Mobile learning readiness: Psychological factors influencing students' behavioural intention to adopt mobile learning in South Africa

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Declaration

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I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

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Abstract

With recent advances in technology, distance education has seen a move towards online and e-learning programmes and courses. However, many students in South Africa have limited access to computer technology and/or the Internet resources necessary for online learning. Worldwide trends have recently seen a growing emphasis on the use of mobile technology for learning purposes. High mobile penetration rates in South Africa means that mobile learning can potentially overcome many of the challenges associated with distance- and online learning. This research therefore aimed to explore adult distance education students' mobile learning readiness in the South African context. Specifically, this study examined the influence of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning on students' behavioural intention to adopt mobile learning. In order to test a model predicting students' behavioural intention, the conceptual framework guiding the investigation combined the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB) and extended the model to include locus of control and mobile learning self-efficacy. A sample of 1070 students from a private higher education institution in South Africa participated in this study. Data were collected using an online survey questionnaire. Multiple regression analysis indicated that perceived ease of use contributed most significantly to behavioural intention to adopt mobile learning, followed by attitude towards mobile learning, subjective norm, perceived usefulness, perceived behavioural control and locus of control. Mobile learning self-efficacy did not significantly influence behavioural intention to adopt mobile learning. Overall, the model accounted for 44.8% of the variance in behavioural intention to adopt mobile learning. Significant differences in age, gender, race and household income existed with regard to several of the psychological constructs hypothesised to influence behavioural intention to adopt mobile learning.

Structural equation modelling was used to examine the fit between the data and the proposed model. The chi square goodness for fit test and the RMSEA indicated poor fit between data and model. Considering the sensitivity of the chi square statistic for sample size and the negative influence of too many variables and relationships on the RMSEA, a variety of alternative fit indices that are less dependent on the sample size and distribution were used to examine model fit. The GFI, AGFI, NFI and CFI all exceeded their respective acceptable levels, indicating a good fit with the data.

Keywords: mobile learning, mobile learning self-efficacy, locus of control, perceived usefulness, perceived ease of use, attitude, perceived behavioural control, behavioural intention and higher education.

Dedication

This dissertation is dedicated to my precious husband, Floris Bellingan. Thank you for allowing me to be who I am. Thank you for your support, encouraging words and love. Without you this journey would not have been as rewarding.

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Chapter 1: Introduction

In order to examine the psychological constructs that influence behavioural intention to adopt mobile learning, this study focused on the design and testing of a theoretical model of user technology acceptance in the field of mobile learning in South Africa.

In order to contextualise the research, Chapter 1 outlines the background and context of this study. Next, consideration is given to the relevance and importance of mobile learning research, thus presenting a rationale for the study. The chapter delineates the purpose of the study and describes the significance and scope of the research. The chapter then concludes with an outline of each of the chapters contained in the dissertation.

Background

Professionals in various careers need to engage in continuous education to stay current in their respective fields (Cavanaugh & Blanchard-Fields, 2015). Similarly, the general South African workforce participates in learning programmes to avoid job loss and reaching career plateaus and to keep up with the rapid changes in information and technology (Cavanaugh & Blanchard-Fields, 2015). In addition, many unemployed South Africans also view education as a means to escape poverty and unemployment. Consequently, each year many adults enrol for various types of learning programmes offered by universities and private higher education institutions. This demand for adult education has seen rapid growth over the past decade in the registration of several new private higher education institutions and public institutions offering distance education programmes in South Africa.

In an attempt to service the growing market of adults specifically wanting to participate in distance learning, many private and public education providers have invested in the implementation of web-based educational systems. Integration between web-based education systems and other institutional systems allows students access to convenient online

programmes, module registration, assignment and examination results tracking, library resources and student account information. In addition, lecturers use web-based education systems to provide students with access to course material, video lessons, URL links to content, discussion forums, chats, and quizzes. However, despite the implementation of these web-based education systems, the shift to e-learning has been slow with many distance education institutions still using printed course materials as a modality for teaching and learning. Factors influencing the slow transition to e-learning programmes include a lack of access to computer technology, deficient computer skills, lack of Internet access and the high cost of data (Ngampornchai & Adams, 2016).

It is therefore necessary that higher education institutions consider alternatives to computer technology for learning purposes. One such alternative is mobile technology. In South Africa, mobile devices such as the smartphone are often the only device available to students. Considering that South Africa has one of the highest mobile penetration rates in the world, it is possible for mobile learning to overcome the digital divide that separates students who own, or have access to, computer technology for learning online and those who do not (Fuegen, 2012). Ownership and availability of proper and appropriate technology does not, however, guarantee that students will engage in mobile learning. Although it can be argued that the new generation of young adults in South Africa is mobile technology savvy (with regard to the use of social media, apps, games, online shopping, using Google to search for information, etc.), there is a need to investigate students' readiness to adopt mobile learning from a psychological perspective.

In this study, psychological readiness is viewed from a reflective and pragmatist approach and refers to readiness to perform an action (Vladimirovna & Nikolayevna, 2019). This approach assumes that the psychological readiness to study with a mobile device is influenced by a developed system of opinions, views, relations, reasons, will and

intellectual qualities, knowledge, skills and attitudes aimed at mobile learning (Vladimirovna & Nikolayevna, 2019). Psychological readiness is viewed as the most significant factor that could affect the implementation of mobile learning in higher education (Coopasami, Knight, & Pete, 2017). Empirical evidence of the psychological constructs that influence behavioural intention to adopt mobile learning is needed to improve higher education institutions' understanding of students' psychological readiness to engage in mobile learning.

Context

In South Africa, residential universities and private institutions that offer face-to-face education provide students with access to computer technology in the form of computer laboratories. In the context of distance education in South Africa, only one distance education university, namely the University of South Africa (Unisa), provides access to computer technologies for learning at their centres in the main cities across the country. Private higher education institutions offering distance education do not, however, have the funding available to invest in the provision of computer laboratories for their students across the country. It is this group of institutions that can benefit the most from mobile learning. This study therefore focused specifically on adult learners in the private higher education sector registered for distance learning programmes.

Justification for the Study

The majority of published research on mobile learning in the period 1981 to 2008 originated in countries including Taiwan, USA, South Korea, China and the United Kingdom (Hung & Zhang, 2012). In the period between 2010 and 2015 several other countries began contributing to research in the field of mobile learning, including Malaysia, Sri Lanka, Pakistan and Iran, amongst others (Chee, Yahaya, Ibrahim, & Hasan, 2017). According to the meta-analyses conducted by Hung and Zhang (2012) and Hwang and Wu (2014), the focus of published research in the period 1981 to 2008 centred on a wide variety of topics including

the utilisation of mobile learning in the teaching of various higher education programmes (i.e. languages, engineering, computer sciences, history, and environmental, cultural and ecology courses). During this period, other researchers focused on exploring student and teacher perceptions regarding the use of mobile technology, collaborative mobile learning initiatives, mobile learning case studies, and strategies and frameworks for mobile learning. A limited number of studies, however, have investigated the acceptance of mobile learning and its various, related issues (Hung & Zhang, 2012).

The meta-analysis conducted by Chee et al. (2017) reviewed mobile learning trends between 2010 and 2015. In this period, there was a shift in research foci. Studies in this period mainly focused on the evaluation of the effects of mobile learning on student performance, the design of mobile systems for learning and student and teacher perceptions of mobile learning (Chee et al., 2017).

Although countries such as Taiwan, USA, South Korea, China, and the United Kingdom actively participated in mobile learning research during the period 1981 to 2008 (Hung & Zhang, 2012), South African researchers only started to conduct research in the field of mobile learning in the period from 2010 to 2016 (Kaliisa & Picard, 2017). Research topics related to the adoption and acceptance of technology by students, teachers, and institutions, while other studies focused on learning theories and technology self-efficacy (Cigdem & Ozturk, 2016; Dray, Lowenthal, Ruiz-Primo, & Marczynski, 2011; Kaliisa & Picard, 2017; Querios & de Villiers, 2016). South African studies that explored student adoption and acceptance of mobile technology, in the period from 2012 to 2015, focused on the types of mobile devices students used, their Internet access and whether they would use their mobile devices to access Facebook, WhatsApp, watch videos and listen to podcasts (Chipangura, van Biljon, & Botha, 2012; Mayisela, 2013; Pimmer, Brysiewics, Linxen, Walters, Chipps & Grohbiel, 2014; Rambe & Bere, 2013).

Although a study conducted by Chipangura, van Biljon and Botha (2015) among 129 third year Information Systems (IS) students at the University of South Africa revealed that these students were ready to use their mobile devices to access information from the institution's Learner Management System (LMS) and use the discussion forums provided, as with most South African readiness studies, the focus was on measuring readiness based on their knowledge of mobile phone features and what kinds of Internet activities they engaged in with the use of their mobile phones. A limitation of South African research, therefore, pertains to the fact that the majority of researchers have not considered the influence of psychological factors and processes on the mobile learning readiness of students in South Africa. This requires a move beyond an understanding of student access to mobile technology, data and the types of mobile technology available towards a consideration of the psychological factors that may influence behavioural intention to adopt mobile learning. Studies conducted in other countries that focused on the impact of psychological factors on the acceptance of new technology and the readiness of students are found throughout e-learning, mobile learning and information systems literature (Al-Emran, Elsherif, & Shaalan, 2016; Keengwe & Maxfield, 2015). These studies referred to various models of technology adoption readiness including the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), and the Technology Acceptance Model (TAM) (Abdullah & Ward, 2016). The psychological constructs contained in these models include perceived usefulness, perceived behavioural control, perceived ease of use, subjective norm and behavioural intention. In this study, the TAM and TPB models were combined and extended to include two additional psychological constructs, namely locus of control and mobile learning self-efficacy. The psychological constructs included in this study’s theoretical model, therefore, included perceived usefulness, perceived ease of use, perceived behavioural control,

subjective norm, attitude towards mobile learning, locus of control, mobile learning self-efficacy and behavioural intention.

The aim of this study was to explore the influence of these psychological constructs on students' behavioural intention to adopt mobile learning. In addition, the study aimed to test the goodness of fit of this theoretical model predicting behavioural intention. This study could therefore potentially provide teaching staff and higher education management at distance education institutions with insights related to the psychological factors that influence behavioural intention to adopt mobile learning. The outcomes of this research can contribute to the purposeful design of infrastructure, curricula, content, and assessments for mobile learning audiences at distance education institutions and provide valuable information regarding how to effectively support students using mobile devices, with a focus on access, adoption and student success. The benefits of this research further relate to a widening of access to higher education through the design of mobile learning-friendly educational infrastructure.

Research Problem

In South Africa, access to quality higher education is important not only for improving the lives of individuals but also for the country's economic growth. Widening access to higher education, therefore, remains an important item on Government and Higher Education Providers' agendas. Mobile learning can play an important role in widening access to higher education through the utilisation of technology in education. Institutions in South Africa can overcome some of the technological and financial constraints that their students face by introducing them to mobile learning (Chipangura et al., 2013; Rosman, 2008). However, access to mobile devices does not necessarily imply that students are ready to adopt these devices as a tool to access and engage in educational programmes. Apart from research that focuses on issues surrounding access to mobile technology,

additional research is necessary to explore the psychological factors that may impact on student readiness to engage in mobile learning.

Research Questions

The central research question posed in this study was:

What is the influence of locus of control, mobile learning self-efficacy, attitude towards mobile learning, perceived usefulness, perceived ease of use, perceived behavioural control and subjective norm on students' behavioural intention to adopt mobile learning?

To answer this research question, locus of control, mobile learning self-efficacy, attitude towards mobile learning, perceived usefulness, perceived ease of use, perceived behavioural control, subjective norm and behavioural intention were included in a comprehensive theoretical model of user technology acceptance in the domain of mobile learning. Based on relevant literature and research findings in the field of mobile learning, it was argued that the constructs in this model would influence students' behavioural intention to adopt mobile technology in their learning. To confirm this argument the study was guided by twelve sub-research questions and twelve hypothesis statements.

The twelve sub-research questions guiding the investigation were formulated as follows:

1. Do students display high or low self-efficacy beliefs about learning with mobile technology?
2. Do students perceive mobile learning to be useful as a platform for learning?
3. Do students perceive mobile learning to be easy to use in their studies?
4. Do students exhibit positive or negative attitudes towards mobile learning?
5. Do students exhibit an internal or external locus of control?
6. What level of perceived behavioural control do students exhibit?

7. What influence do significant others have on a students' behavioural intention to adopt mobile learning?
8. Do students display behavioural intention to adopt mobile learning?
9. Are there any significant gender differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning?
10. Are there any significant age differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning?
11. Are there any significant differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning, in terms of race?
12. Are there any significant differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning, in terms of household income?

The following hypotheses were proposed:

$H_{1:}$ Mobile learning self-efficacy positively influences perceived usefulness.

$H_{2:}$ Mobile learning self-efficacy positively influences perceived ease of use.

$H_{3:}$ Perceived usefulness positively influences attitude towards mobile learning.

$H_{4:}$ Perceived ease of use positively influences attitude towards mobile learning.

$H_{5:}$ Attitudes toward mobile learning positively influence behavioural intention to adopt mobile learning.

$H_{6:}$ Internal locus of control positively influences perceived usefulness.

$H_{7:}$ Internal locus of control positively influences perceived ease of use.

$H_{8:}$ Internal locus of control positively influences perceived behavioural control.

$H_{9:}$ Perceived usefulness positively influences behavioural intention to adopt mobile learning.

$H_{10:}$ Perceived ease of use positively influences behavioural intention to adopt mobile learning.

$H_{11:}$ Perceived behavioural control positively influences behavioural intention to adopt mobile learning.

$H_{12:}$ Subjective norm positively influences behavioural intention to adopt mobile learning.

