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Undergraduate Student Nurses' Use of Information and Communication Technology in Their Education

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Abstract

Students expect to use technology in their study just as they use technology in other aspects of their life. Technology is embedded in the day-to-day work of nursing, and therefore needs to be integrated in education to prepare students to assume professional roles and develop skills for lifelong learning. A quantitative descriptive study, using an anonymous survey, explored how undergraduate student nurses from one New Zealand school of nursing, access information and communication technologies for their learning. In total 226 completed questionnaires were returned (75%). Nearly all students (96%) have smart phones, all students have a computer and 99% use the university learning management system daily or several times a week. The search engine most commonly used to find information for assignments was Google Scholar (91%), with only 78% using subject specific academic databases. Implications from this study include the need for charging stations and further education on information searching.

Keywords: *New Zealand, Surveys and Questionnaires, Educational Technology*

Introduction

Today's nursing students are part of "Generation Z", sometimes also referred to as the "net-geners", "digital natives" or as part of the "Google generation", who are characterised by wanting to be connected and being in constant communication with their peers [1]. The ease of access to devices and internet connectivity is key for many of these young people in every aspect of their lives. Mobile technologies, internet access, social media and free online material is revolutionizing the way students learn, communicate and collaborate [2]. However, as faculty we do not often know what devices our students have or how they are using these. This study, undertaken at one school of nursing in New Zealand, involved surveying all undergraduate nursing students in 2015 to understand their access to information and communication technologies (ICT) in relation to their learning.

Background

Nursing students, particularly those who recently left school are used to having easy access to information [1]. They are also more likely to have been exposed to ICT at school, however, their personal access to technology may be dependent on funds, both for devices and internet connectivity [3]. All nurses need to be prepared for increased use of technology in the health arena, and exposure to technology may be usefully incorporated into nursing education.

Educational technology relates to technologies that facilitate education. Today's students undertaking higher education, expect to use technology in the course of their study, just as they use technology in many other aspects of their life [4]. Further, technology is embedded in the day-to-day work of many professions, including nursing, and therefore it should be integrated in the learning paradigm to ensure students are prepared to assume professional roles and develop skills for lifelong learning [5]. To make best use of technology in the education of nurses there is a need to understand student nurses' access to, and use of, ICT in relation to their studies. This is particularly important as the internet and mobile technologies have revolutionized how students find, consume, and interact with content [4]. This highlights the need to know what devices students are using, how they communicate and collaborate with each other and access learning materials.

In 2016 trends predicted for the next five years in higher education include the use of blended learning approaches, enhanced learning management systems with advanced feaures such as dashboards to inform students of their progress and Bring Your Own Device (BYOD) [4]. Additionally, learning resources are increasingly available via mobile devices [3]. However, until we know what devices students have access to then it is difficult to include new technologies and innovations into teaching practice as there may be issues of equity of access to learning resources if not all students have their own devices.

The United Kingdom is suggesting that every nurse needs to be an e-nurse so all nurses are ready with the digital capabilities for 21st century nursing [6]. The role of nursing education is to prepare the future nursing workforce so nursing education needs to prepare nurses for working in a digital world. Institutes of higher education, such as the university that is the context for this study, often assume student's personal access to devices and their skills on-line in the context of their learning. However, there has been little evidence to support these assumptions.

Context for this study

This study was undertaken in one school of nursing in New Zealand. New Zealand is a small country in the southwest of the Pacific Ocean, with a population of 4.8 million [7]. There are 17 schools of nursing in New Zealand who take students to complete a three year bachelor programme to qualify as a Registered Nurse. The school this study took place is located in a university with a smaller than average yearly intake of only 110 students. The university recognises the need to provide "high quality infrastructure and services to support outstanding teaching, learning, research and community service" [8]. Additionally, the university strategic plan describes an

increasingly "technologically sophisticated student body" [8] and the graduate profile states students from this university will have "an ability to make appropriate use of advanced information and communication technologies" [9].

While the university provides excellent library services with both physical and on-line library access and learning support, there are additional services such as a Student Learning Centre, an Information Commons, with computers and printers, and Student Services Online which helps guide students through admission, course advice, enrolment, grades and finances. There is an assumption that students have the skills and access to technology for online support.

