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ONLINE OFF-TASK? IMPACT OF PRESERVICE TEACHERS' USE OF MOBILE DEVICES DURING CLASS

Carolyn Broadbent (a)*, Jill Burgess (b)
*Corresponding author

(a) PO Box 256 Dickson ACT 2602 Australia. E-mail: Carolyn.broadbent@acu.edu.au
(b) PO Box 256 Dickson ACT 2602 Australia. E-mail: jburge2019@gmail.com

Abstract

Over the past decade dramatic shifts in the educational landscape have led to a proliferation of technology use during university classes, including the increased use of laptops, tablets and smartphones and surreptitious focus on social network sites, such as Facebook, Twitter.
This study explores the nature of and time spent by preservice teachers on the use of technology in class unrelated to academic work. The research utilises predominantly quantitative methods, including a survey distributed to ninety-five preservice teachers at an Australian university, for the collection of data, analysis and discussion of results. Results indicate that eighty-four percent of preservice teachers use social media and internet sites unrelated to their academic work during lectures, workshops and tutorials of one or more hours per week, with more than a third indicating over three hours. Links to engagement, the impact on learning and need for further research in the field are highlighted and explored.

Keywords: Preservice teachers, technology use, engagement in learning, university, social networks.

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1. Introduction

1.1. Impact change in universities

Higher education institutions in Australia have experienced increased pressure to broaden opportunities for young Australians to participate in education. The trend has led to significant increases in enrolments (Universities Australia, 2013) and the proliferation of technologically driven teaching and learning environments such as Massive Open Online Courses (MOOCs) and, concurrently, larger class sizes in the more traditional lecture and tutorial modes of study (Norton, Sonnemann, & McGannon, 2013). Lecturers have responded by adopting innovative pedagogical methods such as the use of mobile technology devices, including tablets, laptops and smartphones. Such devices have also been used regularly by university students in a variety of settings and have become the standard for note taking, recording, photographing work, and searching the Internet within the academic learning environment at university (Roberts & Rees, 2014; Witecki & Nonnecke, 2015). While students regard mobile devices as highly useful in such university contexts, ready access to the internet and social network sites (SNS) has changed the forms and depth of students' engagement in the teaching and learning process. As Glasby (2015, p.14) states, the impact of the digital technologies and changing needs of learners requires a significant change of thinking for universities, for example:

> First, universities must understand that creating knowledge and sharing it with students is no longer enough and second, universities will have to be much more self-reflective and self-critical when it comes to what they do, with more focus on the students (Gallagher & Garrett, 2013, p.10).

While the impact of the changes to pedagogy and delivery mode has been noted, less attention has been given to the impact on lecturers often challenged by the apparent reduction in student engagement during their on-campus classes (Bates, 2015).

Roberts and Rees (2014) utilised a survey to investigate the use and duration of mobile devices within one-hour lectures and found that the majority of mobile device use in class was related, helpfully, to lectures and on-task requirements. Research of higher education students by Kay and Lauricella (2011), however, found that students used 25-50% of their class time off-task for communication activities such as personal emails and instant messaging. The study found that structured use of laptops resulted in more time taken by students on academic activities and that unstructured use of laptops resulted in lower overall course grades and more off-task behaviour. Earlier studies found, conversely, that a laptop-free format resulted in higher performance when compared with unstructured use of laptops (Fried, 2008; Hembrooke & Gay, 2003).

1.2. Need for change

Some researchers have argued that the use of computers in classrooms can be a distraction both to users and other students thereby impacting on the quality of the learning experience (Wurst, Smarkola, & Gaffney, 2008). Students who used laptops were often viewed by lecturers as not on-task (Kay & Lauricella, 2011) and using laptops to take notes was found to be detrimental to learning (Mueller & Oppenheimer, 2014). The OECD (2015) report, *Students, computers and learning: Making connections*, states that the

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impact of technology used in the school classroom is 'mixed at best', with 'no appreciable improvements in student achievement in reading, mathematics or science in countries that had invested heavily in ICT for education' (p.15).