Research Objectives

The purpose of this study was to explore the influence of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning on a students' behavioural intention to adopt mobile learning and to assess the goodness of fit of a hypothetical model for the assessment of students' psychological readiness to adopt mobile learning. The main objectives of this study were to gain an understanding of the psychological constructs that influence a student's behavioural intention to adopt mobile learning in order to gauge South African distance education students' psychological readiness to learn with the use of a mobile device.

Methodology

A cross-sectional survey design was employed in this research. Participants in this study had to be adult South African students registered for a distance learning programme. Data were collected using a self-administered online survey that was completed by 2203 students who were registered for short learning programmes and higher certificate qualifications at a private higher education institution in South Africa in the first semester of 2019. After removing responses with missing data and outliers, 1070 responses (representing a response rate of 5%) were available for analysis. 76.4% of participants were between the age of 25 and 44 years old. 63.7% were female students, while 91% of respondents were African and 80.5% of respondents had a household income of less than R10 000 per month.

In order to answer the central research question, multiple regression analysis, specifically stepwise regression, was conducted to examine the influence of the predictor variables in the model on the outcome variable (students' behavioural intention to adopt mobile learning). Descriptive statistics were calculated to answer sub-research questions 1 to 8. Multivariate analysis of variance (MANOVA) was used to test for differences in gender, age and household income in the variables, while an Analysis of variance (ANOVA) test was conducted to identify differences in race groups that were unequal in size. Structural equation modelling was used to test the hypotheses and explore how the data fitted the hypothetical model.

Results

Multiple linear regression analysis indicated that perceived ease of use made the greatest significant contribution to the behavioural intention to adopt mobile learning, followed by attitude towards mobile learning, subjective norm, perceived usefulness, perceived behavioural control and locus of control. Mobile learning self-efficacy did not

make a statistically significant contribution to the behavioural intention to adopt mobile learning. It was therefore removed from the hypothesised model. Perceived ease of use, perceived usefulness, attitude towards mobile learning, subjective norm, perceived behavioural control and locus of control accounted for 44.8% of the variance in students' behavioural intention to adopt mobile learning.

Respondents displayed above moderate to high self-efficacy beliefs about learning with mobile technology. Respondents perceived mobile learning to be a useful platform for learning and easy to use. Respondents exhibited a positive attitude toward mobile learning, an internal locus of control and a high level of perceived behavioural control. The majority of the respondents indicated that significant others had an influence on their behavioural intention to adopt mobile learning. Finally, respondents' behavioural intention to adopt mobile learning was high.

Gender differences had a significant influence on perceived usefulness, perceived ease of use, attitude towards mobile learning, perceived behavioural control, subjective norm and behavioural intention, while age had a significant influence on perceived usefulness and subjective norm. Differences in race were found in perceived usefulness, subjective norm and perceived usefulness. Respondents' household income had a significant influence on perceived behavioural control.

Goodness-of-fit between the model and data was measured with the use of several goodness-of-fit indices. The chi square results were high, rejecting the model. According to Hox and Bechger (1999) one of the problems with the Chi square test is that when the sample size is very large, which is the case in this study (N = 1070), the test will almost certainly be significant and therefore the model will be rejected. Given the sensitivity of the chi square test to sample size, other fit indices were used to assess model fit. Results from the RMSEA

indicated inadequate fit. However, one of the disadvantages of the RMSEA is that it has been found to be sensitive to the number of variables and relationships hypothesised (Hooper, Coughlan, & Mullen, 2008). The GFI, AGFI, NFI and CFI indices all exceeded their respective acceptable levels, indicating good model fit. In fitting the data to the model, structural equation modelling identified perceived ease of use to have the most significant influence on behavioural intention followed by perceived usefulness, subjective norm and perceived behavioural control. In addition, hypotheses 1, 2, 7, 8, 9, 10, 11 and 12 were supported, while hypothesis 6 was only partially supported and hypotheses 3, 4 and 5 were not supported.

Dissertation Organisation

This dissertation is organised into six chapters. Each of the chapters is briefly summarised here:

Chapter 1 (this chapter) provides the background and introduction to the study. It also outlines the research questions and objectives.

Chapter 2 reflects a discussion of existing literature about mobile learning. This chapter also unpacks each of the psychological constructs included in the theoretical model.

Chapter 3 specifies the design of the research and outlines the methodology followed in this study.

Chapter 4 presents the results of the quantitative online survey. The results are organised according to the stated research questions and hypotheses.

Chapter 5 provides an interpretation and evaluation of the results as well as a discussion of the main findings from this study in terms of the theoretical model used to investigate the psychological constructs that influence behavioural intention to adopt mobile learning.

Chapter 6 draws conclusions from the findings and considers the contributions of the study, the study's limitations, and recommendations for future studies.

Summary

The majority of South Africans cannot afford computer technology for learning online. However, with the arrival of mobile devices and the rapid improvements in mobile technology, it is now possible to study online with the use of a mobile device. This study, therefore, investigated the psychological factors that influenced behavioural intention of South African distance education students to adopt mobile learning. It focused on establishing a new theoretical model that can be used in the assessment of a student's psychological readiness to adopt mobile learning and aimed to contribute insights into mobile learning readiness research in the South African context.

Chapter 2: Literature Review

This chapter is organised into three main sections. The first section considers the developments in distance education relating to the progression from correspondence learning to e-learning and, most recently, to mobile learning, as well as the implications these hold for distance education learning. The second section provides an overview of key trends and issues in mobile learning research, both internationally and within the South African context. This section also discusses mobile learning readiness studies with a specific focus on various behaviour change theories. The final section outlines the theoretical development of the model used in this research to examine student psychological readiness to adopt mobile learning.

Technology in Distance Education

According to Holmberg (1977), distance education encompasses various forms of study where the student is not physically present in a lecture room or on the same premises as the lecturer. Schlosser and Simonson (2006) defined distance education as a form of formal education where the student is separated from the lecturer, while the institution uses telecommunication systems to connect students, resources and lecturers. The Department of Higher Education and Training in South Africa, in their draft policy framework for the provision of distance education, defined distance education as a set of teaching and learning strategies that are implemented to overcome the spatial separation between lecturer and student (Department of Higher Education and Training, 2012). As with these definitions of distance education, various other definitions include the common element of separation (Keegan, 2013). There are, however, various levels of separation in distance education (Keegan, 2013). Levels of separation are dependent on institutional teaching and learning strategies. Distance education institutions may opt to include block

classes, workshops or enrichment classes that students are expected to attend as part of the programme they are studying (Keegan, 2013).

Distance education has been in existence for approximately 180 years (Schlosser & Simonson, 2006). Distance education provides mature working students who are unable to access full-time higher education with an opportunity to upskill themselves. In the earliest forms of distance education, students received printed material to study. This meant that students would complete assessments for an institution and submit them for marking via postal services. Marked assignments would then also be returned to students via the postal services. This method of distance learning was referred to as correspondence education. Any communication between the lecturer and student was conducted via postal services or telephonically.

As technology evolved, institutions began to explore how technology could be used to provide students with access to lecturer support. Even though students still received print materials, their learning was further supported through telephonic contact with lecturers, teleconferences, and various audio, video, and broadcasting technologies (Keegan, 2013; Schlosser & Simonson, 2006). e-Learning came into existence in the 1990s and allowed institutions to deliver distance education programmes to students using the Internet or private networks and computers (Al-Busaidi, 2013). Al-Araibi, Mahrin, Yusoff, and Chuprat (2019) defined e-learning as the use of electronic media, educational technology, Internet, e-mail and computers to teach students. Al-Busaidi (2013) defined e-learning as learning by utilising digital technology, such as the Internet or private networks. e-Learning, therefore, refers to the use of computer technology (computer hardware and software) in the learning process (Adams, Sumintono, Mohamed, & Noor, 2018). In higher education, the main purpose of e-learning is to increase access to education without restrictions to place and time (Adam et al., 2018). With the incorporation of e-learning in both contact and distance education

institutions, the demand for e-learning software increased dramatically (Al-Busaidi, 2013). The use of Learning Management Systems (LMS) such as Moodle, Blackboard, Sakai, and Canvas to name a few, made it possible for distance education institutions to develop content in the LMS, to include discussion forums, administer online assessments and monitor online class participation. Students are also able to access their administrative information such as student fees, and view their results using the LMS (Al-Busaidi, 2013). E-learning has enabled institutions to provide virtual classrooms for students where all coursework is completed online (Al-Busaidi, 2013). In South Africa, the Council of Higher Education (CHE) categorises e-learning as internet-supported, internet-dependent or fully online (The Council on Higher Education and Training, 2014). Internet supported e-learning refers to e-learning that is optional and supplementary for students. Students still receive printed course material and therefore mainly use the institutional LMS to access additional information on course content, examination dates, venues and results, library reading lists and other online learning resources. Internet-dependent e-learning refers to distance education where participation via the Internet is a requirement. In this case, students are required to use the Internet to engage with course content and to communicate with lecturers and peers. In the case of fully online e-learning, all engagements with lecturers and peers, course content, learning activities, assessments, and various support services are all conducted online (The Council on Higher Education and Training, 2014).

e-Learning trends in overseas countries indicate that institutions have moved towards Internet-dependent and fully online modalities. However, distance learning has not yet successfully evolved into Internet-dependent and fully online e-learning in Africa and specifically, South Africa, as most South African students cannot afford to purchase a computer and/or have limited access to Internet resources (Chipangura et al., 2013). A

possible solution for distance education students in South Africa that could aid in overcoming some of the technological and/or financial constraints they face is to consider mobile learning (Chipangura et al., 2013; Rosman, 2008). Mobile learning refers to the practice of using a wireless mobile device that runs the latest mobile technology for teaching and learning at any given time and from any location (Keskin & Metcalf, 2011). Chee et al. (2017) defined mobile learning as a learning method that enables students to access content and discussions with peers and facilitators from anywhere and at anytime. Several integrated software applications allow students to learn using a variety of wireless mobile devices that use wireless network connections or broadband services (Chee et al., 2017). Mobile learning thus enables institutions to deliver learning programmes that students are able to access on pocket-sized, wireless devices called mobile devices which include smartphones, tablets and tablet PC's (Fuegen, 2012; Mahat, Ayub & Wong, 2012; Smith & Walters, 2013).

In South Africa, mobile learning is viewed as a possible solution to the support and management of existing conventional education systems, specifically distance learning systems, with the emphasis on narrowing or removing the geographical or infrastructural distance and separation between students and between students and the institution (Berge & Muilenburg, 2013). Mobile learning affords distance education students the opportunity to engage in discussion forums, chats, and webinars with fellow students and lecturers, facilitating student-to-student and student-to-lecturer engagement (Fuegen, 2012). According to various researchers, the rapid changes in smartphone and related technology, combined with high mobile device ownership in South Africa, opens up new opportunities for distance education institutions to reach students who do not have access to computers (Kaliisa & Picard, 2017; Li, 2017; Vilkonis, Bakanoviene & Turskiene, 2013). Mobile learning also allows South African higher education institutions to bypass the establishment of costly

education infrastructure including, for example, the building and maintenance of computer laboratories (Pulla, 2017).

Furthermore, LMS providers (i.e. Blackboard, Moodle, Sakai, Canvas, Edmodo, Desire2Learn, etc.) have made free mobile LMS applications available that make it possible for students to learn using their mobile devices. These mobile LMS applications are downloadable from Google Play store for Android devices and the App store for Apple devices. The mobile LMS applications all have the same functionalities (i.e. course modules, discussion forums, assignments, grades, chats, and notifications) as the LMS web-based applications (Mtebe & Kondoro, 2016). These mobile LMS applications also offer an offline functionality that allows students who live in areas where there is no, or limited, internet coverage to access their learning programmes together with all their resources using a mobile device (Mtebe & Kondoro, 2016), thus reducing the cost of data.

There are some disadvantages to mobile learning in terms of device functionality. Mobile devices often have small screen sizes and keypads which may make scrolling and navigation on the small screen difficult. The devices may also have limited storage capacity and limited battery life. In addition, often only one application may be used at a time and software limitations may limit what applications can be used on the device. Additional device security that protects the mobile devices against viruses, trojans and spam and text-intensive content all reduce the device's performance (Fuegen, 2012; Ozdemir, 2010; Rosman, 2008; Smith & Walters, 2013). With the launch of mobile cloud computing technology, many of these limitations are no longer relevant and constraints such as limited processing power, battery life and the internal storage capacity have become something of the past (Chipangura B. , A framework for providing mobile centric services to students at higher education institutions: The case of open distance learning, 2016). With mobile cloud computing, students can now improve their mobile device's

performance by storing applications and large files in the cloud (Chipangura, 2016). Furthermore, mobile cloud computing applications designed specifically for use in the academic environment offer distance education students in remote parts of South Africa the opportunity to access their learning resources in an offline environment (Chipangura, 2016). Learning resources may include prescribed readings, videos, audio lessons, quizzes, graded assessments, group work and discussions (Keskin & Metcalf, 2011). Given the range of learning activities, further interrogation is required in terms of mobile device functionality. Issues such as whether students are able to download and read documents on their mobile devices, complete assessments, collaborate on discussion forums and access library resources need to be addressed. It is, therefore, necessary to determine student readiness to participate in mobile learning.

Overview of Mobile Learning Research

Between 1981 and 2008 the majority of published research in the area of Mobile Learning came from countries such as Taiwan, USA, South Korea, China and the United Kingdom (Hung & Zhang, 2012). Mobile learning research now spans the globe and has been conducted in several countries across Africa and Europe as well as in Malaysia, Sri Lanka, Pakistan, Iran, Scandinavia, Australia and New Zealand (Berge & Muilenburg, 2013; Chee et al., 2017).

