PART II

Selected Applications of Mobile Phones and Social Media in Education

CHAPTER 7

Operational Use of Mobile Learning: Understanding and Retention of Curriculum Content

JEREMY SUNKER, OYETADE KAYODE EMMANUEL, and
KEHDINGA GEORGE FOMUNYAM

ABSTRACT

This chapter aims to evaluate and explore students' perceptions of mobile phones in helping with understanding and retention of curriculum content. This aim is achieved within a theoretical framework on the use of mobile learning with understanding and retention. Student learning is influenced by different environmental factors, which impact the adequacy of their understanding and retention of curriculum content. At tertiary education level, the intensity and quality of work become more physically and mentally demanding. Students may find it more difficult to deal with the workload they are presented with. As a result, this may affect the potential level of understanding that can be accomplished in certain subject areas. This study was conducted on undergraduate students studying Information Technology (IT) at a university in Durban, South Africa in 2016. The self-administered questionnaire-based survey was used while transactional distance theory (TDT) is the core theoretical framework that underpins this study. The outcome of students' perception was analyzed and it was found that the use of mobile phones in teaching and learning improved their understanding and retention of curriculum contents.

7.1 INTRODUCTION

An aspect to demonstrate mobile learning can be identified as using different features of the mobile phone such as Mp3, voice recordings, podcasting,

videos, and pictures, which are easily accessible from the internet and can be downloaded directly onto any mobile device, provided the device has internet connectivity. This media can be viewed or listened at the convenience of the mobile user at any time and place. It is possible for mobile phones to be more easily integrated across the curriculum than desktops, and this is because many students already possess mobile phones.[14] The 2008 student survey by Evans[5] established that students consider learning materials in the form of podcasts on a mobile phone as an effective learning material and revision tool rather than traditional lectures, self-made study notes, and textbooks. It is interesting to note that mobile learning has the power to facilitate changes in the quality of learning modalities, which consequently can impact educational outcomes.[21]

Incidentally, m-learning is more than a mere extension of traditional methods of education. The m-learning aids alternative learning processes and instructional techniques that the concepts of new learning identify as effective for learning. It has been recognized that students face lot of challenges, such as time management, inadequate lecture time, and understanding of curriculum content.[21] This is intensified by their inability to balance studying with other day-to-day activities. More often than not, students find the workload at tertiary education level to be overwhelming. Finding the time to study while trying to complete assignments, homework, and personal work have an adverse effect on their studies. The operational use of mobile phones in tertiary education is one of the tools that can improve understanding and retention of curriculum content.

This study aims to uncover students' perceptions of mobile phones in helping to understand and retain the curriculum content. By understanding their perceptions, it provides a possibility to encourage the incorporation of mobile phones to assist students in improving understanding and retention at university level and to help deal with the abovementioned problems ultimately optimizing students' academic performance.

7.2   HYPOTHESES

Null hypothesis: Students perceive the operational use of mobile phones as a tool for learning to be ineffective in helping improve understanding and retention of curriculum content.

Directional hypothesis: Students perceive the operational use of mobile phones as a tool for learning to be effective in helping improve understanding and retention of curriculum content.

7.2.1 RATIONALE

This research was undertaken to find out students' perception of how the use of mobile phones can help with understanding and retention of curriculum content. If the directional hypotheses are correct, it will be possible to encourage the use of mobile phones based on the results of the research. The benefits of using mobile phones as a learning tool include "ease of use," which is the ability to use mobile phones to go over study materials anywhere at the student's own convenience.[5] For example, a student utilizing his or her time when traveling home on a bus to revise the curriculum content as well as the ability of using camera features of mobiles to take pictures of lecture notes during lectures instead of writing notes down from the board due to the high pace of lecturers. In addition, students are also able to use the voice note features on mobiles to record the voice of lecturers while they speak so they can go over it later and pick up important point they might have missed out during lectures.

It is believed that being able to repetitively go over revision work can improve retention of study material. Mobile phones are compact and comfortable to carry around. This has an advantage over using textbooks, which are much heavier and difficult to carry around.[4] It is easier to use a mobile device rather than textbooks, in terms of searching for pages and sections in the textbook for which one needs to study, whereas with podcasts or videos it is possible to just focus on a specific topic without having the trouble of going through a textbook.[16]

7.3 THEORETICAL FRAMEWORK

Several theories have been proposed in studying overall framework of the developments of technologies in distance education. These theories have focused on the use of technologies and their contributions to our understanding of distance education. Among these theories, this chapter focuses on the TDT as the core of framework that underpins distance education.