Australian universities, including the one in the present study, have sought to embrace more innovative models of practice that accommodate and strengthen the engagement of students in the teaching and learning process. They have sought to provide an increased focus on blended learning that combines online components with face-to-face lectures (Andrews & Tynan, 2011; Chigeza & Halbert, 2014) along with numerous in-class tools and technology-based strategies such as games and gamification, wearable technologies (NMC Horizon Report, 2013) and use of social media (Dyson, Vickers, Turtle, Cowan, & Tassone, 2014). These have been met with varying levels of success resulting in the need to seek new approaches that stimulate higher levels of student interest and motivation to engage more purposely in learning.

There is considerable research literature that focuses on what students do with the technology used in class and the technology they are using (Norton, Sonnemann, & McGannon, 2013; Roberts & Rees, 2014; Witecki & Nonnecke, 2015); fewer studies address the amount of time spent by students in class connected to the Internet and utilising SNS unrelated to their academic work. This research study aims to help address this gap in the research literature while also reflecting on the impact of students' in-class behaviours and level of active participation in the teaching and learning environment.

Accurately observing students' use of technology, which may also be undertaken as part of regular in-class work (Kay & Lauricella, 2011), and recording students' covert use of technology to access SNS without a direct focus on each mobile device over the entire lecture, workshop or tutorial period (Kraushaar & Novak, 2010) can prove difficult. Research by Witecki and Nonnecke (2015) found that the effects of unstructured use of other mobile devices on student engagement and on-task behaviour, resulted in similar outcomes for students, while Kay and Lauricella (2011) found that instant messaging and emailing to maintain social networks were rated as the highest off-task behaviours during class time.

1.3. Social network sites

Boyd and Ellison (2007) distinguished between the interchangeable terms used in public discourse of "social network sites" and "social networking sites". They argued that participants on SNS are not necessarily looking to meet new people, relationship initiation or networking, but instead the primary practice is interacting with individuals who are known to them as part of their existing social network.

While numerous definitions for SNS (Social Network Sites) exist, this research adopts that provided by Boyd and Ellison (2007). From this perspective, SNS are:

> Web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site (p. 211).

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Population numbers accessing social network sites such as Facebook, Twitter, emails and blogging websites have grown at a phenomenal rate and while numbers appear to have levelled off for Facebook, there continues to be a preoccupation with SNS, such as Facebook, Twitter, emails and websites. In the United States 87% of those aged 18-29 years use Facebook, 37% Twitter, 53% Instagram, 34% Pinterest and 23% LinkedIn (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015). In Australia 97% of those aged 18-29 years use Facebook and up to 79% access social media every day, with Facebook users spending on average 8.5 hours each week, or the equivalent of a full working day, on Facebook (Sensis Social Media Report, 2015). While some researchers indicate that scientific literature addressing addiction to SNS is scarce, there is anecdotal case study evidence of the potential for mental health problems for some users (Kuss & Griffith, 2011). The impact of this problem on family, work and social life engagement has also been highlighted by numerous researchers (Kuss & Griffith, 2011; Masur, Reinecke, Ziegele, & Quiring, 2014).

The relationship between frequency of Facebook use and student engagement was found to be both positively predictive of time spent in co-curricular activities and negatively predictive when playing games (Junco, Heiberger, & Loken, 2010). Earlier studies found that better psychosocial outcomes can arise with targeted use of Facebook (Gordon, Juang, & Syed, 2007), the Internet (Ellison, Steinfield, & Lampe, 2011) and improved academic outcomes using Twitter (Junco, Heiberger, & Loken, 2010).

In a study of Faculty staff, Moran, Seaman and Tinti-Kane (2011) found that 91% of teaching staff used at least one social media site for professional purposes and/or in their classes. Online videos, podcasts, wikis and blogs were considered valuable sites for use in classes; however, many Faculty staff believed Facebook (53%) and Twitter (46%) had a negative value for use in class with barriers to their use. Eighty-one percent indicated that 'social networks take more time than they are worth' (p.14). Dyson, et al (2014) found that the inclusion of Facebook use within courses did not actually result in higher engagement and understanding of course content. Their study highlights that successfully integrating social network sites into the university classroom also brings challenges, including the complex interaction of students' attitudes on using social network sites for academic purposes, timing of content delivery and the alignment and integration with course assessment.