The period between 2003 and 2007 was seen as the ‘Innovators stage’ of mobile learning studies, as there was a slow growth rate in research outputs in the field, with only eight articles published in 2003. The ‘Early Adopters stage’ began after 2007 when the growth rate in mobile learning research increased, with thirty-six articles published in 2008 (Chee et al., 2017; Hung & Zhang, 2012). According to four meta-analysis studies that were conducted on mobile learning research during this stage, the focus centred on the identification of the effectiveness of mobile learning, mobile learning systems design, lecturer and student

perceptions of mobile learning for instruction, the role of mobile learning in distance education, learning theories, conceptual frameworks for mobile learning and technical features (Chee et al., 2017; Hung & Zhang, 2012; Hwang & Wu, 2014; Wu, Wu, Chen, Kao, Lin & Huang, 2012). During this period researchers in Taiwan focused more on the technology itself, exploring content protection, transmission, and management, adaptive evaluation of intelligent tutoring systems in mobile devices, personalised mobile learning systems and mobile learning tool development (Hung & Zhang, 2012). In contrast, researchers in the United States focused their research on instructional aspects of mobile learning such as collaborative mobile learning, interactivity of mobile learning and mobile learning in the school environment (Hung & Zhang, 2012).

In the period between 2010 and 2015, the global focus of mobile learning research centred on the evaluation of the effects of mobile learning, the design of mobile systems for learning, user perceptions of mobile learning and the review and evaluation of factors that influence the adoption of mobile learning (Chee et al., 2017).

Research concerning the role of mobile learning in distance education has identified several benefits that mobile learning holds for distance education: Not only does mobile learning enable students to access course content, feedback and support services, most importantly it assists in bringing lecturers and students closer (through the use of, for example, discussion forums) thus creating student-to-student and student-to-lecturer interactivity (Keengwe & Maxfield, 2015). Furthermore, mobile learning may be the solution that helps to eliminate barriers to access in distance education, creating a more open learning environment in which learning is student-centred and flexible, while still delivering quality education (Traxler, 2010). As one of the main and defining problems in distance education, mobile learning therefore attempts to address the isolation that students encounter when studying from a distance (Traxler, 2010). Traxler (2010) views

mobile learning in distance education as a tool that not only reaches across spatial and geographical distance but also social, economic and cultural distance.

Research that explored the integration of mobile devices into classroom instruction showed that students generally had positive learning experiences and that mobile learning could be very useful in improving the quality of higher education (Keengwe & Maxfield, 2015). In addition, studies that investigated the impact of cultural factors on the adoption of mobile devices for learning emphasised that the outcomes of these studies were influenced by different cultural factors, thus producing varied results (Keengwe & Maxfield, 2015). This was evident in studies conducted in Taiwan, Saudi Arabia and Malaysia (Keengwe & Maxfield, 2015). A comparison of the results from these studies revealed that students in Taiwan generally held positive attitudes towards learning with their mobile devices, while only 50% of students in the Saudi Arabia study supported mobile learning (Keengwe & Maxfield, 2015). Students in Malaysia were not ready to accept the concept of learning with the use of a mobile device (Keengwe & Maxfield, 2015). Another readiness study conducted in Malaysia that focused on psychological readiness, basic skills and budget readiness concluded that students were very familiar with computer technology and that they would welcome the integration of mobile devices into education (Keengwe & Maxfield, 2015). Reflecting on the results of these studies, it is important to consider that South Africa has its own unique cultures and is diverse, not only in terms of culture and language but also with regard to differences in socioeconomic status. It is therefore not possible to assume that results from mobile readiness studies conducted in other countries will apply to the South African context, even if those studies were conducted in other developing countries.

Mobile learning research in South Africa.

Research that explored the adoption and acceptance of mobile technology by students in South Africa, has focused on the types of mobile devices students use (equipment readiness),

the different kinds of Internet access available to them (equipment readiness) and whether they would use their mobile devices to access Facebook (Mayisela, 2013), WhatsApp (Pimmer et al., 2014; Rambe & Bere, 2013), and watch videos and listen to podcasts for educational purposes (Chipangura et al., 2012). WhatsApp was noted as a teaching tool that could be used for sharing videos, podcasts and links to documents, to upload documents, take pictures and engage in discussions (Pimmer, et al., 2014; Rambe & Bere, 2013). According to Rambe and Bere (2013), WhatsApp creates an environment for collaboration, knowledge creation, critical thinking, and information seeking and sharing.

In another study conducted at a contact university, the researcher created a Facebook page where coursework was uploaded for students to access (Mayisela, 2013). The coursework was available for 36 students registered for a Java Programming course. Only 30 of the students completed participation in the study. Students had to indicate which of the following devices they used to access the course content, namely: desktop computers, laptops and mobile devices. Students could select more than one device. The study found that the respondents made use of desktop computers (43.3%), laptops (46.7%) and mobile devices (16.7%) to access the coursework materials. Mayisela (2013) concluded that some students perceived that mobile devices provided them with extended opportunities to interact with coursework, indicating that, given the opportunity, students would make use of mobile devices to access coursework. A limitation of the study pertained to the fact that only a small number of students registered for only one course were included in the sample (Mayisela, 2013).

Another study was conducted among sixteen nursing students registered for an advanced midwifery education programme at the University of South Africa (Pimmer, et al., 2014). Findings from this study indicated that nursing students in resource-poor settings used their mobile devices to participate in learning that involved joint problem-

solving and reflection (Pimmer, et al., 2014). Some students used their mobile devices to document, share, discuss and reflect on their own professional experiences in the communities where they were active (Pimmer, et al., 2014). The researchers concluded that more studies are needed to identify how mobile devices can be utilised as an educational tool in the learning process.

A study conducted at the University of South Africa aimed to identify students' mobile information access needs (Chipangura et al., 2012). A small group of 50 students participated in the study. Findings showed that students were more interested in using the LMS (referred to as MyUnisa) on their mobile devices to access information related to their student fees and results. They showed less interest in accessing course resources such as lecturer notes, practice exams, study material, and podcasts with the use of their mobile phone. Chipangura et al. (2012) noted that these results aligned with earlier studies regarding information usage of students. Students were more interested in accessing university services that helped them reduce the cost of phoning the university or physically going to the university than using their mobile devices for learning purposes. The researchers concluded that the students who participated in their study did not see mobile phones as tools for accessing bandwidth-intensive resources (Chipangura et al., 2012).

Subsequent to these studies, South Africa experienced a rapid change in mobile technology with the introduction of integrated application software, wireless network connections, cloud computing and higher competition between network providers to provide their customers with cheaper data packages. Research conducted by Chipangura, van Biljon and Botha (2015) among 129 third year Information Systems students, also at the University of South Africa, revealed that these students were ready to use their mobile devices to access information from the institution's LMS and also to use the discussion forums provided. Limitations of this study again involved the small sample size and, furthermore, that

Information Systems students may be more mobile savvy than other students, as they are likely comfortable with and knowledgeable about technology.

The primary focus of South African readiness studies has centred on measuring student readiness based on their knowledge of mobile phone features (technological readiness) and the type of Internet activities in which they engaged using their mobile phones. This is a one-sided view of readiness which ignores the mental preparedness or psychological readiness of students to participate in mobile learning.

Readiness is defined as being prepared mentally for an experience or action (Coopasami et al., 2017). Mobile learning readiness, then, refers to a student's mental preparedness to experience mobile learning and to participate in mobile learning (Mahat, Ayub, & Luan, 2012; Mutono & Dagada, 2016). Mental preparedness highlights the importance of a student being psychologically ready, in the right state of mind, as it impacts the adoption of mobile learning (Coopasami et al., 2017). A student's mental preparedness is one of the most important factors that could affect the successful adoption of mobile learning (Coopasami et al., 2017). Students may have the appropriate technical skills (technological readiness), own the equipment required to engage in mobile learning (equipment readiness) such as laptops, tablets and smartphones and have the necessary financial resources (financial readiness) to afford data, but they may not be psychologically ready to adopt mobile learning. In order to successfully introduce mobile learning, it is necessary to establish students' psychological readiness to learn using their mobile devices. Various theories and models have been employed to assess mobile learning readiness. In the following section, the two theories and models relevant to this study are discussed.

Mobile learning readiness studies.

Research regarding the readiness of students to adopt new technologies and the impact of various psychological constructs on the acceptance of new technologies are found throughout e-learning, mobile learning and information systems literature (Al-Emran, et al., 2016; Keengwe & Maxfield, 2015). These studies employed various theories of behaviour change, such as the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB), together with several technology adoption models including the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM) (Abdullah & Ward, 2016) to investigate student readiness to adopt mobile learning. In this study the TAM and TPB were combined and extended to include two additional variables. The section below provides an overview of the TPB and TAM together with findings from existing research utilising these theories and models to investigate mobile learning readiness.

Theory of planned behaviour (TPB): The relationship between attitude, subjective norm, perceived behavioural control and behavioural intention.

According to the Theory of Planned Behaviour (TPB), behavioural intention predicts a person's behaviour, while three factors impact on behavioural intention, namely a person's attitude towards mobile learning, subjective norms and perceived behavioural control (Cheon, Lee, Crooks, & Song, 2012). The figure below illustrates the TPB model:

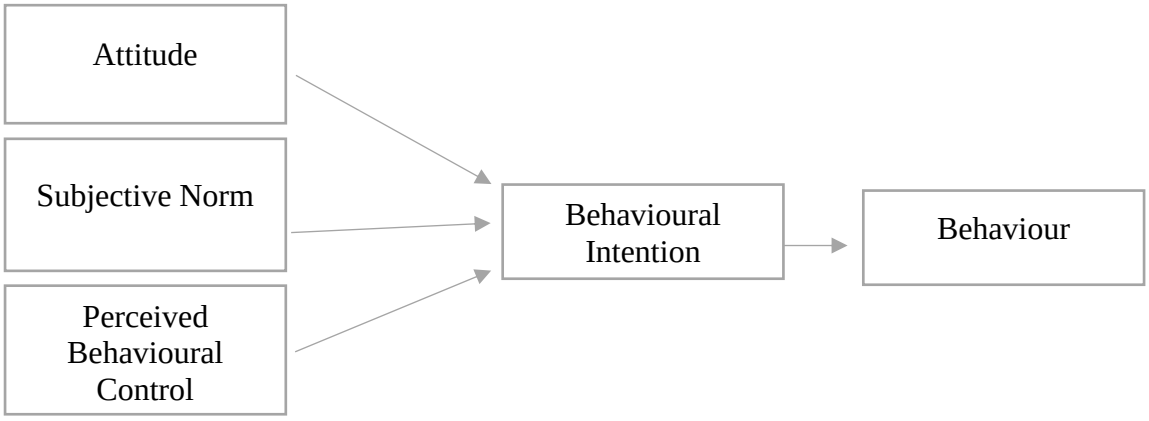


Figure 1 TPB Model (Madden, Ellen & Ajzen., 1992)

In social psychology, there are hundreds of definitions for the term attitude (Albarracin, Johnson, & Zanna, 2005). Fishbein (1967) defined attitude as the readiness for action of a definite sort. Aiken (1996) defined attitude as a learned tendency to respond positively or negatively to certain situations. A person's attitude towards a behaviour, therefore, refers to the positive or negative feelings he/she has towards the specific behaviour they have to perform (Cheon et al., 2012). Furthermore, attitudes consist of beliefs, knowledge, expectations, motivation, emotions, behaviour and actions (Aiken, 1996). These may be categorised as cognitive, affective and performance components (Aiken, 1996). These three components describe what a person believes about an attitude object (cognition), then identifies that person's positive and negative feelings towards the attitude object (affect) and the person's action and response towards the attitude object (behaviour) (Fabrigar, MacDonald, & Wegener, 2005). Attitudes cannot be directly observed and therefore, they are inferred from behaviour (Aiken, 1996; Fabrigar et al., 2005). A behaviour is any denotable overt action that an individual performs (Albarracin et al., 2005). Albarracin et al. (2005) cited several definitions of attitude and then highlighted that most of these definitions indicated an obvious link between attitude and the concept of behaviour. In the TPB model attitude is shown to influence behavioural intention which then leads to a specific behaviour. Behavioural intention is a person's intention to perform a specific behaviour based on factors such as attitude towards the behaviour (Hsia, Chang, & Tseng, 2014; Yeap & Soto-Acosta, 2016). In this study, behavioural intention is therefore also included as a predictor of actual behaviour. Research has shown that the stronger the person's intention to perform a specific behaviour, the more likely the individual was to perform that specific behaviour (Yeap & Soto-Acosta, 2016). In previous research conducted using the TRA, TPB and TAM, behavioural intention was identified as one of the most accurate forecasters of a person's future, actual behaviour (Yeap & Soto-Acosta, 2016). In the context of

psychological readiness to adopt mobile learning, then, it is argued that a positive attitude towards mobile learning, with a high level of behavioural intention should lead to behaviour where students adopt mobile learning.

Research has shown that there are limitations to the measurement of people's attitudes as they change from one day to the next and are influenced by unknown factors and previous emotional experiences (Fishbein, 1967). Despite these limitations, research into the relationship between attitudes and behaviour has found a positive correlation between the verbal expression of attitudes and overt action (Fishbein, 1967). Therefore, it is argued that attitudes can provide a context for understanding the student's intention to use their mobile device to participate in mobile learning activities. It is therefore important to determine whether students hold positive or negative attitudes towards mobile learning as this has an impact on whether or not students are likely to engage in mobile learning (Mahat et al., 2012).

Subjective norm refers to a person’s perception that people who are important to him/her approve of and support a certain behaviour (Tagoe & Abakah, 2014). Subjective norm therefore refers to the perceived peer or social pressure to perform or not to perform a certain behaviour. People that an individual view as important or that have an influence on him/her may consist of family, friends, colleagues, community members or fellow students. In accordance, then, if a student perceives that other students think they should use mobile learning, then they are more likely to adopt mobile learning (Tagoe & Abakah, 2014).

