THE DIGITALIZATION OF SOUTH AFRICAN HIGHER EDUCATION TO SUPPORT LEARNING: ARE STUDENTS FACING A DILEMMA?

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Abstract

The advancement in digital technology continues to alter the conventional order in the adoption and usage of technological innovation from a top-down approach (institutions to individuals) to bottom-up approach (individuals to institutions). This change is more notable in higher education institutions where the implementation of the Bring Your Own Device (BYOD) concept continue to grow at an astounding pace. This is in response to changing educational environment and increasing technology usage. The digitalization of education has pushed students towards the use of devices to access their institution’s network resources. This has led to what is termed Bring Your Own Device (BYOD), where students bring their personal devices with the genuine intention of gaining access with them to access university resources. The concept promises to enhance learning and improve student productivity while avoiding issues associated with budget constraints and the consumerization of technology. The article seeks to provide a snapshot of student ownership of mobile devices in a rural university. The results show that although a substantial number of students have access, majority of students purchase these mobile devices themselves. Students use these devices for accessing course materials even though learning activities were not optimized for use with mobile devices in the institution. Most concerning is that most of the students surveyed do not use their preferred devices to support their learning because of the cost component. The paper concludes with suggestions that higher education institutions (HEIs) can employ to support the digitalization of their institutions.

Keywords: Digitalization, devices, dilemma, BYOD, adoption, HEIs.

1 INTRODUCTION

Educational institutions are facing a paradigm shift towards social construction of knowledge where competencies such as self, relating to others and participating and contributing are core elements of today’s skill sets (Bolstad, Gilbert, McDowall, Bull, Boyd, & Hipkins, 2012). As the implementation of bring your own device (BYOD) concept continue to grow at an astounding pace, heads of higher institutions (HEIs) are faced with the dilemma of how to incorporate this initiative into the curriculum while continuing to increase the overall value of education. This has resulted in the digitalization of education: are universities facing a dilemma? The goal of digital technology is to support individuals to develop to their full potential and to experience success in ways that matter to them and their communities (Bolstad et al., 2012). Currently, there are increasing number of educational institutions undertaking mobile device initiatives. However, many heads of institutions are struggling having to operate under tight budget constraints and resource shortfalls, leaving them unable to afford school-owned devices for students when the demand for them is on the rise.

These increasing demand for using these mobile devices in the context of learning environments is therefore a valid question. The consumerization of technology products generally plays an important role in this situation, considering the significant personal investment of students in these devices. The past decade has seen the proliferation of various mobile devices such as laptops, netbooks, application-based tablets and smartphones. These devices are internet-enabled with a variety of applications that seem full of promise for the personal use of students. The increasing demand for using these mobile devices in the context of learning environments is therefore a valid question. The consumerization of technology products generally plays an important role in this situation, considering the significant personal investment of students in these devices. The trend has led to the dramatic reduction in the prices of these devices. This confluence of conditions has fostered the idea that students could use their own device at school (Dixon and Tierney, 2013), and therefore, more and more students are coming to school with their own device.

Institutions are therefore gradually turning to the concept of BYOD in response to changing educational environment and increasing technology usage. This new trend allows students to bring a personally owned device for the purpose of learning (Stavert, 2013). It focuses on changing the mode
of teaching and learning in schools rather than just equipment use. Thus, it changes teaching from “management to service delivery” since emphasis will no longer be on tools, or a standardized learning environment (Sweeny, 2012:8). BYOD provide solutions to better enable and provide the benefits of technology such as digital education resources to enhance learning and improve student productivity while avoiding issues associated with budget constraints and the consumerization of technology.