Educational technology provided centrally by the university include a learning management system (this university uses Canvas), an e-portfolio used by students of the health professions (Chalk and Wire) and anti-plagiarism software (Turn It In). Students are also provided with a university email account along with wireless internet access. However, to make best use of technology in the education of nurses there is a need to understand student nurses' access to, and use of ICT in relation to their studies.

Methods

A quantitative descriptive approach was used to determine undergraduate student nurses access to information and communication technologies in the context of their learning. All 302 students enrolled in undergraduate Bachelor of Nursing courses in semester two 2015 were invited to respond to a short anonymous questionnaire estimated to take no more than ten minutes to complete. The questionnaire was distributed at the end of a class by a research assistant. Ethical approval was obtained for this study (UAHPEC Reference Number 014905).

The survey tool had been developed and used with students at the University of Copenhagen, Denmark [2] and permission to use the tool was obtained from Professor Lars Kayser. Minor modifications for language and local context were made. For example, the questions on software use are focused on the most commonly used options as the University has a site licence for Microsoft Office. Demographic information such as gender, age or ethnicity was not collected due to concerns it would impact on maintaining participants' anonymity. Data was collated and analysed using the software package IBM SPSS Statistics.

Results

Participants

The questionnaire was distributed to the whole student body of 302 students and 226 completed it, giving a response rate of 74.8%. Students were asked to indicate which year of the programme they were enrolled in and 83 were from first year (37% of students responding), 67 from second year (30%) and 76 from third year (33%). Enrolment data identifies students as predominantly (82%) coming directly from school and 10% are males.

Personal Equipment

All students have mobile phones and 217 (96%) of these were smart phones able to access the internet. Two main operating systems dominate, with 57.5% using iOS and 37.2% using Android. All students have a personal computer (PC) or laptop, with 95.1% owning a laptop or notebook and 40.3% owning a desktop computer. Of those with desktop PCs, 73.9% use the Windows operating system and only 26.1% use iOS. Whereas of those with laptops or notebooks, 57.8% use Windows and 41.8% use iOS (one person was unsure, making up the other 0.4%). In addition, 35.7% of the students have a tablet, 60% of these use iOS, 23.7% use Android, and 16.3% use Windows. When asked about the battery life of their mobile computing devices the majority (n=58, 25.7%) had 4 to 6 hours battery life (Table 1).

Table 1 – Battery life of mobile devices

	Number of students	Percent
0-2 hours	18	8.0
2-4 hours	42	18.6
4-6 hours	58	25.7
6-8 hours	54	23.9
8-10 hours	22	9.7

Software Use

Most students are familiar with word processing software with 95.57% indicating being 'very familiar' or 'familiar', whereas with spreadsheets the majority (39.38%) are only familiar 'to some extent' with this type of programme. In relation to their familiarity with reference management software (EndNote or RefWorks), 34.07% reported being not at all familiar with this type of software, and only 8.4% were very familiar (Table 2). Of those students who use a smart phone or tablet, 67% have downloaded at least one new app in the last month, and 36.7% have apps that they use only in relation to their studies.

Table 2 – Familarity with software

	Word Processing		Spread sheets		Reference manage-ment	
	n	**%**	**n**	**%**	**n**	**%**
Very familiar	175	77.43	55	24.34	19	8.41
Familiar	41	18.14	51	22.57	21	9.29
To some extent	7	3.10	89	39.38	66	29.20
A little familiar	2	0.88	22	9.73	43	19.03
Not at all familiar	1	0.44	9	3.98	77	34.07

Use of university online services

Almost all students use the university learning management system regularly; 79% (n=178) on a daily basis and a further 20% several times a week. The same applies to university email, with over 91% (n=207; 91.59%) using it daily or several times a week. However, Student Services Online is not used frequently by the majority of students; only 9.3% use SSO on a daily basis, with most students (30.53%) only using it several times a month (Table 3).

Finding information in relation to assignments

The most commonly used search engine used when finding information for assignments was Google Scholar (n=206; 91%), with only 78% (n=177) using subject specific academic databases (such as the Cumulative Index for Nursing and Allied Health Literature (CINAHL) and 62% (n=139) using the university library search engine (Figure 1).