Perceived behavioural control is a person’s perception of how difficult or easy it is to perform a behaviour (Cheon et al., 2012). This perception is formulated by a person’s previous experience as well as the future obstacles they perceive to exist with regard to performing the behaviour (Doll & Ajzen, 1992). According to Madden et al. (1992), lack of resources is an obstacle that influences a person’s control beliefs. Under such circumstances, intention to

perform a behaviour will be low even if the individual has a positive attitude towards performing the behaviour. In the South African context, it can then be argued that if a student, for example, does not have access to a reliable and stable connection to the Internet, even if they may hold a positive attitude towards mobile learning, their intention to engage in mobile learning will be low.

The TPB argues that, a student's intention to perform a specific behaviour will be high if a student holds a positive attitude towards the specific behaviour, if they perceive a high degree of control over the behaviour and if social pressure exists to engage in the behaviour (Cheon et al., 2012; Tagoe & Abakah, 2014). Behavioural intention has been recognised as one of the most accurate predictors of a person's actual future behaviour (Yeap & Soto-Acosta, 2016). Tagoe and Abakah (2014) argued that in the context of mobile learning, student readiness to learn with the use of a mobile device can be predicted by investigating a student's attitude towards mobile learning, subjective norm and perceived behavioural control (Tagoe & Abakah, 2014). The TPB, therefore, predicts the probability that students are ready to use their mobile device when learning (Tagoe & Abakah, 2014).

The validity of the TPB model as a measure of mobile learning readiness among higher education students, was confirmed by Cheo et al. (2012) in a study conducted among 189 undergraduate students at a public university in Southwest, United States. The TPB model was extended to include several additional variables. The research model hypothesised a relationship between perceived ease of use and attitude towards mobile learning and between perceived usefulness and attitude towards mobile learning. Furthermore, the model hypothesised that instructor readiness and student readiness influenced subjective norm, while perceived self-efficacy and learning autonomy were hypothesised to influence perceived behavioural control (Cheon et al., 2012). Results from the model fit analyses (CFI = .955, TLI = .949, RMSEA = .060) indicated a good fit. Furthermore, the model indicated

that 87.2% of behavioural intention to adopt mobile learning was explained by attitude, subjective norm and perceived behavioural control (Cheon et al., 2012). Perceived ease of use ($\beta = .486$, $p < .001$) and perceived usefulness ($\beta = .491$, $p < .001$) significantly related to attitude. Perceived behaviour control ($\beta = .501$, $p < .001$) had the highest impact on behavioural intention, followed by attitude ($\beta = .431$, $p < .001$) and subjective norm ($\beta = .158$, $p < .001$).

In a study at a Malaysian university, Yeap & Soto-Acosta (2016) employed the same model as Cheon et al. (2012) with the aim of identifying potential factors that drive mobile learning adoption, specifically in developing countries. Analyses of results in this study revealed that perceived ease of use ($\beta = .156$, $p < .001$) and perceived usefulness ($\beta = .637$, $p < .001$) positively influenced attitude towards mobile learning. Perceived ease of use and perceived usefulness contributed towards 57.2% of the variance in attitude towards mobile learning. Attitude towards mobile learning ($\beta = .188$, $p < .001$), subjective norm ($\beta = .421$, $p < .001$) and perceived behavioural control ($\beta = .320$, $p < .001$) were all positively related to behavioural intention explaining 71.6% of the variance in behavioural intention (Yeap & Soto-Acosta, 2016). Subjective norm had the strongest positive influence on behavioural intention followed by perceived behavioural control and attitude towards mobile learning (Yeap & Soto-Acosta, 2016). These results indicate that the adoption of mobile learning at this institution was mainly driven by students' perceptions of their ability and confidence to work with the technology and other peoples' views of mobile learning (Yeap & Soto-Acosta, 2016).

Technology acceptance model (TAM): Perceived usefulness, perceived ease of use and behavioural intention.

In their review of acceptance literature, Abdullah & Ward (2016) identified the Technology Acceptance Model (TAM) as the most commonly used technology adoption theory. The TAM measures three constructs, namely perceived usefulness, perceived ease of

use and behavioural intention (Ngampornchai & Adams, 2016). The figure below illustrates the TAM model:

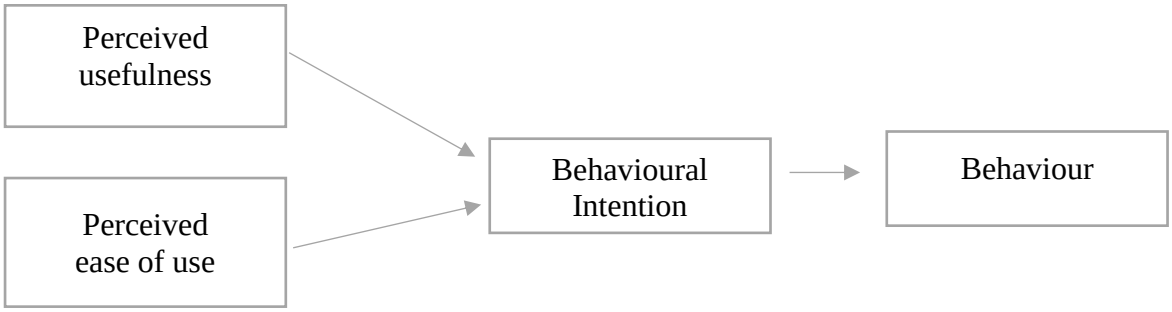


Figure 2 TAM Model (Davis, 1989)

According to Ngampornchai and Adams (2016), perceived usefulness and perceived ease of use both influence behavioural intention and actual behaviour. The perception that a person has that his/her performance improves when they use a specific new technology is referred to as perceived usefulness (Iqbal & Bhatti, 2015; Raza, Umer, Qazi, & Makhdoom, 2018). In the context of mobile learning, it can be argued that when students perceive mobile learning as useful, they will likely display a high degree of intention to use mobile devices when learning (Hsia, 2016). In accordance with this, then, if a student perceives mobile learning to be more useful in improving his/her academic performance than other learning modalities, then the student is likely to display a higher behavioural intention to adopt mobile learning (Hsia, 2016).

Davis (1989) defined perceived ease of use as the belief that using a specific new technology will not require much effort. Perceived ease of use thus refers to a person's belief that using the new technology would be relatively free of effort (Ngampornchai & Adams, 2016). It can then be inferred that if students perceive mobile learning systems as easy to use, their intention to use mobile learning increases (Hsia et al., 2014; Hsia, 2016).

An e-learning acceptance study conducted in Taiwan that investigated the influence of locus of control and computer self-efficacy on 241 employees, extended the TAM model to

include locus of control and computer self-efficacy (Hsia et al., 2014). The companies that participated in this study had all implemented e-learning courses as part of their employee development initiatives. The researchers hypothesised that locus of control positively influenced perceived usefulness and perceived ease of use, while computer self-efficacy influenced perceived ease of use and behavioural intention (Hsia et al., 2014). Findings from this study confirmed previous research findings that both perceived usefulness and perceived ease of use have a direct positive influence on behavioural intention (Hsia et al., 2014). The goodness of fit indices (GFI = .99, AGFI = .93, NFI = .95, NNFI = .90, CFI = .97 and RMSR = .044) exceeded their respective acceptable levels and therefore the model was considered a good fit for the data (Hsia et al., 2014). Locus of control had a statistically significant positive impact on both perceived usefulness ($\beta = .31$, $p < .05$) and perceived ease of use ($\beta = .22$, $p < .05$). Self-efficacy had a significant positive influence on perceived ease of use ($\beta = .17$, $p < .05$) and behavioural intention ($\beta = .27$, $p < .05$). Perceived ease of use ($\beta = .13$, $p < .05$) and perceived usefulness ($\beta = .43$, $p < .05$) both had a statistically significant positive influence on behavioural intention with perceived usefulness exhibiting the greatest influence on behavioural intention (Hsia et al., 2014). The hypothesised model accounted for 32% of the variance in behavioural intention (Hsia et al., 2014).

Iqbal and Bhatti (2015) investigated the readiness of university students to adopt mobile learning at private sector universities in Islamabad. The study, conducted among 244 students, used an extended version of the TAM that included two additional variables, namely student readiness and psychological readiness (Iqbal & Bhatti, 2015). Perceived usefulness and perceived ease of use were hypothesised to have an influence on behavioural intention. The research identified a good fit (RMR = .041, CFI = .989, GFI = .922, NFI = .95, RMSEA = .033) between the data and proposed model. Perceived ease of use ($\beta = .264$, $p < .001$) had a statistically significant positive influence on perceived usefulness. Both perceived

usefulness (β = .652, p <.001) and perceived ease of use (β = .150, p < .05) had a significant positive relationship with behavioural intention (Iqbal & Bhatti, 2015). Results from this study indicated that perceived usefulness positively influenced students' intention to study with the use of a mobile device. Perceived ease of use was identified to have a significant positive effect on students' intention to use mobile technology when learning (Iqbal & Bhatti, 2015). Furthermore, the study also identified a strong relationship between perceived ease of use and perceived usefulness (Iqbal & Bhatti, 2015). This strong relationship between perceived ease of use and perceived usefulness is well noted in technology adoption literature (Iqbal & Bhatti, 2015).

Mutono and Dagada (2016) conducted an investigation of mobile learning readiness at a higher education institution in South Africa. These authors made use of the same model as Iqbal and Bhatti (2015). 180 students from a higher education institution situated in Johannesburg, South Africa participated in the study. Structural equation modelling (CFI = .955, GFI = .972, NFI = .981, RMSEA = .026, RMSR = .036) presented a good fit between the data and the model (Mutono & Dagada, 2016). Perceived ease of use (β = .368, p < .001) had a statistically significant positive influence on perceived usefulness. Both perceived ease of use (β = .592, p < .001) and perceived usefulness (β = .156, p < .05) had a significant positive relationship with behavioural intention. Mutono and Dagada (2016) concluded that 86.2% of behavioural intention to adopt mobile learning was explained by perceived ease of use and perceived usefulness.

In a study conducted among 222 undergraduate students at a higher education institution in South Korea, the researchers combined the TAM and the Expectation Confirmation Model (ECM) (Joo, Kim, & Kim, 2016). The TAM model was used to predict student acceptance and perceptions of new technology, and the ECM model measured students’ acceptance and perceptions after experiencing the technology (Joo et

al., 2016). The purpose was to first measure the students' readiness to adopt mobile learning followed by a measurement of their perceptions of the experience after engaging with the LMS using mobile technology (Joo et al., 2016). The constructs examined in this study were expectation confirmation, perceived usefulness, satisfaction and continuance intention and perceived ease of use (Joo et al., 2016). Goodness of fit analysis presented a good fit between the data and the model (TLI = .979, CFI = .987, RMSEA = .057). As in the study conducted by Iqbal and Bhatti (2015) and Mutono and Dagada (2016), Joo et al. (2016) also identified a relationship between perceived ease of use and perceived usefulness in that perceived ease of use ($\beta = .627$, $p < .05$) predicted perceived usefulness (Joo et al., 2016).

In summary, the studies cited above (that employed the TPB) all consistently showed that attitude, subjective norm and perceived behavioural control were significant predictors of behavioural intention to adopt mobile learning in higher education (Cheon, et al., 2012; Tagoe & Abakah, 2014; Yeap & Soto-Acosta, 2016). The studies cited above employing the TAM consistently showed that perceived ease of use and perceived usefulness were significant predictors of behavioural intention to adopt mobile learning in higher education (Hsia et al., 2014; Iqbal and Bhatti, 2015; Joo et al., 2016; Mutono and Dagada, 2016). The TPB and TAM were therefore combined in this study to examine their influence on students' behavioural intention to adopt mobile learning in a South African context.

Theoretical Development: Testing a Model of Students' Behavioural Intention to Adopt Mobile Learning

The literature cited in the preceding section, identified the following psychological constructs as important when examining students' behavioural intention to adopt mobile learning: Attitude towards mobile learning, subjective norm, perceived behavioural control, perceived ease of use and perceived usefulness.

Furthermore, Ngampornchai and Adams (2016) cited self-efficacy as a strong predictor of a person's intention to use e-learning technology. Yorganci (2017) defined self-efficacy as the belief a person holds about whether they can perform a specific behaviour. According to Bandura's (1997) conception of self-efficacy, people must believe they can produce the desired effect through their actions, or else they will have little or no incentive to act. According to Bandura (1997), self-efficacy beliefs influence a person's willingness to participate in activities, the level of effort exerted while performing an activity, a person's level of perseverance and resilience when faced with obstacles and failures while performing the activity, a person's level of flexibility when experiencing difficulty, the positive or negative role of a person's thought patterns in their progress and a person's stress tolerance and inclination towards depression when coping with difficult situations.

Compeau and Higgens (1995) defined computer self-efficacy as a judgment of one's own capability to use a computer. Applied to the domain of mobile learning, it can be said that mobile learning self-efficacy refers to the domain of mobile learning and is, therefore, a judgment made by students of their ability to use mobile devices to learn. These personal beliefs about their ability to learn or perform learning activities at different levels using mobile technology impact on whether students will employ mobile technology in their learning (Schunk, 2012). It can, then, be argued that mobile learning self-efficacy impacts on a student's willingness to participate in mobile learning activities, the effort he/she is willing to make to learn how to learn with new technology, his/her level of perseverance and whether his/her thoughts hinder or aid their learning.

Students who believe that they do not possess the necessary power to produce results will not try to learn with the use of mobile technology. Consequently, a student's self-efficacy belief is a major basis for action (Bandura, 1997).

Research has shown that students with high self-efficacy solve more problems correctly and choose to rework more problems that were previously unsolved than those with low self-efficacy (Schunk, 2012). In relation to mobile learning, this may mean that students with low mobile learning self-efficacy may avoid attempting learning activities using their smartphones (Schunk, 2012). Conversely, students with high self-efficacy beliefs who face difficult tasks are more likely to exert effort and persist at these tasks (Schunk, 2012).