2 RELATED LITERATURE

2.1 Bring Your Own Defined

The bring your own device concept was introduced by Intel in 2009 in response to the growing importance of employees to use their own devices for accessing corporate resources and network. The concept allows employees to use their personally-owned IT devices to stay connected, access data from, or complete tasks within the scope of a provided IT service for business purposes. The word “device” goes beyond just hardware such as laptop, tablets, notebook as it covers even a hotspot (Lang, 2012). Users of BYOD programs are able to access employer-provided services on their personally-owned devices. In the educational context, BYOD refers to technology models where students bring their personally-owned devices to school for the purpose of learning. A personally owned device is any technology device brought into the school and owned by a student (or the student’s family), staff or guests” (Alberta Education, 2012, Stavert, 2013). Thus, by this trend, students literally bring their own device to school in order to access internet or school network by 3G or Wi-Fi, be it laptop, tablet, smartphone or other mobile device.

One argument for the use of BYOD trend is its potential to effectively utilize institutional resources. In the corporate world, employees leave their official computers unutilized after office hours, weekends and public holidays. Similarly, students in some campuses are not allowed to use their personal devices. DeWitt (2013) argues that just like in the workplace, schools ban devices that make them uncomfortable. However, because of the consumerization of technology, both the corporate and educational sectors have accepted and adopted BYOD. For the employer, BYOD is an efficient means of cost cutting in IT equipment. For employees, it offers an opportunity and flexibility to choose technology of their choice to do their office work. For students, BYOD allow them to work with technology which they are already comfortable and familiar (Horizon Project, 2013), and are able to engage in more intellectual, conceptual, analytical and creative thinking. School authorities are free from the pressure of buying school-owned devices for students and staff at a time that the demand for these devices is increasing rapidly.

2.2 Bring Your Own Device Trend in South African Higher Education

The appearance of BYOD in educational institutions was the result of the pressure from students for institutions to resolve issues related to their connectivity needs. It was realised that allowing students to access the institution’s network from their personally-owned devices rather puts them on competitive advantage.

Globally, access to mobile technology has been recognized as providing new opportunities for students to enter the digital realm (UNICEF 2012) and a key enabler for expanding teaching and learning. The use of educational technologies as learning tools for enhancing teaching and learning is highly recognised in South African universities (Bozalek et al. 2013), and BYOD has become part and parcel of student life. In fact, some universities are encouraging the use of mobile devices in lecture halls and are asking students to bring their own device to access online educational resources. This effort is highly acknowledged by the Department of Higher Education (DHET) and is encouraging universities to expand their online resources and have collaborative learning (DHET, 2013). Given the desire to improve accessibility and successful use in the universities, it is imperative that the role of technology in curriculum initiatives aimed at improving teaching and learning be better understood by all stakeholders.

The socioeconomic and digital imbalances in South Africa requires that government continue to pursue and develop initiatives to enhance ICT access (UNICEF, 2012). The complex connection between students’ accessibility to ICTs, their home language and the socio-economic backgrounds of students are relevant in the higher education sector (Brown & Czerniewicz, 2010). This issue is acknowledged in universities in South Africa. In response to this problem, some universities have created an initiative where they negotiate cost-effective purchasing scheme for students to acquire
laptops and tablets. Despite this, the share numbers of poor students present a significant cost and hence the educational values of these mobile devices need to be demonstrated before funding can be acquired. Some universities have therefore implemented their specific strategies to facilitate and investigate the use of ICTs in the lecture halls. Progress in the implementation of such strategies is often hindered by perceptions that such initiatives would disadvantage students who do not have access to mobile devices, particularly students from lower socio-economic status backgrounds (Handal, Ritter & Marcovitz, 2014).

2.3 Objectives of the Study

Given the importance of digital technology in the South African context, the article seeks to identify whether the assumptions of mobile learning initiatives disadvantaging students who do not have access to mobile devices, particularly students from lower socio-economic status backgrounds were accurate or whether universities would more readily be able to adopt mobile learning initiatives that rely on students bringing their own devices. The article however has the specific aims of:

- Investigating the factors that facilitate the adoption BYOD in universities
- Exploring how the BYOD initiative impact on learning and teaching
- Exploring the challenges of BYOD in universities

3 RESEARCH METHOD

Students of a comprehensive rural university in the Eastern Cape province of South Africa were approached to participate in the online survey as well as face-to-face focus groups. The aim of the research is to provide an insight into how university students perceive mobile learning initiatives and the dilemma they face when they are asked to bring their personal mobile devices to support learning. By way of ethics, students were under no obligation to participate in the research and were free to withdraw at any stage.

