4TH IR – IMPLICATIONS FOR HIGHER EDUCATION BY LOOKING AT THE USE OF MOBILE TEACHING DEVICES

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Abstract

Students and lecturers use mobile devices more and more and within a few years they will become indispensable tools in the classroom. Recent research clearly indicates that mobile devices such as smartphones, laptops and tablets are the tools of choice for students, scholars, teachers and lecturers. It will play a major role in teaching and learning, especially in higher education as the 4th IR, the development of artificial intelligence and new ways of communication need to take their place in the classroom. The integration of these new technologies into the teaching and learning experience in the classroom will be dependent on effective pedagogical implementation and planning to be successful. Taking this into account, this paper explores the effect that mobile devices have in the classroom on the teaching and learning experience of the student. The advantages of the implementation of mobile devices must be weighed against the negative influence they may have. All of the participants in the study reported that they have access to and use mobile devices to access the internet to source information.

Keywords: Mobile technology, 4th IT, 4th industrial revolution, higher education.

1. Introduction

During the 4th industrial revolution (4th IR) the world will see the emergence of a new form of higher learning institutions. These institutions will have no classrooms, no library and no onsite lecturers. The institutions will be inter-disciplinary, will have virtual classrooms and laboratories, the library will be online and the lecturers will either be virtual or located anywhere in the world. Higher Education in the 4th IR is creating an exciting but complex opportunity which has the potential to transform society for the better. Artificial intelligence is driving the 4th IR and the needs of the workplace will be transformed from task-based orientation to human-centred characteristics. Due to the merging of "man" and machine, the distance between social sciences and humanities as well as between technology and science will be reduced. This will necessarily require more interdisciplinary teaching, research and innovation. All the components of the "new" higher education system will be inter-dependable of each other, but will also remain independent of each other.

2. Aim

The main purpose of higher education will always remain the same and that is to ensure quality of learning via teaching; to enable the students to be exposed to technology and the latest knowledge through research, and innovation to sustain the development of societies by means of service. One of the foremost tasks of every university is to educate and prepare the youth. Therefore, it is necessary to use the most appropriate, current and innovative teaching strategies and to organise the teaching experience in a way that promotes learning. This has implications on learning programmes, better learning experience, and the cultivation of lifelong learning attitudes. The impact of the 4th IR and the utilisation of mobile teaching devices on higher education need to be researched and t understood. The question is what the impact of the 4th IR will be on higher education.

3. Literature review

Our society has been transformed by technology which has changed our lives irreversibly over the last 25 years. In the education and training environment technology and especially mobile technology has become an essential tool for the modern student. The digital age caused an upsurge in access to information, as well as increased and immediate interaction between people. Bilbao-Osorio, Dutta, and Lanvin (2013) stated, in their study on the state of global information technology, that the number of mobile subscribers will reach 6.9 billion worldwide in the year 2020. They indicated that the use of mobile technology in the form of tablets, phones and laptops is on the increase at all universities and even schools.

3.1. Role of technology in learning

Researchers have indicated that student engagement is the aspect of learning that focuses on the activities in which students are involved during their studies and which promote learning and result in their academic achievement (Sidelinger, Frisby & Heisler, 2016). While researching student engagement researchers suggested that the main objective of education is for students to construct their own knowledge (Covington, 2017; Sidelinger et al., 2016). Therefore, a research study which examines the influence of mobile devices on learning, engagement, and performance shall be relevant and valuable.

3.2. The effect of mobile technology on academic performance

Radesky, Schumacher & Zuckerman (2015) argue that mobile devices do have a noteworthy influence on academic performance by causing distractions. However, several studies found that mobile technology does not have any effect on the student's academic performance (Heflin, Shewmaker & Nguyen, 2017; Rabiu, Muhammed, Umaru, & Ahmed, 2016). Student performance was linked with cell phone use during class time in a study by Duncan, Hoekstra, & Wilcox (2012). They found an average negative grade difference of 0.36 ± 0.08 (on a four-point scale) for students who reported regular cell phone use in class. Information from the same study revealed that students accessed their phones at a rate of seven times per class period.

3.3. Educational benefits of mobile devices

It is time that we start thinking of cell phones as computers. The description of cell phones seems unclear. Several terms are used by researchers such as cell phones, mobile phones, portable media players, tablet computers or smartphones (Al-Emran, Elsherif & Shaalan, 2016). In an academic setting there are many effective uses for cell phones, such as supplementing the class experience and getting tutoring assistance from instructors (Tao & Yeh, 2013). They found in their study that using cell phones to augment teaching helped increase the quality and quantity of student feedback. Students use their mobile devices to access other media such as the Internet, Facebook, Twitter, YouTube, and other information communication technology. Bannon, Martin, & Nunes-Bufford (2012) suggested that the use of social media by college students ages 18 to 34 was increasing. Gikas and Grant (2013) explored the process of integrating mobile technologies into teaching and learning. The faculty members at the institutions where they conducted their research incorporated mobile technologies into their courses. They concluded that the use of mobile technologies in these institutions of learning resulted in positive outcomes that would make learning a meaningful and fruitful experience for the students.

4. Methodology

An integrated methodology, the FraIM (Frameworks for an Integrated Methodology) was followed with the research. FraIM integrates qualitative and quantitative methods in a way that is argued will enable a researcher to employ a mixed methods approach with any research project (Plowright, 2011). It is appropriate for carrying out small-scale empirical investigations that are aimed at evaluating, developing, and improving an understanding of practice. It can be applied to research undertaken for a programme of study in a university setting. It can also be deployed to solve problems in a variety of professional, vocational and workplace contexts and locations. (Fourie-Malherbe *et al.*, 2016).