Junco (2012) utilises Astin's original five tenets of engagement to conceptualise student involvement on and use of, a social network site, in this case, Facebook:

1) Engagement refers to the investment of physical and psychological energy: Students invest a great deal of psychological energy in using Facebook, as evidenced by usage statistics;
2) Engagement occurs along a continuum: Some students are more engaged on Facebook than others, while some don't use social media at all;
3) Engagement has both quantitative and qualitative features: Students can spend a great deal of time using Facebook (quantitative feature) and may engage in a wide variety of activities on the platform (qualitative features);
4) The amount of student learning and development associated with an educational program is directly related to the quality and quantity of student engagement in that program: It is possible that Facebook use is related to real-world student engagement in some tangible ways.

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5) The effectiveness of any educational practice is directly related to the ability of that practice to increase student engagement: If Facebook indeed increases engagement, it is possible for Facebook to be used in educationally relevant ways to improve student academic outcomes (p.164).

1.4. Digital competencies

Recent changes to Government and professional bodies require new teachers to have achieved the required Australian Professional Standards for Teachers (APSTs) and to ensure exiting pre-service teachers are classroom ready at the completion of their degree. Of further importance is that exiting pre-service teachers are cognisant of the values, ethical behaviours and characteristics that underpin the principles of the profession. They must also be competent with digital technologies.

The way in which universities provide for the learning needs of preservice teachers and work to ensure their students are well versed in the use of the emerging technologies is instrumental in terms of the level of engagement in learning at university. Learning environments that reflect the 'real world' of students are more likely to promote active engagement in learning.

2. Problem Statement

Over the past decade dramatic shifts in the educational landscape have led to a proliferation of technology driven teaching and learning environments and increased use of digital technologies at universities, including the increased use of laptops, tablets and smartphones and the intensive focus on social network sites, such as Facebook and Twitter. While the impact of these changes has been noted regarding mode of delivery, less is known about students' preference for and use of mobile devices during classes at university. The increased use of these devices in university classes has for many, changed the dynamics of the teaching and learning environment at university leaving some lecturers challenged by the apparent reduction in student engagement in their on-campuses classes (Witecki & Nonnecke, 2015).

3. Research Questions

What is the nature of preservice teachers' use of mobile devices during class?
How does preservice teachers' use of mobile devices transform teaching and learning environments and lecturers' pedagogical practices?

4. Purpose of the Study

The purpose of this research study is to explore the nature and time spent by preservice teachers on the use of mobile devices when undertaking on-campus classes at a university. The research also aims to identify preservice teachers' level of engagement and preferences for learning, including off-task learning, during on-campus classes and the impact of changing levels of student engagement on academic staff. This research study aims to bring further understanding to this complex issue.

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5. Research Methods

The research presented in this paper forms one component of a larger study of preservice teachers from one campus of a multi-campus Australian university. Some outcomes, relating to incidence of classroom bullying, of the larger study were presented at the 2019 ICEEPSY Conference in Athens (Broadbent & Burgess, 2018). The sample comprised 95 preservice teacher education students undertaking a Bachelor of Education Primary (n=50) or Bachelor of Education (Early Childhood and Primary) combined degree (n=43) or Bachelor of Education/Arts (Secondary) degree (n=2). The main study utilised predominantly quantitative research methodologies for the collection of data.

This paper focuses on Section 5 of the original survey, which comprised 7 Sections as shown below, and explores the nature of and time spent by preservice teachers on the use of technology, such as laptops, tablets and smartphones, in on-campus classes unrelated to academic work. The process, which involved self-assessment, required participants to indicate an hour range to estimate the time spent accessing social network sites (SNS) and other Internet sites that were unrelated to their academic work among their other digital technology usage time. They indicated that they used technology (one of more of the following: laptop, PC, tablet, mobile phone, other) for set hours each week. At this university campus, wireless access to the internet is available to all students both inside and outside university lecture and tutorial rooms.

