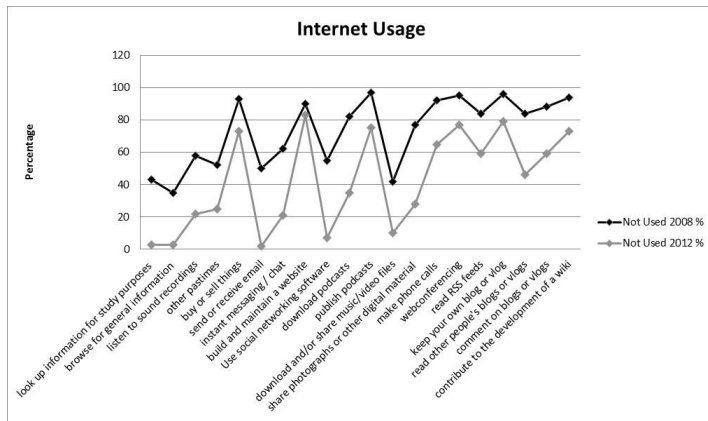


Figure 1: Internet Usage (Summary)

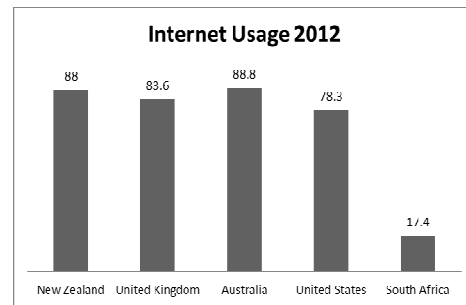


Figure 3: Worldwide Internet Usage

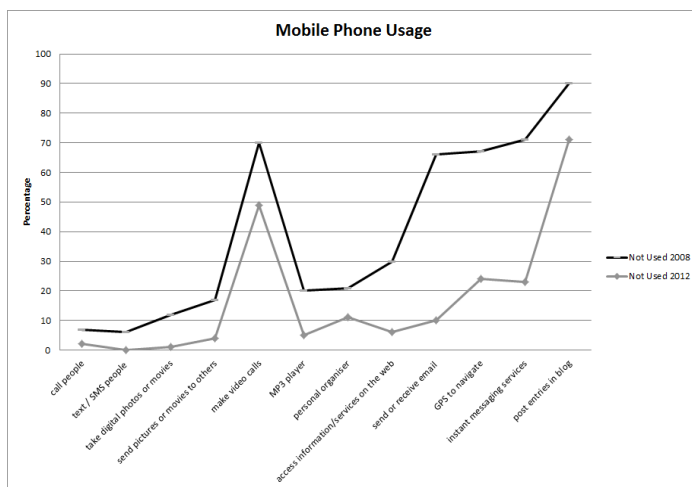


Figure 2: Mobile Phone Usage (Summary)

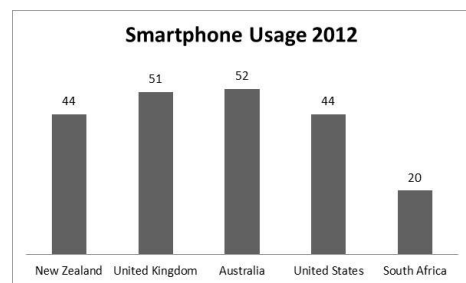


Figure 4: Worldwide Smartphone Usage

While many students are digitally literate when entering tertiary learning, the majority of students are not well equipped for such learning. Given these findings, the challenge for lecturers in South Africa is to ensure that the design of ICT curriculum is developed in such a way as to cater for a wide range of students. In order to ease this burden, a teaching and learning intervention in the form of a bridging course or summer school program may be beneficial. Such programs may provide an opportunity to bridge the gap between the digitally illiterate and literate students.

Conclusion

Being computer literate in the modern world will impact learning and, therefore, not being digitally literate means that in certain learning contexts, learning may not be optimal. This paper has shown that students' studying at the University of Johannesburg in South Africa begin their first year studies with a range of ICT abilities. Some are experienced game players, use the web for blogging or e-mail purposes, develop their own web sites and are proficient in several software packages, whilst others have never used a computer. Therefore, students who are classified as 'digital natives' by default of the year in which they were born, may not be as digitally literate as their counterparts around the world.

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