Based on this, it can then be argued that mobile learning self-efficacy is an important construct that influences students' perceived usefulness and perceived ease of use of mobile learning. However, limited research has been conducted on mobile self-efficacy (Al-Emran et al., 2016; Yang, 2012; Yorganci, 2017). In research conducted at Ataturk University in Turkey, Yorganci (2017) concluded that most of the students believed that they had the capability to use mobile technology to learn. Yang (2012) conducted a similar study at the Technical University in Taiwan. Yang (2012) found that students demonstrated the ability to use their mobile devices to read prescribed texts, post questions in the discussion forums and complete peer assessments. In a study conducted in Malaysia, students only scored a 'moderate' for mobile self-efficacy (Mahat et al., 2012). However, the students felt that they would use the mobile technology if they could attend a lesson that would explain to them how to use the technology effectively in their learning or if they had easy access to a person or department that could help them if they had difficulties using the technology (Mahat et al., 2012).

In research conducted by Hsia et al. (2014) a significant positive relationship between locus of control and two of the TAM constructs, namely perceived usefulness and perceived ease of use, were identified. Locus of control refers to the extent that an individual perceives that an event is under their control or under the control of external forces (Hsia et al., 2014). Those people who perceive that they have control are referred to as internals (Hsia et al., 2014) and

are said to have an internal locus of control. People who perceive that events are under the control of external forces are referred to as externals (Hsia et al., 2014) and are said to have an external locus of control.

Research has shown that students with an internal locus of control perform better in learning activities and problem-solving activities than students with an external locus of control (Hsia et al., 2014). Students with a strong internal locus of control are more likely to collect information to dispel uncertainty and identify ways to complete new tasks (Hsia, 2016). In the context of this study, it was hypothesised that students with a high internal locus of control are more likely to perceive mobile learning as useful and easy to use (Hsia, 2016). Hence, adult higher education students with a high internal locus of control are more likely to have enough confidence in their ability to use mobile learning and improve their academic performance with technology (Hsia, 2016). Hsia (2016) found that locus of control related directly to perceived usefulness, perceived ease of use and perceived behavioural control, thereby influencing behavioural intention to use mobile learning.

Considering the research concerning readiness, adoption and acceptance of new technology cited above, it can then be argued that internal locus of control, perceived usefulness, perceived ease of use, high mobile learning self-efficacy, perceived behavioural control, subjective norm and a positive attitude towards the use of smartphone technology in learning environments will influence students' readiness to employ mobile technology. The converse would then also presumably be true: Negative attitudes and low mobile learning self-efficacy beliefs towards the use of smartphone technology and an external locus of control could indicate that students are not ready to use mobile technology in their studies as they do not perceive it as useful or easy to use. Furthermore, since locus of control, perceived usefulness, perceived ease of use, subjective norm, mobile learning self-efficacy, perceived behavioural control, attitude towards mobile learning and behavioural intention

have all been identified as significant predictors of mobile learning readiness, adoption and acceptance of new technology, this study sought to validate a comprehensive theoretical model of user technology acceptance in the domain of mobile learning. This theoretical view combined the TAM and TPB and extended the model to include two additional variables, namely mobile learning self-efficacy and locus of control. The model was tested using a sample of distance education students at a private higher education institution to investigate South African distance education students' readiness to learn using mobile technology. The figure below is an illustration of the proposed research model.

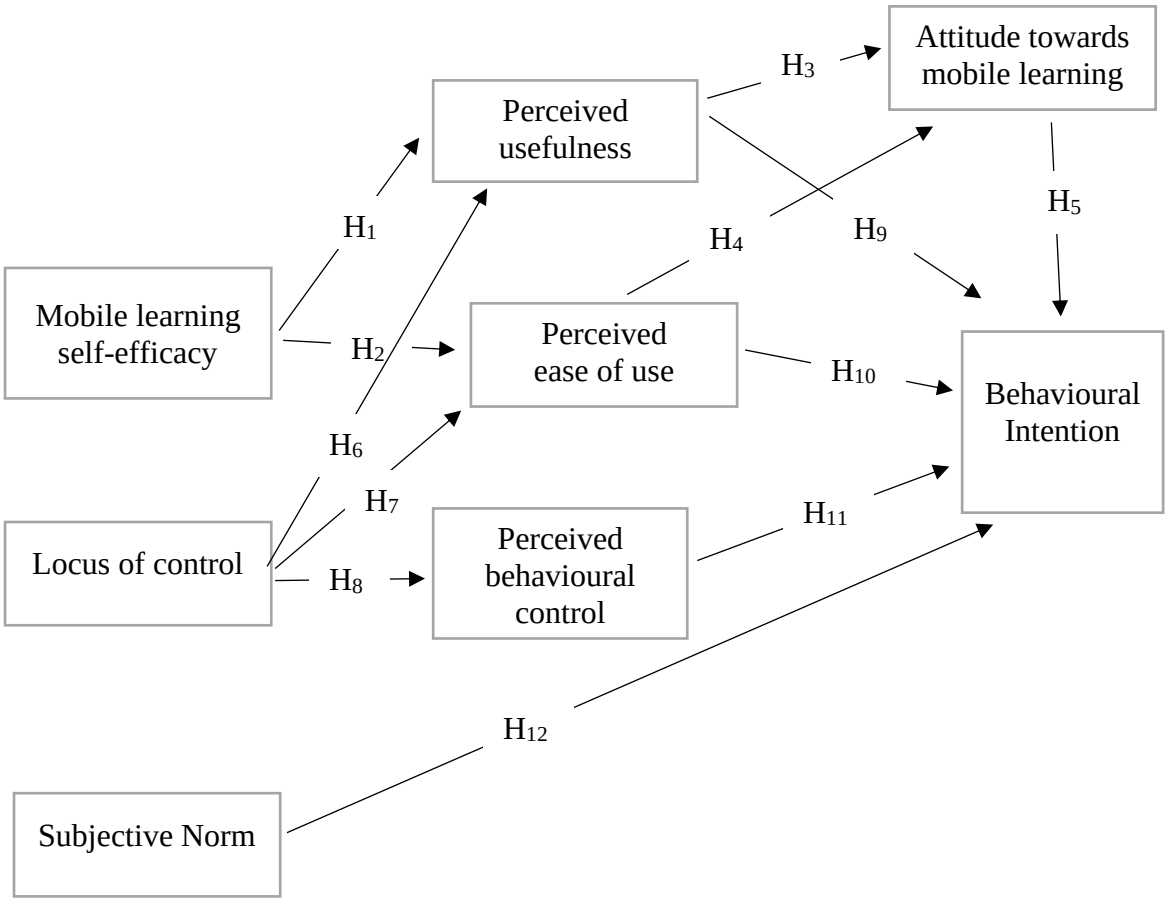


Figure 3 Proposed Research Model

In this model, mobile self-efficacy was hypothesised to have a strong influence on perceived usefulness (H_1) and perceived ease of use (H_2) regarding mobile learning. The higher a student's mobile self-efficacy, the more useful and easy to use the perception of

mobile learning will be. In contrast, students with low mobile learning self-efficacy are likely to perceive mobile learning as not useful nor easy to use. In addition, it was hypothesised that a student that perceives mobile learning to be useful and easy to use should have a positive attitude towards mobile learning (H_3 and H_4), while students who perceive mobile learning as not useful or not easy to use should display negative attitudes towards mobile learning. It was also hypothesised that students who perceive mobile learning to be useful, easy to use and have a positive attitude towards mobile learning will display high levels of behavioural intention to adopt mobile learning (H_9, H_{10}, H_5). In contrast, students who perceive mobile learning not to be useful, not to be easy to use and have negative attitudes towards mobile learning will display lower levels of behavioural intention to adopt mobile learning. Locus of control was hypothesised as an important factor that impacts on perceived usefulness (H_6), perceived ease of use (H_7) and perceived behaviour control (H_8). A student with an internal locus of control should find mobile learning easy to use and useful. At the same time, a student with an internal locus of control should demonstrate high perceived behavioural control. Inversely, students with an external locus of control should view mobile learning as difficult to use and not useful. At the same time, a student with an external locus of control should display low perceived behavioural control. Perceived behavioural control was also hypothesised to have a positive influence on behavioural intention to adopt mobile learning (H_{11}). It was argued that a student with high perceived behavioural control will have higher levels of behavioural intention to adopt mobile learning. However, if a student exhibits low levels of perceived behavioural control, then the student's behavioural intention to adopt mobile learning should also be low.

Finally, the model considered the influence of subjective norm on behavioural intention (H_{12}). If a student thinks that people who influence or who are important to him/her think

that he/she should use mobile learning, subjective norm should positively influence behavioural intention to adopt mobile learning (Tagoe & Abakah, 2014). Conversely, if a student does not think that people who influence or are important to him/her think that he/she should use mobile learning, then subjective norm should not have a positive influence on behavioural intention.

Summary

This chapter defined, explained and discussed important concepts in distance education and mobile learning. The transition from correspondence learning to e-learning and, recently, mobile learning in distance education was explored. The advantages and disadvantages of learning with a mobile device were highlighted.

The second part of the chapter focused on key trends and issues in mobile learning. The focus areas of mobile learning research in South African were discussed and the role of mobile learning in distance education was explored.

The literature review highlighted several theories and models of technology acceptance and readiness. The two theories and models that were employed in this study, namely the TPB and TAM, were explained and discussed. Research conducted using these models was explored. From the review of the literature, a theoretical model, that includes seven psychological factors that were hypothesised to influence students' behavioural intention to adopt mobile learning, was illustrated and discussed.

Chapter 3: Method

Chapter 3 begins with an overview of the research problem, the research purposes and the research questions and hypotheses. This is followed by a discussion of the study's research design. A detailed exposition of the research population is provided next as well as the sampling method followed to identify and recruit research participants. Data collection is discussed with reference to the data collection instrument as well as the procedures followed in the collection of data. Next the chapter outlines the analytic techniques used in the analysis of the data and the reliability and validity considerations pertaining to the research. The chapter concludes with a discussion of the ethical considerations related to this study.

Research Problem

Advances in mobile technology have made it possible for institutions in South Africa to design and offer course content that can be accessed, and learning activities that can be executed, on a mobile device. In this way students can study without the need to own or have access to a computer. However, having access to mobile devices does not necessarily imply that students are ready to adopt these devices as tools to access and engage in education programmes. Apart from research that focuses on issues surrounding access to mobile technology, additional research is necessary to explore the psychological factors that influence students' behavioural intention to adopt mobile learning in South Africa.

Research Purposes

In order to gauge South African students' readiness to adopt mobile learning, this study aimed to explore the psychological constructs that influence distance education students' behavioural intention to adopt mobile learning. To this end, the study also assessed the goodness of fit of a theoretical model predicting behavioural intention.

Research Questions

The central research question explored in this study was framed as follows:

What is the influence of locus of control, mobile learning self-efficacy, attitude towards mobile learning, perceived usefulness, perceived ease of use, perceived behavioural control and subjective norm on students' behavioural intention to adopt mobile learning?

To answer this research question, the psychological constructs (mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention) were combined to form a comprehensive theoretical model of behavioural intention to adopt mobile learning. Based on relevant literature and research findings in the field of mobile learning, it was argued that the constructs in this model would predict students' behavioural intention to adopt mobile learning. To confirm this argument the study was guided by twelve sub-research questions and twelve hypothesis statements.

The twelve sub-research questions guiding the investigation were formulated as follows:

1. Do students display high or low self-efficacy beliefs about learning with mobile technology?
2. Do students perceive mobile learning to be useful as a platform for learning?
3. Do students perceive mobile learning to be easy to use in their studies?
4. Do students exhibit positive or negative attitudes towards mobile learning?
5. Do students exhibit an internal or external locus of control?
6. What level of perceived behavioural control do students exhibit?
7. What influence do significant others have on a students' behavioural intention to adopt mobile learning?
8. Do students display behavioural intention to adopt mobile learning?

9. Are there any significant gender differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning?
10. Are there any significant age differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning?
11. Are there any significant differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning, in terms of race?
12. Are there any significant differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning, in terms of household income?

The following hypotheses were proposed:

$H_{1:}$ Mobile learning self-efficacy positively influences perceived usefulness.

$H_{2:}$ Mobile learning self-efficacy positively influences perceived ease of use.

$H_{3:}$ Perceived usefulness positively influences attitude towards mobile learning.

$H_{4:}$ Perceived ease of use positively influences attitude towards mobile learning.

$H_{5:}$ Attitude toward mobile learning positively influences behavioural intention to adopt mobile learning.

$H_{6:}$ Internal locus of control positively influences perceived usefulness.

$H_{7:}$ Internal locus of control positively influences perceived ease of use.

$H_{8:}$ Internal locus of control positively influences perceived behavioural control.

$H_{9:}$ Perceived usefulness positively influences behavioural intention to adopt mobile learning.

$H_{10:}$ Perceived ease of use positively influences behavioural intention to adopt mobile learning.

$H_{11:}$ Perceived behavioural control positively influences behavioural intention to adopt mobile learning.

$H_{12:}$ Subjective norm positively influences behavioural intention to adopt mobile learning.

Research Design: Survey Research

The research paradigm within which this study is situated is the positivist paradigm. Positivists believe in the use of natural science methods to study certain phenomena, including social phenomena (du Plooy-Cilliers, Davis, & Bezuidenhout, 2017). Positivistic research involves the use of theories to test hypotheses. These hypotheses are tested, and their results are described in terms of causal relationships (du Plooy-Cilliers et al., 2017). Within the positivist tradition quantitative data may be collected using surveys that are administered online and where respondents are required to complete rating scales (Wagner, Kawulich, & Garner, 2012). Survey responses are statistically analysed with the use of SPSS Version 25.0 to identify relationships between variables in order to answer the research questions (Wagner et al., 2012). This study utilised a quantitative, online self-administered survey in which respondents had to complete a rating scale for each psychological construct. Survey responses were analysed with the use of a statistical software programme to identify the relationships between the constructs.