5.1. Data Collection Instrument for the main study

This survey was distributed to ninety-five preservice teachers at this Australian university for the collection of data, analysis and discussion of results. The questionnaire included seven sections:

Section 1: *About you* (to gain information about the participant, including age, cultural heritage, university year level and degree)

Section 2: *Bullying* (to ascertain what the participant knew in the area)

Section 3: *How you behave with others* (investigating participants bullying behaviours towards others)

Section 4: *How others behave towards you* (investigating bullying behaviour from others experienced by the participants)

Section 5: *About your use of technology* (investigating the participants use of technology and accessing the Internet and SNS both at university and home)

Section 6: *Your activities in cyberspace* (investigating participant cyberbullying behaviours towards others)

Section 7: *Your experience in cyberspace* (investigating cyberbullying behaviour from others experienced by the participants)

Results for Sections other than Section 5 were provided in the paper by Broadbent and Burgess (2018). This paper addresses the Section 5 component.

Results are shown in Table 1 and Figure 1.

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Table 1 shows percentages of periods of time related to usage patterns for digital technology devices.

Figure presents the data in graphical form to highlight outstanding features of time spent in technology use.

5.2. Limitations of the Study

This research project has utilised a survey for the collection of data. All participants did so anonymously, which may have worked in favour of improved reporting; however, the use of self-reporting questionnaires can also result in both over and under reporting. This research study was conducted at one campus of a multi-campus university and therefore the findings cannot be necessarily generalised to other locations.

6. Findings

The findings of this research clearly demonstrate that digital technologies have become an integral part of students' lives and central to the way in which they engage with the educational learning environment at university. As evidenced from the data collected, some 11% of preservice teachers in this study make use of their mobile phones an astonishing 50 plus hours per week (Figure 1). For the younger generations who are studying for professional careers, most notably as primary or early childhood teachers in this study, it is apparent that portable devices are closely linked with their thoughts and actions during waking hours with 98% (effectively 100%, Table 1) using the internet at home albeit for varying hours (69% for 3 to 20 hours, over 10% for more than 30 hours at home). The technology is in use widely not only at home but also at university (95% outside classes) and 84% use social media and internet sites unrelated to their academic work during lectures, workshops and tutorials of one or more hours per week, with more than a third indicating over three hours (Table 1). Of the devices used, mobile phones dominate although over a wide range of hours. 3 to 10 hours per week total use of these devices was claimed by 42% of students (Table 1).

The implications for lecturing staff are obviously far reaching in view of the admission that such a high percentage of this usage is unrelated to the lecture content being presented at the time. These results highlight the need for lecturers to be able to harness this usage pattern and utilise 21st Century pedagogies that offer flexibility to encourage learning that 'can be collaborative or co-constructed in one instance and an individual undertaking the next' (Baroutsis, 2018, p. 4). Unless lecturers involve students in the purposeful use of digital technologies, they will remain challenged in their communication efforts due to the competing attention between the message they hope to convey and the students' use of laptops and mobile phones during on-campus class time.

Ongoing support for lecturers and preservice teachers alike is needed to ensure the importance of technological advances, including software, programs and other forms of communication, is recognised as a core component of students' learning at university. Educational pedagogies and interactive learning spaces should be integral to students' learning experiences and aim to regain and enhance the relationship between lecturer and learner to build a cohesive and stimulating interactive learning environment. Of

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importance also is the need to build an environment that supports all students to engage effectively in the learning inclusive environment, including both basic and advanced levels for success.

Given the rapidity of change, the ongoing development of new technologies will continue to be an essential component of universities, workplaces and young peoples' lives. In education, access to innovative learning environments for students and lecturers is essential; this is especially so for preservice teachers who will become the teachers of the future. Encouraging internet group discussions on topics relevant to the curriculum may prove to be beneficial to student teacher learning and ultimate use of technology themselves in their classroom practices. There are also implications for lecturers who may continue to face ongoing challenges related to new technologies. Of importance is that lecturers are fully supported to embrace the new technologies to build collaborative and connected teaching spaces that reflect 21st century pedagogies, self-directed learning and higher levels of student engagement. Facilitation of effective learning pedagogies and creative learning environments that are both relevant and productive are essential. Harnessing the use and value of new technologies to support effective communication and achievement of teaching and learning objectives both in and out of class is a critically important objective most suited to modern day life.