TDT is an educational theory that defines critical concepts of distance learning. It is a concept that describes the creation of teacher–learner relationships that exist when learners and instructors are separated by space and/or by time.[7,13] This interaction comes in the form of technology that helps to reinforce the transaction that fills up the communication space created by the distance.[13] TDT is "invaluable in guiding the complex practice of a rational process such as teaching and learning at a distance" (p. 3).[6] Hence, this theory is helpful in understanding the perceptions of students with the use of mobile phones in understanding and retention of curriculum content. TDT was chosen in this chapter because it informs about the material being studied by students. Using the theory to analyze their perceptions and how mobile phones can influence retention becomes an apt choice.

7.4   LITERATURE REVIEW

Asabere[1] argued that there is a growing need for mobile learning in Africa and the developing world in general. He articulates three reasons.

- Firstly, there is a disparity between existing academic facilities and physical infrastructure versus the increasing number of students admitted into educational institutions. This disparity creates the need or void which can be filled using mobile learning.
- Secondly, there is a limited time and place opportunities for workers. Other modes of education require students to be in the classroom or on site, which is most of the time difficult for employees as a result of their working schedules. This is supported by arguments by other scholars[22] that most institutions have limited staff and these staff members are already overburdened in ways that make it increasingly difficult for them to dedicate more time to other students or initiatives.
- Thirdly, some public institutions in developing countries are being originally developed as places for both study and residence because of their national character and model adopted. This leaves little room for more students as these campuses most often can only take few students.

The advancements in technology today have created an array of different means for teachers to interact with students.[17] Numerous tertiary

institutions in South Africa have implemented the use of e-learning into their traditional teaching methods. The e-learning relates to the use of electronic media for a variety of learning purposes that range from add-on functions in conventional classrooms to full substitution for the face-to-face meetings by online encounters.[8] In essence, e-learning helps students with the freedom of pace, individual study, self-planned learning while the educator/institution provides guidance planning and feedback essential for continued student motivation, participation, and curriculum completion.[2,20] The e-learning in contrast to traditional lectures has the benefit of enabling learners to study at their own convenience (when, where, and how).

The use of m-learning naturally inherits the benefits of e-learning but extends its reach because mobile devices are portable and easily accessible to anybody and everybody.[5] m-Learning can be defined as "a form of e-learning, which can take place anytime, anywhere with the help of a mobile communication device such as a mobile phone, a personal digital assistant (PDA), iPod, or any such small portable device." This means that any portable digital or analogue device capable of keeping recordings and storing information can be used for m-learning. A key benefit of using a mobile device is that it allows students to study anywhere they prefer and to study "on the go.[9]" Other benefits are flexible and friendly environments leading to improved balance between students curriculum work and their lives; eliminating the demands of a scheduled study time and other commitments on and off campus reducing stress, anxiety, and absenteeism; a study tool that makes it easy for students to transport their study material anywhere; unanticipated free time as they regularly have their mobile handsets on them.[15]

In addition, learners are able to download study media directly to their devices so it is accessible at any given time and place providing greater flexibility to students which is highly beneficial in correspondence learning.[11] Students can also record lectures on their mobile devices and listen to them whenever they want instead of taking down notes. This is beneficial because when taking notes, it may be difficult to take note of curriculum content delivered by the lecturer. Furthermore, with the other features of m-learning such as podcasting, learning engagement is increased with better completion rates as students can watch videos downloaded to their mobiles and study materials repeatedly, which results in higher retention through revision.[12,19] With podcasting, students find it more fun to use their mobile devices to study, it replaces the boring methods of having to

sit with books. Other benefits are multidevice support because audio and video media are compatible with almost all mobile devices today. Some of the challenges faced with podcasting are lack of quality recording as lecturers may be recording the podcasts in an environment that is not acoustically suitable.[18]

Investigators[1,22] argue that there are numerous benefits of using mobile learning in higher education (HE), such as: (1) Mobile learning can occur at anyplace and anytime, and learning content can be accessed anywhere. This makes mobile learning unique and efficient; (2) mobile learning processes are not limited to one particular place. The experience of learning can happen anywhere; (3) mobile learning enhances interaction between instructors and learners/students. Students are able to interact with the people facilitating the curriculum any time they are studying and need help; (4) mobile learning is a great opportunity for students and instructors to continue to learn while on the move. Just like the name, students can go anywhere with the learning experience; and (5) students in mobile learning practice undergo self-centered learning with focus. Self-centered or learner-centered learning give students the opportunity of pacing their own learning and making the best out of every opportunity they get.