3.1 The Research Instrument

A quantitative online survey was developed in March 2018 in response to the prevalence of mobile devices available to students in universities with the aim of connecting them to the institutions' network for resources to support their learning process. There is often the perception that this initiative disadvantages students from lower socio-economic status backgrounds (Farley, Murphy, Johnson, Carter, Lane, Midgley, Hafeez-Baig, Dekeyser, and Koronios, 2015). The study was designed to establish whether these assumptions were accurate or if universities can implement the initiative that rely on students bringing their personal hardware devices to connect and use a university's computer network to support their learning. The survey consisted of four sections: 1) student demographics, 2) benefits, 3) student challenges of the initiatives, and 4) usage of the initiative by students to support learning.

To enable comparison, questions were asked about smartphones, laptops and desktop computers. The survey was administered online using blackboard. Students were notified of the study verbally. The survey data was collected between April and May 2018. The survey was followed by on-campus focus groups held in June 2018. The data presented in this article is drawn from a subsection of the questions from the quantitative online survey. The results from the on-campus focus group are not explicitly presented but specific examples may be drawn out from those transcripts to further explain specific points.

3.2 Survey Participants

A final sample of 317 students participated in the online survey which consisted of 118 males (37%) and 199 (63%) females. Majority of participants (87%) were continuing students and doing undergraduate studies (89%). The age range of students was between 17 and 29 with a mean age of 22.6 years (SD = 2.83). The demographic characteristics of respondents are presented graphically in Figure 1.
4 RESULTS

4.1 Accessibility and usage of devices to support learning

Personal mobile devices are important in the implementation of the BYOD initiative in higher education institutions (HEIs). However, one of the arguments against the implementation of BYOD in HEIs is the potential disadvantage to students who do not have access to mobile devices and technologies associated with it (Farley et al. 2015). While the implementation of BYOD in HEIs is not new, in a resource-constrained environment access to mobile technologies cannot be assumed. The findings of the current research study identified that only a small proportion of students do not own mobile device of some sort (6%). Ownership of or access to these mobile devices is widespread with 78% of students reporting of having to purchase their own device to support their learning. With the persistent socioeconomic and location-based digital divides in South Africa, it is imperative that government continues to pursue and create initiatives to optimize ICT access (UNICEF, 2012), as student accessibility to mobile devices through efforts of their institution was 16%. Figure 2 also presents data from the survey about the current and preferred mobile device used by students to support their learning. The figure shows that students in the sample mostly use tablet computers to support their learning (39%), yet laptops (29%) and smartphones (26%) are nearly equally split when it come to the use of mobile devices to support their learning. Nonetheless, majority of students sampled (57%) preferred to use laptops.
Further analysis was conducted using chi-square tests to determine if there were any differences between different classifications of students and their access to mobile devices. Differences in the access and usage of mobile devices by students (students purchasing their device, devices supplied by university or do not own or have access to device) was assessed against five demographic questions; the student's gender (male or female); proficiency in the use of mobile devices for learning (yes or no); awareness of BYOD concept (yes or no); undergraduate or postgraduate study; and first year of study (yes or no). The results are presented in Table 1.

**Table 1. Access and usage of mobile technologies for supporting learning.** *Sig difference p<.05*

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Access to and usage of tablets and laptop computers by students to support learning is relatively high across all groups of students, although some significant differences are apparent. Male students (47%) and students doing their undergraduate studies (39%) were significantly less likely to have access to and use laptop computers for learning compared to female students (63%, n = 317, p = .005) and postgraduate students (73%, n = 317, p = .019). Similarly, male students were significantly less likely to have tablets as compared to female students (69%, n =317, p = .002). Students with access to standard mobile phones (51%) and desktop computers (39%) were however significantly less aware of BYOD concept compared to students without standard mobile phones (71%, n = 317, p = .009) and those without desktop computers (63%, n = 317, p = .001).