This study took the form of a cross-sectional, survey design where data was collected at one point in time from respondents (Setia, 2016). In a cross-sectional study, participants are selected based on the inclusion and exclusion criteria set for the specific study (Setia, 2016). The inclusion criteria dictated that participants in this study had to be South African adult students registered for a distance learning programme at a Higher Education institution. A cross-sectional survey design allowed for the creation of an overall picture of student readiness to learn with the use of a mobile device. du Plooy-Cilliers et al. (2017) define surveys as a data collection tool that is used to collect data from a relatively large group of people using questions, statements and rating scales. Surveys allow for the collection of high volumes of data within a short period of time (Bless, Sithole, & Higson-Smith, 2013; Wagner et al., 2012). Surveys provide a quantitative description of a research population's attitudes and opinions, not usually observable, by asking a sample of research respondents questions and then generalising the findings to the population from which the sample was selected (du Plooy-Cilliers et al., 2017). Besides its cost effective and time-saving nature, data collected using surveys is already in a format required for import to data analysis software (Wagner et al., 2012). Furthermore, survey research also makes the identification of respondents impossible (Bless et al., 2013; Wagner et al., 2012). The disadvantages of using online survey questionnaires in South Africa relate to the concerns about the effectiveness of online surveys in developing countries (Bless et al., 2013; Wagner et al., 2012). Bless et al. (2013) cite a few factors that may impact on the effectiveness of online surveys. The first relates to the language in which the survey is administered. In countries such as South Africa where the population speaks eleven different languages, research participants may find it difficult to complete a survey such as the one in this study, namely in English, as it may not be their home language (Bless et al., 2013). Furthermore, social and cultural constraints may lead to a person other than the

chosen participant to complete the survey. In many South African households, the head of the household considers it their right to answer for their wives and daughters (Bless et al., 2013). Furthermore, access to the Internet in rural parts of South Africa, and the cost of data usage, may discourage students to complete an online survey (Bless et al., 2013).

Sampling

Target population.

According to the research focus, the target population in this study referred to distance education students in South Africa. A population is defined as the totality of people from whom information is required (du Plooy-Cilliers et al., 2017). The accessible population or study population is that part of the population that can be included in the study (du Plooy-Cilliers et al., 2017). The accessible population in this study consisted of 21 361 distance education students registered in the first semester of 2019 at a private higher education institution in South Africa.

Sampling procedure.

This study employed a combination of two non-probability sampling techniques, namely purposive and convenience sampling. Non-probability sampling techniques imply that the sample was not gathered from the target population in a randomised way (Etikan, Musa, & Alkassim, 2016). Purposive sampling can be defined as a sampling method in which the sample is drawn from the population in a deliberate way, based on a list of characteristics derived from the research question and population (Etikan et al., 2016; Punch, 2016). It is important in quantitative research to select a sample that has the same characteristics of the population for which inferences will be made (Wagner et al., 2012). As derived from the research question, the inclusion criteria dictated that participants in this study had to be South African, adult students registered for a distance learning programme at a Higher Education institution. Convenience sampling refers to a non-random sampling method that includes

members of the target population that are easily reachable, geographically close, available at the required survey date and are willing to participate in a study (Etikan et al., 2016). Convenience sampling was employed to select South African distance education students at a private higher education institution that was easily accessible to the researcher.

The entire student population of 21 361 students registered for the 2019 academic year at the private higher education institution were invited to participate in the online survey. Invitations to participate were sent via email and an SMS messaging system in May 2019. The email invitations were sent to 11 425 email addresses, while 9 936 students received an SMS message with the survey link in the body of the message. A reminder email and SMS were sent out two weeks after the first email. Responses were received from 2 203 students.

The responses received from the 2 203 students were exported from the online survey platform (SurveyMonkey) to Microsoft Excel to identify missing data. It was found that 1 106 students only completed the demographic information of the questionnaire after which they opted out of the survey. These incomplete responses were then removed from the data set, leaving a total of 1 097 respondents. A response rate of 5% was therefore obtained. The responses received from the 1 097 participants were imported to a statistical analysis tool, namely SPSS (IBM Corp, Released 2017). Twenty-seven outliers were identified and removed from the data which left 1 070 responses that were used in the final analysis.

Participants.

The demographic data collected from the sample included information related to 1) participant age, 2) participant gender, 3) participant race and 4) household income.

Age.

As illustrated in Table 1, 18.9% of respondents were categorised in the 18-24-year age group, with the majority of the respondents (53.5%) in the 25-34-year age group. 22.9% of respondents were aged between 35 and 44 years, with the minority of respondents falling in the 45 and older group. In terms of age, the majority of respondents (76.4%) were between 25-34 years and 35-44 years. This is common in a distance education institution where there is a wide range of student ages, with only a small proportion of students in the 'traditional' age group of 18-24 years.

Table 1 Research Participants: Age

Age	Frequency	Percent	Valid percent	Cumulative percent
18-24	202	18.9	18.9	18.9
25-34	572	53.5	53.5	72.4
35-44	246	22.9	22.9	95.3
45 years and older	50	4.7	4.7	100.0
Total	1070	100.0	100.0	

Gender.

As shown in Table 2, 63.7% of research respondents were female and 36.3% were male.

Table 2 Research Participants: Gender

Gender	Frequency	Percent	Valid percent	Cumulative percent
Female	682	63.7	63.7	63.7
Male	388	36.3	36.3	100.0
Total	1070	100.0	100.0	

Race.

Table 3 illustrates the racial representation of the research participants. 85.4% of the sample were African, while 9.5% were categorised as Coloured and 3.9% were White. The remainder of the sample were Indian (1%) and Asian (0.2%).

Table 3 Research Participants: Race

Race	Frequency	Percent	Valid percent	Cumulative percent
African	914	85.4	85.4	85.4
Asian	2	0.2	0.2	85.6
Coloured	101	9.5	9.5	95.1
Indian	11	1.0	1.0	96.1
White	42	3.9	3.9	100.0
Total	1070	100.0	100.0	

Household income.

Table 4 shows the household income of participants. 80.5 % of research participants have a household income of less than R10 000 per month, while 8.3% of research participants have a household income of R10 001 to R15 000 per month and 5.2% of research participants have a household income of R15 001 to R20 000 per month. The remainder of the sample were household income R20 001 to R25 000 (1.8%), household income R25 0001 to R30 000 (2.1%) and household income above R30 000 per month (2.1%).

Table 4 Research Participants: Household Income

Household income	Frequency	Percent	Valid percent	Cumulative percent
Less than R5 000 per month	546	51.0	51.0	51.0
R5 001 to R10 000 per month	316	29.5	29.5	80.5
R10 001 to R15 000 per month	89	8.3	8.3	88.8
R15 001 to R20 000 per month	56	5.2	5.2	94.0
R20 001 to R25 000 per month	19	1.8	1.8	95.8
R25 001 to R30 000 per month	22	2.1	2.1	97.9
More than R30 000 per month	22	2.1	2.1	100.00
Total	1070	100.0	100.0	

In summation, the majority of research participants were between the age of 25 and 44 years old (76.4%), female (63.7%), Africans (85.4%) and earn a household income of less than R10 000 per month (80.5%).

Data Collection

Data were collected with the use of an online survey questionnaire. The questionnaire was administered with the use of SurveyMonkey software. SurveyMonkey is an electronic survey application which has been developed to enable researchers to design and distribute surveys to a wide audience at minimal cost (Wagner et al., 2012). The online survey included a detailed introduction that explained the purpose of the survey and addressed ethical matters including informed consent and voluntary participation. Terms such as 'mobile learning' and 'mobile technology' were also defined in the questionnaire. It was expected that the respondents would take 15 – 20 minutes to complete the questionnaire.

Research instrument.

In order to guide the construction of the questionnaire for this study, a review of the literature was conducted to identify the measuring instruments used in previous research about psychological readiness to adopt mobile learning. As highlighted in Chapter 2, mobile learning researchers have employed various technology adoption theories and models (i.e. TPB, UTAUT, and TAM) and, in some cases, extended them to include other psychological constructs (Abu-Al-Aish & Love, 2013; Alharbi & Drew, 2014; Cheon et al., 2012; Chu & Chen, 2016; Tagoe & Abakah, 2014; Yeap et al., 2016). A questionnaire employed by Yorganci (2017) measured mobile learning self-efficacy and mobile learning attitude among students at the Erzurum Vocational School, Ataturk University. Similar instruments measuring mobile learning self-efficacy and mobile learning attitude were included in two other studies conducted by Al-Emran et al. (2016) and Mahat et al. (2012) respectively. In the review of these instruments, the scales employed by Yorganci (2017) were deemed more appropriate for use in this study as they also gathered valuable information about how to improve mobile self-efficacy among students. In research conducted at the National Chiao Tung University in Hsinchu, Taiwan, Hsia (2016) combined the TAM and TPB models and

extended the model to include locus of control as an additional variable. This instrument included measurements for locus of control, perceived usefulness, perceived ease of use, perceived behavioural control and behavioural intention (Hsia, 2016). In research conducted by dos Santos and Okazaki (2016), the Decomposed Theory of Planned Behaviour (DTPB) model was extended. The hypothesised model measured ease of use, perceived usefulness, compatibility, attitude, subjective norms, resource facilitating conditions, usage intention and behavioural control. The measures of subjective norm were identified as suitable for this study.

In order to establish whether South African distance education students displayed behavioural intention to adopt mobile learning, the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB) were combined and extended to include two additional variables, namely mobile learning self-efficacy and locus of control. Based on this comprehensive theoretical view of user technology acceptance, the measuring instrument employed in this study included measures for the following psychological constructs: Mobile self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, attitude towards mobile learning and behavioural intention. The constructs included in this hypothesised model were identified in the literature as relevant and important factors related to readiness to adopt mobile learning.

The measurement instrument for this study took the form of an online, self-administered questionnaire. The section that follows discusses each section of the questionnaire in more detail. (See Appendix A for the complete questionnaire.)

Demographic questionnaire.

A demographic section allowed the researcher to identify respondent characteristics. The demographic questionnaire gathered information related to the participants' age,

gender, race, and household income. Given the purposes of this study, the data garnered from the demographic section was necessary in order to investigate whether there were any significant differences between the constructs measured in this study in terms of age, gender, race and household income.

Mobile learning self-efficacy questionnaire.

The Mobile Learning Self-efficacy Questionnaire measured students' level of confidence in their judgement of their ability to complete specific tasks with the use of their mobile device (Yorganci, 2017). This questionnaire included task difficulty elements, while self-efficacy strength was identified in the response scale (Yorganci, 2017). The questionnaire yielded one composite self-efficacy score for each research participant and a score for each item in the questionnaire. The questionnaire consisted of 10 items. Participants were required to indicate their confidence level on a 10-point Likert scale. The Likert scale ranged from 1 ('not at all confident') to 10 ('totally confident') (Yorganci, 2017). A score of 5 represented moderate confidence whereas a score of 6 and above represented high mobile self-efficacy and scores below 5 indicated low mobile self-efficacy (Yorganci, 2017).

The internal consistency of the scale, which was based on the consistency of responses to all items in the measure, was .86, which is above the acceptable reliability coefficient of .70 (Hsia, 2014; Yorganci, 2017).

Each item in the questionnaire begins with 'I could use m-learning…'. For the purposes of this study, it was argued that research participants may not be familiar with the term 'm-learning' and therefore 'm-learning' was replaced with 'mobile learning' and a definition of mobile learning was provided in the introduction to the questionnaire.

Mobile learning attitude scale.

The Mobile Learning Attitude Questionnaire measured students' attitudes towards the use of their smartphones for participating in and completing the learning activities included in online programmes. The questionnaire was developed and used by Al-Emran et al. (2016) and consists of 10 items that measure students' attitude towards studying using a mobile device and using a mobile device to collaborate with fellow students and facilitators, to find resources online and to access learning material. The Mobile Learning Attitude Scale yielded one composite attitude score for each research participant and a score for each item on the scale. The items were measured on a 5-point Likert scale. The scale ranged from 1 ('strongly disagree') to 5 ('strongly agree') where 'strongly disagree' (1) and 'disagree' (2) indicated a negative attitude, 'agree' (4) and 'strongly agree' (5) indicated a positive attitude and 'not sure' (3) indicated that they were unsure how to respond to an item in the scale.

To validate the questionnaire, Al-Emran et al. (2016) sent the attitude towards mobile learning survey to experts in mobile learning at the British University in Dubai for review of all items. The experts verified that items included in the survey indicated satisfactory content validity of the measure. Content validity is the process by which researchers determine whether the content or items in the research instrument covers a representative sample of the behaviour domain to be measured (Foxcroft & Roodt, 2015). In addition, exploratory factor analysis was conducted. The questions loaded onto one factor. Factor loadings ranged between .722 and .844 (Al-Emran et al., 2016). The internal consistency of the Mobile Learning Attitude scale was .89, which is above the acceptable reliability coefficient value of .70 (Hsia, 2016; Yorganci, 2017).

The items contained in the instrument were formulated as statements. Each item in the questionnaire begins with 'Mobile technology…'. It was argued that research participants

may not be familiar with the term ‘mobile technology’ and therefore a definition of mobile technology was provided in the introduction to the questionnaire.

Subjective norm.