Furthermore, mobile learning is a great opportunity for just in time training or review of content. The content can be reviewed and reconceptualized at any time to meet the students changing needs. Finally, mobile learning facilitates collaboration among students and instructors through both asynchronous and synchronous communication techniques. The synchronization between the devices ensures that all stake holders get feedback at the same time.

In conclusion, learning in higher education is seen as an individual effort. Most students vary greatly in their learning styles (abilities and disabilities) and assimilate at different rates. It is therefore important to assist these students with the needed tools that would allow them to learn at their varying pace and timeframes.[2,10]

7.4.1   CURRENT STATUS OF RESEARCH

Technology is constantly changing and evolving at a fast rate, there are new ways or forms of media that can be used for learning such as virtual reality. There have been advancements in terms of quality and availability of videos and podcasting. Evidence from literature shows that most

studies conducted relating to using mobile devices as a tool for education are done in the developed world.[3,17] As countries have different standards of education, it is important to conduct this research in the South African context so that readers may be able to understand or identify the problem or opportunities for improvement with regards to education.

7.5   RESEARCH METHODOLOGY

Research strategy employed in this study used the quantitative research approach and the method for gathering data was a questionnaire. The total population size of 70 Bachelor of Technology (BTech) and IT students from the Faculty of Accounting and Informatics were targeted for the survey. Applying this sample size to the formula below[17] gives the calculation of our sample size proportion.

$$n = \frac{NZ^2 P(1-P)}{d^2(N-1) + Z^2 P(1-P)} \tag{7.1}$$

where, $N = 70$ (total population), $Z = 1.96$ (statistic for level of confidence), $P = 0.05$ (expected prevalence or proportion), $d = 0.05$ (expected level of precision), sample size (n) $= 35$.

Accidental nonprobability sampling method was used. The implementation of the accidental nonprobability sampling method involved using random volunteers from the BTech class. A total of 35 survey responses were obtained. Survey results were analyzed using descriptive statistics and frequency response (mode or percentage of responses). The aim of using frequency response was to observe where there are areas of strong and weak correspondence among the results obtained.

7.6   RESULTS

The surveyed IT students evaluated the perception of students on the use of mobile phones for educational purposes and use of mobile phones in understanding and retention of curriculum content via an anonymous paper-and-pencil survey. From the survey, insight was gained regarding the students' perception of the effectiveness of mobile phones as a helpful tool for effective learning.

7.6.1   DATA RELIABILITY AND VALIDITY

The Cronbach alpha method was used to provide the measure of consistency scale within the questionnaire. Results in Table 7.1 show that data collected from students who participated in this study are reliable (Cronbach's alpha (α) greater than 0.75).

TABLE 7.1   Reliability Table for Research Variable.

Research variable	No. of items	Cronbach's alpha (α)
Students' perceptions of mobile use for educational purposes	10	0.95
Students' perceptions of mobile use in understanding and retention of curriculum content	7	0.77

7.6.2   DESCRIPTIVE STATISTICS

Table 7.2 gives an overview of the student's demographics. The study found that a simple majority of the respondents of this survey are males (60%) between ages 20 and 23 (79%). There is almost a mix of ethnicity between students of Indian and African origin who strongly use mobile phones on a daily basis (97%). Table 7.3 represents the perceived usefulness of mobile phones for educational purposes by students who participated in this study.

Results in Table 7.3 indicated that students overwhelmingly agree (79%) that the use of mobile phones for educational purpose is effective and useful. Descriptive statistics for individual questions were analyzed nonparametrically using the mean. In response to the statement "I think that using mobile phones as an educational tool can enhance my learning in general," the majority of students (85%) agree that mobile phone was useful. Out of the 35 students, 74% of them indicated that it was important for them to be able to access curriculum content through the use of their mobile phones and 65% of respondents indicated that using their mobile phones to acquire their study material was necessary. This implies that in general, the majority of students in this survey overwhelmingly agree (84%) that mobile phones are useful tools for educational purposes.

TABLE 7.2 Profile of the Respondents.