Students use these devices for a range of learning activities. Survey participants were therefore asked about the types of activities by lecturers that were designed to engage students.
Pre-recorded lectures with PowerPoint were used extensively (97%), followed by access to course material on blackboard (91%) (see Figure 3). Learning activities used less frequently by lecturers included discussion forums (43%), instant messaging (25%), live lecture capture (7%), and wikis (3%). Further analysis revealed significant difference in learning activities using wikis as experienced by postgraduate, compared to undergraduate students. Postgraduate students were more likely to have experienced wikis (78% vs. 32%, n = 317, p = .027).

Students were asked to indicate which of these learning activities is most likely to improve engagement with their course on 5-point likert scale from Strongly Agree to Strongly Disagree (see Figure 4).

The learning activity considered by students to have a high impact on improving engagement were discussion forums (M = 54.6, SD = 0.24), pre-recorded lectures with PowerPoint (M = 55.8, SD = 1.10) and access to course material on blackboard (M = 61.6, SD = 1.80). None of these learning activities were optimised for use with mobile devices in the institution.
4.2 Strategies for HEIs to support students in their use of mobile devices for learning

Given that access to and usage of mobile devices is high among all student groups to support their learning (see Figure 2), it seems the most efficient and easy entry into mobile learning for HEIs, lies in supporting what students already do. Students are usually power users of mobile devices and not in favour of slowing down in the HEIs (Crompton, 2013). The following strategies were formulated as a result of the research. These steps could be taken by HEIs irrespective of institutional environment to support students in using their mobile devices for informal learning.

4.2.1 Implementation

The initiative of asking students to bring their own device to campus to support their learning should be embraced institutionally as this will bring with it institutional-wide changes in approaches to teaching and learning rather than an isolated ‘thing’. In a whole institutional approach resources and skills could be marshalled from different sources meaning commitment from all lecturers rather than a select few.

4.2.2 Cost of owning devices

For this new paradigm of teaching and learning that involve students providing their own mobile devices, cost can be prohibitive. HEIs should consider funding of devices for students as it will allow for a one-to-one access and help improve sustainability of this initiative and promote support. For students, owning a device can serve as a bridge between formal school learning and informal learning (learning off campus). Students have the opportunity to use the device in both situations. Owning and using devices means students become familiar with it, they understand and applications can be customized for use which in turn can reduce the amount of training on the device.

4.2.3 Innovative style

HEIs should create an enabling environment for innovative use of ICTs for teaching and learning. Lecturers must be encouraged to innovative in their teaching. Students must no longer be made to sit passively in the lecture hall, but instead be encouraging with complimentary material online. HEIs must invest in building network that offer the opportunity for students to use online resources via their personal devices rather than supplying and upgrading their platform so that all students can access virtual learning environments. This approach is a less expensive way of getting students involved. Student devices should be incorporated into the learning activities they do as part of the module design. Many students have devices that are more current, powerful and flexible than the institutions. This capability can be used by lecturers to leverage these technologies in keeping up with the rapid of technological advancement.

4.2.4 Accessibility

HEIs must develop a robust technology infrastructure to ensure accessibility for all students. Although the idea behind this paradigm is HEIs shifting the cost of technology onto students, they can make investments in building a Wi-Fi network with enough capacity to support an expanding number of devices per student and thereby increase accessibility.

5 CONCLUSIONS

The increasing prevalence of mobile devices in higher education institutions have motivated research with students. Although higher education institutions are excited about the potential of mobile technology on campus, students are grappling with the issues associated with using their mobile devices to support their learning. For most students, the cost of owning mobile devices is prohibitive enough as this concept allow HEIs to shift the cost of devices onto students. As result of this cost component, students are not able to acquire their preferred mobile device to support their learning. It is essential for HEIs irrespective of their situation to support students in using their mobile devices to support their learning since there is no sign of them slowing down on the use of mobile devices on campus.
REFERENCES