Table 01. Time usage patterns for technology used by students, per week

	Internet use at university	**Unrelated use of SNS/I in classes**	**Internet use at home**	**Internet use other than uni/home**	**Laptop use**	**PC use**	**iPad use**	**Mobile use**
1-2 hours	43%	45%	5%	42%	19%	16 %	20%	12%
3-10 hours	39%	31%	40%	16%	31%	9%	22%	42%
11-20 hours	11%	5%	29%	0%	22%	2%	8%	16%
21-30 hours	1%	1%	6%e	0%	9%	1%	2%	9%
31-40 hours	0%	0%	8%	1%	5%	1%	0%	5%
41-50 hours	1%	0%	1%	2%	2%	1%	3%	2%
50+ hours	0%	2%	9%	2%	6%	1%	1%	11%

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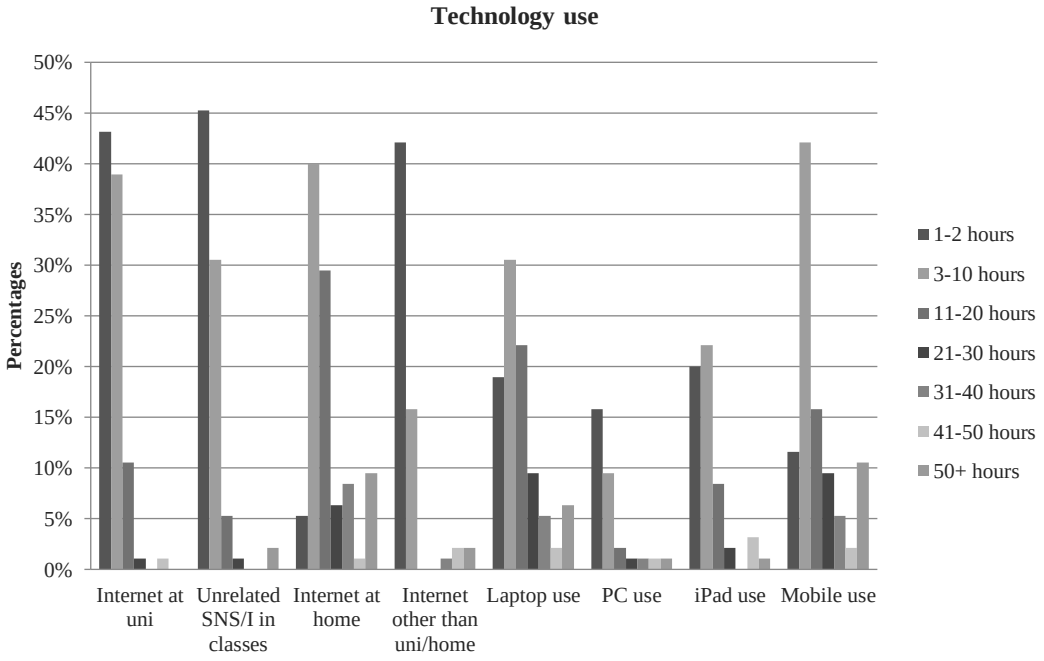

Figure 01. Comparative hours of use

7. Conclusion

The findings of this study, focused on preservice teachers' use of technology during university classes, are that eighty-four percent of preservice teachers use social media and internet sites unrelated to their academic work during lectures, workshops and tutorials of one or more hours per week, with more than a third indicating over three hours. The findings from this small research study contribute to the research literature available and align with the findings of earlier research in this complex area, such as the study by Kay and Lauricella (2011) that focused on lecturers' perceptions of students use of laptops (off task). The study highlights the need for a deeper understanding of preservice teachers' preferences for learning and their propensity to engage in new and more creative pedagogies that strengthen class interaction, critical thinking and purposeful engagement in the learning process.

Recognition of the professional learning needs of lecturers is also of importance and it is essential that adequate time is required to ensure lecturers are able to engage in professional learning opportunities that support the development of new skills and pedagogies reflective of 21st Century learning practices, including group activities involving the internet. More confident lecturers familiar with relevant software programs and various forms of technology and motivated students should together be able to connect more authentically in on-campus teaching and interactive learning spaces at university. Therefore, the adoption of a proactive approach towards the provision of professional learning opportunities and support for lecturers by the university, as well as the development of new policies that counter negative influences, in the ongoing introduction of new technologies is essential.

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