Subjective norm was measured using two items that were included in research conducted by dos Santos and Okazaki (2016). These 2 items were measured on a 5-point Likert scale ranging from 1 (‘strongly disagree’) to 5 (‘strongly agree’) where ‘strongly disagree’ (1) and ‘disagree’ (2) indicated that people who influence research participants or who are important to them do not think that mobile learning is important, while ‘agree’ (4) and ‘strongly agree’ (5) indicated a belief that people who influence them or are important to them would want them to use mobile learning and ‘not sure’ (3) indicated that research participants were unsure of their response to an item in the scale (dos Santos & Okazaki, 2016). dos Santos and Okazaki (2016) assessed the construct validity of the scale. Construct validity of a measuring instrument refers to the extent to which it measures the construct it is supposed to measure (Foxcroft & Roodt, 2015). The scale demonstrated satisfactory convergent validity. The average variance extracted (AVE = .83) (a measure of convergent validity) was higher than the recommended (AVE > .5) threshold, thus demonstrating sufficient construct validity. Internal consistency was measured using Cronbach’s alpha coefficient and composite reliability. dos Santos and Okazaki (2016) reported a Cronbach alpha coefficient of .91. This is well above the .7 threshold (Hsia, 2016; Yorganci, 2017), thus indicating that the two items measuring subjective norm were adequate. The composite reliability of the scale was (CR= .97). A composite reliability (CR) of higher than .7 is deemed acceptable (dos Santos & Okazaki, 2016).

Locus of control, perceived usefulness, perceived ease of use, perceived behavioural control and behavioural intention.

In order to measure locus of control, perceived usefulness, perceived ease of use, perceived behavioural control and behavioural intention, the research instrument used by Hsia (2016) was employed. The questionnaire consisted of 28 items. The items measured locus of control (11 items), perceived usefulness (5 items), perceived ease of use (5 items), perceived behavioural control (5 items) and behavioural intention to use (2 items). These 28 items were measured on a 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') (Hsia, 2016). Each scale yielded one composite score for each research participant and a score for each item on the scale.

Hsia (2016) made use of measures of internal consistency, convergent validity and discriminant validity to assess the psychometric properties of the scales in the questionnaire. Table 5 indicates the Cronbach alpha coefficients and composite reliability of each of the scales in the questionnaire (Hsia, 2016).

Table 5 Cronbach Alpha Coefficient and Composite Reliability

Construct	Cronbach alpha coefficient	Composite Reliability (CR)	Average variance extracted (AVE)
Locus of control	0.89	0.91	0.53
Perceived ease of use	0.86	0.90	0.64
Perceived usefulness	0.84	0.89	0.62
Perceived behavioural control	0.90	0.92	0.71
Behavioural intention to use	0.78	0.90	0.82

Internal consistency of the constructs was measured using Cronbach's alpha coefficient. Composite reliability (CR) and the average variance extracted (AVE) were used to measure construct validity. As noted, CR > .7 and AVE > .5 is deemed acceptable (Hsia, 2016). The Cronbach alpha coefficient and composite reliability results are all well above the .70 suggested threshold (Hsia, 2016). To evaluate discriminant and convergent

validity, Hsia (2016) examined whether all items loaded > .7 on their respective constructs. There were two low factor loading items identified that were removed from the locus of control scale. After removing these two items, the modified loadings showed clear discriminant and convergent validity for all constructs (Hsia, 2016).

Reliability test: Cronbach alpha coefficient for this study.

Table 6 summarises of the Cronbach alpha coefficients obtained in this study as well as those reported in previous studies.

Table 6 Internal Consistency of Measuring Instruments

Construct	Cronbach alpha coefficient (Previous Study)	Cronbach alpha coefficient (This study)
Mobile learning self-efficacy	0.86	0.91
Attitude towards mobile learning	0.89	0.93
Locus of control	0.89	0.84
Perceived ease of use	0.86	0.91
Perceived usefulness	0.84	0.90
Perceived behavioural control	0.90	0.89
Behavioural intention to use	0.78	0.85
Subjective norm	0.91	0.77

All Cronbach alpha results in this study were within the recommended range of .70 to .95, thus indicating acceptable internal reliability of the research (Tavakol & Dennick, 2011). In addition, it is noted that none of the constructs showed a Cronbach alpha coefficient that was too high (i.e. above .95) (Tavakol & Dennick, 2011) and it was therefore concluded that none of the items included in the questionnaire were redundant. Furthermore, it is noted that the Cronbach alpha for subjective norm in the previous study (dos Santos & Okazaki, 2016) was .91, while in this study it was .77. Although this Cronbach's alpha coefficient is lower than reported in the previous study, it is still above the acceptable cut-off of .70 as cited by Tavakol and Dennick (2011).

Data Analysis

Descriptive statistics involves the use of measures of central tendency (mean) and measures of variability (standard deviation) to organise, summarise and describe data (Aron, Aron, & Coups, 2014; Wagner et al., 2012). The mean is the sum of all the scores divided by the number of scores, while standard deviation is about direct, ordinary, unsquared deviation from the mean (Aron et al., 2014). The mean and standard deviation was calculated for each item that measured the psychological constructs included in the proposed model. In addition, one composite score was calculated for each construct. This was achieved by adding the means of the individual items together to obtain a composite score. Descriptive statistics were employed to answer sub-research questions 1 to 8.

Multiple linear regression analysis is used to predict an outcome variable from several predictor variables (Fields, 2009). In this study, the outcome variable was behavioural intention, while the predictor variables were perceived usefulness, perceived ease of use, perceived behavioural control, subjective norm, attitude towards mobile learning, mobile learning self-efficacy and locus of control. In this study, a stepwise regression analysis was conducted. In stepwise regression the order in which the predictor variables are entered into the model are based on mathematical criterion (Fields, 2009). All predictors were included in the proposed model. SPSS was then used to calculate the contribution of each predictor variable by assessing the significance value of the t-test for each predictor variable. If a predictor variable did not make a statistically significant contribution to how well the model predicted behavioural intention, then it was removed from the model. The findings from the stepwise regression analysis provided an answer to the central research question. A significance level of .05 was employed to identify any statistically noteworthy results.

Multivariate analysis of variance (MANOVA) was used to identify any interactions among mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention in terms of gender, age and household income. The findings from the MANOVA procedure provided answers to sub-research question 9, 10 and 12. A significance level of .05 was employed to identify any statistically noteworthy results.

An analysis of variance (ANOVA) was conducted to examine whether there were any differences in race in terms of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning. The findings from the ANOVA provided answers to sub-research question 11. An ANOVA was conducted to identify differences in race. A significance level of .05 was employed to identify any statistically significant differences.

The next step involved confirming the hypotheses and exploring how the data fit the proposed model. In this study structural equation modelling, specifically a path model with manifest variables only, was conducted to assess the proposed model. According to Hooper, Coughlan, and Mullen (2008), structural equation modelling is a statistical technique that is often used to identify the model that best fits the data, as well as align to theory and literature (Hooper et al., 2008). Model fit determines how well the model fits the sample data. If the model fits the data well then it is assumed that the initial predictions are true. If the sample data do not support the proposed model, then either an alternative model will need to be specified and tested or another theoretical model hypothesised and tested. The SPSS programme was used for the structural equation modelling analysis. A significance level of .001 was used to identify any statistically significant results with regard to the structural equation modelling analysis.

In this study, absolute fit and incremental fit indices were used to determine model fit. According to Hooper et al. (2008), absolute fit indices are used to determine how well the model fits the sample data. The absolute fit indices included the Chi-Squared test, Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI) and the Root mean square residual (RMR).

The RMSEA index measures the lack of fit in relation to the saturated model (Hooper et al., 2008). RMSEA results that are less than .05 indicate a good fitting model, while .05 to .08 refer to a moderate fitting model and results higher than .08 indicates a less adequate fit (Hooper et al., 2008). The Goodness of Fit Index (GFI) indicates what amount of the variance in the Sample Variance Covariance Matrix is accounted for by the model (Hooper et al., 2008). GFI results that are higher than .90 indicate a good model fit while a saturated model will be a perfect 1 (Hooper et al., 2008). The Adjusted Goodness of Fit Index (AGFI) is an alternate GFI index. In the GFI index adjustments are made to accommodate for the number of constructs and hypothesised relationships in the model (Hooper et al., 2008). Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI) with a result higher than .90 indicates good model fit. Root mean square residual (RMR) is an index that shows the amount of variance between estimated variances and covariances and the observed variances and covariances (Hooper et al., 2008). A well-fitting model has a value of less than .05, while acceptable models yield values as high as .08. The Incremental Fit Indices do not use the chi-square in its raw form, but instead compare the chi-square value to a baseline model (Hooper et al., 2008). The null hypothesis for these models' state that all variables are uncorrelated (Hooper et al., 2008). In addition, the goodness of fit indices compares the hypothesised model to the independence model rather than the saturated model. The Normed Fit Index (NFI) reflects the difference between the two models, by calculating chi-squares divided by the chi-

square for the independence model (Hooper et al., 2008). According to Hooper et al. (2008), values of .90 or higher indicate good fit. Furthermore Hooper et al. (2008) state that more recently NFI ≥ .95 indicates good fit. The Comparative Fit Index (CFI) uses the same approach (with a non-central chi-square) and has been found to be a good index for use even with small samples. The CFI, as the NFI, also ranges from 0 to 1 where .95 (or .9 or higher) indicates a good fitting model. The parsimony fit indices, such as the Parsimony Normed Fit Index (PNFI), penalise complex models. In cases where a model is too complex, the PNFI results are lower than other goodness of fit indices. The PNFI therefore rewards models that contain few paths. Table 7 summarises various model fit indices, along with their recommended values that indicate an acceptable model fit.

Table 7 Goodness-of-Fit Measures

Goodness-of-fit measure	Recommended value
Chi-square/degree of freedom	≤ 3.00
Root mean square error of approximation (RMSEA)	≤ 0.05
Goodness of fit index (GFI)	≥ 0.90
Adjusted goodness of fit index (AGFI)	≥ 0.90
Normed fit index (NFI)	≥ 0.90
Comparative fit index (CFI)	≥ 0.90
Parsimony normed fit index (PNFI)	No threshold levels recommended

Hooper et al. (2008) stated that when model fit must be determined, it is important to include the Chi-Square statistic, its degrees of freedom and p value. In addition to the Chi-square, the RMSEA and its associated confidence interval, the SRMR, the CFI and one parsimony fit index such as the PNFI should also be included to determine model fit (Hooper et al., 2008).

Ethical Considerations

The researcher obtained ethical clearance from the College of Human Sciences' Research Ethics Review Committee at UNISA (Rec-240818-052) to conduct the research at the private higher education institution in question. The researcher then obtained written consent from

the participating institution's CEO (Principal) and Academic Head to ensure full access to research participants and data. The research was therefore conducted in accordance with the University of South Africa's research and ethical processes.

The research involved student participants that were required to complete an online questionnaire about mobile learning readiness. This study was therefore considered a low-risk study as participants were adult learners in the age range of 18 to 60. Information that was collected related to their gender, age, highest qualification, household income, mobile learning self-efficacy beliefs, attitudes towards mobile learning, perceived usefulness and ease of use of new technology, locus of control, perceived behavioural control, subjective norm and behavioural intention. All responses in the online questionnaire were anonymous. Participants were not required to reveal any of their personal student details, e.g. their names, surnames, student numbers or ID numbers, thus ensuring their anonymity. No other data collection methods that may have impacted on the anonymity or privacy of participants were used in this study.

Furthermore, participation in this study was voluntary. Students who decided to participate in this study first had to read the purpose of the research and the terms and conditions of participating in this research project. They then had to provide informed consent by clicking a radio button in the survey. Students who did not agree could not access the survey questions.

As far as costs were concerned, students were required to complete an online survey, and therefore the only costs incurred by research participants was for data usage. If research participants found any of the questions offensive or anxiety-provoking, they had the right to refuse to complete the questionnaire and could withdraw from the study.

Participants were not expected to undergo any psychometric tests or physical examinations, nor were they observed live or recorded by camera. Participation in this study did not pose any form of physical or psychological harm to the participants. It was argued that this study will contribute positively to the development of new ways of providing higher education programmes for distance education students.

Only the researcher, supervisor and statistician had access to the data records. The data will be retained for 5 years after the conclusion of the research study. Data will be stored on a password-protected flash drive which will be locked away in a safe. Thereafter the data will be discarded.

Summary

This chapter discussed the research design and processes followed in this study. The online survey questionnaire collected participant demographic information and measured each of the constructs contained in the research model. Descriptive statistics were used to profile participants' demographic characteristics. Multivariate analysis of variance, multiple regression analysis and structural equation modelling were used to statistically analyse the data to answer the main research question, eleven sub-research questions, and to test the research hypotheses to determine model fit. The chapter concluded with a discussion of the ethical considerations pertinent to the study.

Chapter 4: Results

This study aimed to explore the psychological constructs, as identified in the literature, that influenced behavioural intention to adopt mobile learning among a sample of distance education students in South Africa. Specifically, this study aimed to explore the influence of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning on student behavioural intention to adopt mobile learning. Furthermore, the study aimed to test the goodness of fit of a theoretical model predicting behavioural intention to adopt mobile learning.

This chapter provides the results of the analyses pertaining to each of the research questions and hypotheses posed in this study as well as the outcomes of the structural equation modelling analysis that was used to determine goodness of fit of the proposed model. A short summary then concludes the chapter.

Central Research Question: What is the Influence of Locus of Control, Mobile Learning Self-Efficacy, Attitude Towards Mobile Learning, Perceived Usefulness, Perceived Ease of Use, Perceived Behavioural Control and Subjective Norm on Students' Behavioural Intention to Adopt Mobile Learning?

Stepwise regression analysis was used to explore whether locus of control, mobile learning self-efficacy, attitude towards mobile learning, perceived usefulness, perceived ease of use, perceived behavioural control and subjective norm predicted students' behavioural intention to adopt mobile learning. With the exception of mobile learning self-efficacy, all the other predictor variables made statistically significantly contributions to behavioural intention to adopt mobile learning. Mobile learning self-efficacy was therefore not included in the final model.

Table 8 shows the correlation between behavioural intention and the predictor variables.