4.1. Limitations

The sample group was small- and the-time frame was limited. Another limitation was access to all the new technologies that are available to demonstrate and for students to have hands- on interaction (Rossing et al., 2011). The target group consisted of 85 students (52 females and 33 males) enrolled in their 3rd year of the B Ed (SP & FET) Technology qualification.

4.2. Findings

This research focused on how the 4th IR impacted on students' engagement and learning in the classroom using mobile devices.

- 65% of the participants reported that other students' use of mobile devices distracted them from paying attention in class, while 33% disagreed with this notion and 2% of the participants were uncertain. This finding indicates that the use of mobile technology by other students in class distracted other classmates from paying attention in class.

- 25% of the participants reported that they played games on their mobile devices in class, while 65% disagreed with this and 10% of the participants were uncertain. This finding indicates that a quarter of the participants were not constantly focusing on learning in class.

- 70% of the participants reported that they enjoy the use of mobile devices for classroom activities, while 8% disagreed with this notion and 22% of the participants were uncertain. The participants reported that they enjoy the availability of more information than what is given by the lecturer.

- 68% of the participants reported that the use of mobile devices in the classroom facilitated their ability to collaborate with other students, while 20% disagreed with this notion and 12% of the participants were uncertain. This finding indicates that many of the participants were able to collaborate with others, using mobile devices in class.

- 65% of the participants reported that they concentrated better on their studies when using mobile devices, while 15% disagreed and 20% were uncertain. The participants who reported that mobile devices helped them to concentrate more on their studies validated this by stating that they could confirm the validity of the information received while learning, they could easily connect with their peer groups, take notes in the class and get informed videos for better understanding on their studies. Thus, this finding indicates that many of the participants concentrated better on their studies when using mobile devices in class.

- 48% of the participants reported that they access social media in the classroom during the lecture, while 30% disagreed and 22% were uncertain. This finding indicates that many of the participants do not pay attention in class when using mobile devices.

- More than 70% of the participants reported that they do use their mobile devices in class to access learning material online in the classroom during the lecture, but the worrying factor is that up to 75% of the participants use their mobile devices in class for non-academic purposes.

- 82.3% of the participants reported that they use their smartphone in class to access the information needed, but the small screen of the smartphone is seen as a problem and it makes it difficult to read the notes. Only 2.4% use their laptops in class and the main reason for this is the lack of power outlets to charge laptops.

- 98% of the participants reported that they use the free university Wi-Fi for their data connection even if it is slow. The 2% of participants that use their own data packages are still not registered due to circumstances out of their control such as bursaries.

5. Summary of findings

Based on the data the beneficial use of mobile technology in the classroom, together with the students' need to use the technology, and the potential for future academic preparation had a substantial influence on students' learning and engagement. It shows clearly that mobile technology has its place in the classroom and that the advantages far outweighs the disadvantages.

6. Discussion

The findings of this study are in line with several other studies on the impact of mobile devices in the classroom. The 4th IR will only increase the availability of mobile devices; even some that do not even exist today. Over the last few year students have increasingly benefited from electronic technologies, podcast lectures, online courses, educational apps on mobile devices, and cooperative activities through social networking platforms (El-Hussein & Cronje, 2010; Traxler, 2007). Students enjoy the freedom technology provides them in becoming more actively engaged in the learning process. Most of the mobile learning technology devices, like tablets provide students direct access to information, course material, and real- world application of knowledge (Alsaadat, 2009; Martin et al., 2013). This is evident in the fact that 73% of the participants in this study indicated that they are comfortable with the use of technology in the classroom. Moreover, they all regard this access as indispensable to their learning experience. New technology often evokes feelings of both excitement and anxiety from students and faculty, and the usage of mobile teaching devices proved no different. Students indicated that the freshness of the usage of mobile teaching devices contributed positively to the learning experience. Students also recounted that the

instantaneous access to information enhanced in-class discussion because they could easily search for information to share with the class. Cobcroft, Towers, & Smith (2006) suggest that students benefit from "flexibility and ubiquity, that is, 'anywhere, anytime, and any device' learner engagement". As discussed, instructional design and the use of technology predominantly affects student perceptions of learning (Armstrong, 2011). But as students gain access to immense amounts of information, educators must provide direction. Educators must support students using mobile information in order to make better assessments and judgments when accessing information on their own. Educators must sensibly adapt the technology to specific learning goals and outcomes. Institutions of higher learning need to get policies and regulations in place to govern the use of mobile devices in the classroom. Clear "rules" on the use of mobile devices in the classroom need to be communicated to the students to minimize the distraction of other students by those that are using their mobile devices to access non-academic information such as social media during class time.

7. Conclusion

The 4th industrial revolution ensures that new technologies are developed rapidly, and the pace is picking up each year. Guri-Rosenblit (2005) perceives that the human capacity to respond to and adapt to the pace of new technologies is meaningfully slower and limited. Therefore, educators using mobile devices in the classroom must be committed to learning how to use devices effectively in classroom. In summary, mobile information and communication technologies such as tablets, laptop computers and mobile phones will feature importantly in the future of learning and classroom environments. Mobile devices offer benefits such as apparently boundless access to information and advantages for collective learning. However, these devices if not controlled properly, can distract learners and create frustration in the classroom. When integrated into the classroom experience sensibly and under control, educators will maximize their potential to enhance learning and minimize their interference with learning.

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