Table 3 - Student use of university services

	Learning Management System		University Email		Student Services Online	
	n	%	n	%	n	%
Less than monthly	1	0.44	1	0.44	28	12.39
Once a month					16	7.08
Several times a month			2	0.88	69	30.53
Once a week	1	0.44	13	5.75	46	20.35
Several times per week	46	20.35	60	26.55	45	19.91
Daily	178	78.76	147	65.04	21	9.29
Do not use			3	1.33	1	0.44

Second and third year students were more likely than first year students to use narrow search engines to find information in relation to assignments ($chi^2 = 24.65$, $p = .00$) and subject specific databases ($chi^2 = 49.07$, $p = .00$).

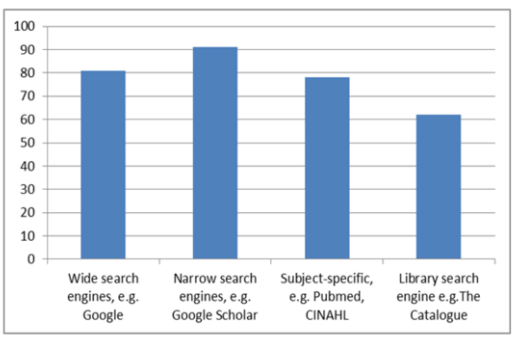

Figure 1 – Percent of students finding information for assignments

Discussion

The results of this survey provide useful baseline information about which ICT devices students are using and how they are using them. Knowing this may impact on future decisions of where technology is used in teaching and learning, therefore providing important information to inform teaching practice within the school of nursing that was the context for this study.

Furthermore, knowing what technology students currently use and have access to has the potential to lead to inclusive teaching and learning initiatives that can be transformative. However, any educational innovation needs to be accessible to all students and equity of access is paramount. This study found students use all three of the common operating systems: iOS, Android and Windows, so any teaching and learning initative needs to take this into account. As the 2016 Horizon Report indicates educational innovation can foster a culture of innovation, which many institutes of higher education are striving to achieve [4].

This study found that all students have a personal computer (PC) or laptop, with a number having both a desktop and mobile device. The students in this study are predominantly straight from school and so are younger and reflect the Generation Z need for access to information through their ICT [1].

While there are recognised beneficial effects of using mobile devices to access resources there are also challenges or barriers [3]. One of these is that students' use of their devices is dependent on power, either directly or through batteries and the ability to recharge these as needed. Issues with battery life has been found in other studies [3]. This has implications for institutes of higher education to provide plenty of charging stations and also power points within lecture theatres, study areas and the library.

Changes to library services are indicated in the results from this study with students strong use of online resources to access information for their assignments. Rather than a reliance on the physical library and shelves of books and journals, it has been suggested the emphasis needed to be on teaching online searching skills [4]. This study supports this notion and students need support and practice to further develop and refine their skills to search for specific information.

Limitations of this study include that with a response rate of 75% there was still a quarter of students who did not participate. Given the importance of knowing what devices students have, a recommendation from this study is to consider collecting this data on enrolment. Futhermore this study only included nursing students at one school of nursing. The school of nursing that was the context for this study in located within a university and based in a large urban centre and represents the charactierstics of only one student body. Repeating this study within other schools of nursing is indicated as their students may differ in terms of age range and socio-economic factors that may influence ownership of ICT devices. Additionally this study did not address issues with WiFi or internet connectivity, nor the cost for students having their own devices, yet the literature indicates these are important considerations also [3].

Conclusion

A survey of undergraduate students in one New Zealand school of nursing found all students had a personal computer, either desktop, laptop or notebook, and a mobile phone, though these were not all smart phones. These findings highlight the need for battery charging facilities so students can continue to use their own devices. While the results of this survey provides a useful baseline for this school of nursing, it is noted that these students may not be representative of all nursing students, and each school is advised to undertake their own survey to understand their own students' access to, and use of ICT in relation to their studies. While students were found to be accessing online resources to complete their assignments further education to improve and focus their searching for online material is indicated.

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