Demographic characteristic		Respondents, %
Gender	Male	60
	Female	40
Age groups	17–19	0
	20–23	79
	24–26	13
	Above 27	8
Mobile usage frequency	None	0
	Daily	97
	Weekly	3
	Monthly	0
Ethnicity	African	44
	Indian	50
	Colored	0
	White	0
	Other	6

TABLE 7.3 Students' Perceptions of Mobile Use for Educational Purposes.

B	SA	FA	WA	FD	SD	Std Dev	Skewness
B1	62	17	6	6	9	8.7	1.99
B2	43	15	11	17	14	4.6	2.19
B3	49	11	14	17	9	5.76	2.12
B4	46	23	11	9	11	5.59	1.5
B5	51	20	11	15	3	6.61	1.7
B6	40	26	6	17	11	4.76	0.95
B7	43	14	17	17	9	4.71	1.93
B8	51	9	14	17	9	6.34	2.1
B9	65	17	6	9	3	9.26	2.01
B10	71	20	0	6	3	10.54	1.89
Ave	52	17	10	13	8	–	–

Table 7.4 represents students' perceptions of mobile phone use in understanding and retention of curriculum content. The results from this table indicated that the students surveyed overwhelmingly agree (84%) that the use of mobile phones is an effective tool that assists with the understanding and retention of curriculum contents. Descriptive statistics for individual questions were analyzed nonparametrically using the mean. Results show that 86% of students surveyed agreed that watching YouTube tutorials of curriculum content downloaded on their phones was an effective means of helping them with curriculum content they did not understand. Also, 83% of respondents agreed that watching tutorials of curriculum contents on their mobile phones helps them reinforce learning content they have learnt in class.

TABLE 7.4 Students' Perceptions of Mobile Use in Understanding and Retention of Curriculum Content.

C	SA	FA	WA	FD	SD	Std Dev	Skewness
C1	49	23	11	9	9	6.14	1.58
C2	51	17	9	20	3	6.61	1.66
C3	57	23	6	9	6	7.82	1.71
C4	49	23	11	9	11	6.38	1.21
C5	43	29	14	9	6	5.63	0.833
C6	49	31	9	9	3	6.94	0.96
C7	49	14	26	9	3	6.5	1.56
Ave	50	22	12	10	6	–	–

Overall, the majority of surveyed students (84%) agree that mobile phones are useful tools that assist with understanding and retention of curriculum content. These results tested the hypothesis by comparing how they perceive it as a tool for education and how they perceive it in assisting with understanding and retention which show a higher positive deviation in the responses confirming our directional hypothesis. Significantly, most students believed that mobile phones are a useful tool in tertiary education purposes and it does assist in understanding and retention.

7.7 DISCUSSIONS

This study builds on the knowledge that majority of students find academic workload in University very demanding. Hence, this chapter intended to examine the perception of students on the operational use of mobile learning in helping with understanding and retention of curriculum content. The results in Section 7.6 have provided a general overview of the perceptual experience of students in this respect.

In a nutshell, the results of this study can be presented as follows:

- According to the literature reviewed in this study, transactional distance theory is able to explain the perceptions of students on the use of mobile learning in helping with understanding and retention of curriculum content.
- According to the results of the survey conducted in this study, students perceived the use of mobile phones is effective and useful for educational purpose.
- According to the results of the survey conducted in this study, students overwhelmingly agree that mobile phones assist with understanding and retention of curriculum content. This satisfies the aim of this study and confirms the directional hypothesis.
- There seems to be a general agreement between the findings of this study and existing literature on the use of technologies in education. These technologies reinforce or enhance motivation, including self-direction. It also offers a more friendly and supportive atmosphere than the traditional teaching.[14,16]
- This study found that the number of female IT students is very low compared with their male counterparts. Therefore, measures need to be put in place to encourage active participation of female students in academic-related activities.

7.8 SUMMARY

South Africa is a developing country and is faced with challenges that are similar to other developing nations with regards to education. Not all students have personal access to personal computers or laptops, and so using their mobile phones becomes an alternative. Taking advantage of

this useful tool can assist in helping students with their academic work. According to the results uncovered in this chapter, students perceive mobile phones not only as a useful tool for education but also as a means to use it for helping improve understanding and retention. Boundaries of technology are continually expanding and advancing at an exponential rate. With this improvement in mobile technology, it opens endless possibilities of enhancing education in South Africa. Exploiting this mobile technology would be a next step in uncovering the possibilities of improvement in education.

KEYWORDS

- **e-learning**
- **m-learning**
- **mobile phone**
- **MP3**
- **podcast**
- **South Africa**

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