Table 8 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.577[a]	0.332	0.332	1.00373
2	.621[b]	0.386	0.384	0.96344
3	.649[c]	0.421	0.419	0.93584
4	.659[d]	0.434	0.432	0.92530
5	.666[e]	0.444	0.441	0.91790
6	.669[f]	0.448	0.444	0.91518

a. Predictors: (Constant), Attitude towards mobile learning
b. Predictors: (Constant), Attitude towards mobile learning, perceived ease of use
c. Predictors: (Constant), Attitude towards mobile learning, perceived ease of use, subjective norm
d. Predictors: (Constant), Attitude toward mobile learning, perceives ease of use, subjective norm, perceived usefulness
e. Predictors: (Constant), Attitude toward mobile learning, perceives ease of use, subjective norm, perceived usefulness, perceived behavioural control
f. Predictors: (Constant), Attitude toward mobile learning, perceives ease of use, subjective norm, perceived usefulness, perceived behavioural control, locus of control

In Table 8, R square ($R^2 = 0.448$) indicates the percentage of the variance in behavioural intention (Fields, 2009). As shown, the predictor variables included in the model accounted for 44.8% of the variance in behavioural intention to adopt mobile learning.

Table 9 shows the outcome of the statistical test of the significance of the R square change.

Table 9 ANOVA

Model		Sum of squares	df	Mean square	F	Sig
1	Regression	535.780	1	535.780	531.807	.000[a]
	Residual	1075.980	1068	1.007		
	Total	1611.761	1069			
2	Regression	621.358	2	310.679	334.706	.000[b]
	Residual	990.403	1067	0.928		
	Total	1611.761	1069			
3	Regression	678.159	3	226.053	258.110	.000[c]
	Residual	933.602	1066	0.876		
	Total	1611.761	1069			
4	Regression	699.935	4	174.984	204.379	.000[d]
	Residual	911.826	1065	0.856		
	Total	1611.761	1069			

5	Regression	715.299	5	143.060	169.796	.000[e]
	Residual	896.462	1064	0.843		
	Total	1611.761	1069			
6	Regression	721.440	6	120.240	143.561	.000[f]
	Residual	890.321	1063	0.838		
	Total	1611.761	1069			

a. Predictors: (Constant), Attitude towards mobile learning
b. Predictors: (Constant), Attitude towards mobile learning, perceived ease of use
c. Predictors: (Constant), Attitude towards mobile learning, perceived ease of use, subjective norm
d. Predictors: (Constant), Attitude toward mobile learning, perceived ease of use, subjective norm, perceived usefulness
e. Predictors: (Constant), Attitude toward mobile learning, perceived ease of use, subjective norm, perceived usefulness, perceived behavioural control
f. Predictors: (Constant), Attitude toward mobile learning, perceived ease of use, subjective norm, perceived usefulness, perceived behavioural control, locus of control

The results indicated that, together, the predictor variables (locus of control, attitude towards mobile learning, perceived usefulness, perceived ease of use, perceived behavioural control and subjective norm) accounted for a statistically significant proportion of the variance in behavioural intention to adopt mobile learning ($p < .05$), while mobile learning self-efficacy was not a significant predictor. One way to evaluate R square is by looking at its effect size. This effect size is calculated as the proportion of the variation accounted for by the regression line relative to the proportion not accounted for (Ellis & Steyn, 2003). An effect size of $ƒ^2 = .02$ is considered a small effect, $ƒ^2 = .15$ a medium effect and $ƒ^2 = .35$ is considered to be a large effect (Cohen, 1992). The effect size for the Model 6 was $ƒ^2 = .79$ which is above $ƒ^2 = .35$ and therefore a large effect.

Table 10 illustrates the variables removed from each model. The findings in Table 10 should be read in conjunction with the linear regression equation coefficients for the various model variables in Table 11.

Table 10 Excluded Variables

Model		Beta in	t	Sig	Partial Correlation	Collinearity Statistics Tolerance
1	Mobile Learning Self-Efficacy	.070[b]	2.523	0.012	0.077	0.811

	Perceived Usefulness	.268[b]	8.506	0.000	0.252	0.592
	Perceived Ease of Use	.328[b]	9.602	0.000	0.282	0.495
	Locus of Control	.185[b]	6.845	0.000	0.205	0.825
	Perceived Behavioural Control	.218[b]	7.474	0.000	0.223	0.701
	Subjective Norm	.233[b]	9.005	0.000	0.266	0.867
2	Mobile Learning Self-Efficacy	.022[c]	0.803	0.422	0.025	0.782
	Perceived Usefulness	.195[c]	6.037	0.000	0.182	0.537
	Locus of Control	.138[c]	5.192	0.000	0.157	0.790
	Perceived Behavioural Control	.171[c]	5.945	0.000	0.179	0.675
	Subjective Norm	.203[c]	8.053	0.000	0.239	0.851
3	Mobile Learning Self-Efficacy	.013[d]	0.479	0.632	0.015	0.780
	Perceived Usefulness	.160[d]	5.043	0.000	0.153	0.525
	Locus of Control	.093[d]	3.457	0.001	0.105	0.744
	Perceived Behavioural Control	.137[d]	4.812	0.000	0.146	0.657
4	Mobile Learning Self-Efficacy	-.010[e]	-0.390	0.697	-0.012	0.757
	Locus of Control	.088[e]	3.312	0.001	0.101	0.743
	Perceived Behavioural Control	.121[e]	4.270	0.000	0.130	0.647
5	Mobile Learning Self-Efficacy	-.027[f]	-1.016	0.310	-0.031	0.742
	Locus of Control	.072[f]	2.708	0.007	0.083	0.726
6	Mobile Learning Self-Efficacy	-.029[g]	-1.088	0.277	-0.033	0.741

a. Dependent Variable: Behavioural Intention
b. Predictors in the Model: (Constant), Attitude towards mobile learning
c. Predictors in the Model: (Constant), Attitude towards mobile learning, perceived ease of use
d. Predictors in the Model: (Constant), Attitude towards mobile learning, perceived ease of use, subjective norm
e. Predictors in the Model: (Constant), Attitude towards mobile learning, perceived ease of use, subjective norm, perceived usefulness
f. Predictors in the Model: (Constant), Attitude towards mobile learning, perceived ease of use, subjective norm, perceived usefulness, perceived behavioural control
g. Predictors in the Model: (Constant), Attitude towards mobile learning, perceived ease of use, subjective norm, perceived usefulness, perceived behavioural control, locus of control

Table 11 illustrates the regression coefficients for each of the constructs included in the model. The regression coefficients refer to the amount of change in behavioural intention for each unit of change in a predictor variable (Fields, 2009).

Table 11 Coefficient

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std Error	Beta	t	Sig
1	(Constant)	2.228	0.277		8.030	0.000
	Attitude towards mobile learning	0.161	0.007	0.577	23.061	0.000
2	(Constant)	2.074	0.267		7.777	0.000
	Attitude towards mobile learning	0.096	0.010	0.344	10.074	0.000
	Perceived ease of use	0.130	0.014	0.328	9.602	0.000
3	(Constant)	1.799	0.261		6.885	0.000
	Attitude towards mobile learning	0.082	0.009	0.295	8.770	0.000
	Perceived ease of use	0.116	0.013	0.291	8.707	0.000
	Subjective norm	0.149	0.018	0.203	8.053	0.000
4	(Constant)	1.549	0.263		5.889	0.000
	Attitude towards mobile learning	0.066	0.010	0.235	6.651	0.000
	Perceived ease of use	0.096	0.014	0.241	6.985	0.000
	Subjective norm	0.135	0.018	0.185	7.317	0.000
	Perceived usefulness	0.067	0.013	0.160	5.043	0.000
5	(Constant)	1.396	0.263		5.299	0.000
	Attitude towards mobile learning	0.055	0.010	0.199	5.517	0.000
	Perceived ease of use	0.088	0.014	0.222	6.413	0.000
	Subjective norm	0.123	0.018	0.169	6.669	0.000
	Perceived usefulness	0.060	0.013	0.144	4.528	0.000
	Perceived behavioural control	0.046	0.011	0.121	4.270	0.000
6	(Constant)	1.119	0.282		3.968	0.000
	Attitude towards mobile learning	0.053	0.010	0.191	5.293	0.000
	Perceived ease of use	0.083	0.014	0.208	5.990	0.000
	Subjective norm	0.112	0.019	0.154	5.957	0.000
	Perceived usefulness	0.059	0.013	0.142	4.493	0.000
	Perceived behavioural control	0.041	0.011	0.109	3.816	0.000
	Locus of control	0.015	0.006	0.072	2.708	0.007

a. Dependent Variable: Behavioural Intention

When all the psychological constructs were included in the model (except mobile learning self-efficacy), results indicated that perceived ease of use had the highest beta value (.208) followed by attitude towards mobile learning (.191), subjective norm (.154), perceived usefulness (.142), perceived behavioural control (.109) and locus of control (.072). It is therefore concluded that perceived ease of use contributed more substantially to the prediction of behavioural intention than the other psychological constructs in the model. As expected, the constructs in the TAM model (perceived ease of use and perceived usefulness) and the constructs in the TBP model (attitude towards mobile learning, subjective norm and perceived behavioural control) all significantly contributed towards the behavioural intention to adopt mobile learning. However, the addition of mobile learning self-efficacy and locus of control to the model yielded mixed results. Locus of control made a small but statistically significant contribution to behavioural intention to adopt mobile learning. Mobile learning self-efficacy, however, made no statistically significant contribution to behavioural intention to adopt mobile learning.

In summary, stepwise regression analysis indicated that 1) perceived ease of use was the strongest predictor of behavioural intention, 2) all the psychological factors included in this study significantly predicted behavioural intention, except for mobile learning self-efficacy, and 3) together, the psychological factors included in the model accounted for 44.8% of the variance in behavioural intention to adopt mobile learning.

Sub-Research Question 1: Do Students Display High or Low Self-Efficacy Beliefs About Learning with Mobile Technology?

The Mobile Learning Self-efficacy questionnaire included task difficulty elements, while self-efficacy strength was identified in the response scale, which measured a student's level of confidence in the judgement of their ability to use mobile learning in their studies (Compeau & Higgens, 1995). Participants were required to indicate their confidence level on

the 10-point Likert scale ranging from 1 (not at all confident) to 10 (totally confident) (Compeau & Higgens, 1995). On the 10-point scale, a score of 5 represented moderate confidence whereas scores of 6 and above represented high mobile self-efficacy and scores below 5 indicated low mobile self-efficacy (Compeau & Higgens, 1995). The mobile learning self-efficacy questionnaire yielded one composite score for each participant as well as a score for each item in the scale.

Table 12 Scale Descriptive: Mobile Learning Self-Efficacy

Item	Questions	N	Mean	Std. Deviation
1	I could use mobile learning even if there was no one around to tell me what to do	1070	7.69	2.459
2	I could use mobile learning if I had never used a mobile device like it before	1070	7.06	2.630
3	I could use mobile learning if I had only the mobile device manual for reference	1070	7.24	2.569
4	I could use mobile learning if I had seen someone else using it before trying it myself	1070	7.51	2.613
5	I could use mobile learning if I could call someone for help if I got stuck	1070	7.72	2.558
6	I could use mobile learning if someone else has helped me get started	1070	7.68	2.674
7	I could use mobile learning if I had a lot of time to complete the task for which the mobile device was provided	1070	8.04	2.353
8	I could use mobile learning if I had just the built-in help facility for assistance	1070	7.58	2.476
9	I could use mobile learning if someone showed me how to do it first	1070	7.81	2.630
10	I could use mobile learning if I had used similar mobile devices before this one to do the same task	1070	7.77	2.575
Total: Mobile learning self-efficacy		1070	76.1075	18.92115

Table 12 shows that the mean scores for the items measuring mobile learning self-efficacy ranged between 7.06 and 8.04. Item 7 (“I could use mobile learning if I had a lot of time to complete the task for which the mobile device was provided”) yielded the highest mean score (M = 8.04, SD = 2.353), followed by item 9 (M = 7.81, SD = 2.630), (“I could use mobile learning if someone showed me how to do it first”), and item 10 (M =

7.77, SD = 2.575), (“I could use mobile learning if I had used similar mobile devices before this one to do the same task”). The lowest mean scores related to Item 2 (M = 7.06, SD = 2.630) and Item 3 (M = 7.24, SD = 2.569).

On the scale, a composite mean score of below 50 indicates low mobile learning self-efficacy whereas a score of 50 indicates moderate confidence, and a score higher than 50 indicates high mobile learning self-efficacy (Compeau & Higgens, 1995). The composite mobile learning self-efficacy mean score was 76.1075, while the total scores ranged from 57.19 to 95.03. The results therefore indicated that respondents in this study displayed above moderate to high self-efficacy beliefs about mobile learning with mobile technology.

Sub-Research Question 2: Do Students Perceive Mobile Learning to Be Useful as a Platform for Learning?

The Perceived Usefulness scale measured whether students perceived mobile learning as useful. When students perceive mobile learning as being useful, they are more likely to have a high degree of intention to use mobile devices when learning (Hsia, 2016). Participants were required to indicate perceived usefulness on a 5-point Likert scale. The Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). The responses ‘strongly disagree’ (1) and ‘disagree’ (2) indicated that students did not perceive mobile learning to be useful, while those participants that responded with ‘agree’ (4) and ‘strongly agree’ (5) perceived mobile learning as useful (Hsia, 2016). Participants could select 3 (‘not sure’) if they were unsure of their response to an item in the scale (Hsia, 2016). The questionnaire yielded one composite score for each research participant and a score for each item on the scale.

Table 13 Scale Descriptive: Perceived Usefulness

Item	Questions	N	Mean	Std. Deviation
1	I believe that learning using mobile learning would enhance my academic performance	1070	4.27	0.713

2	I believe that using mobile learning would enhance my academic productivity	1070	4.30	0.702
3	I believe that using mobile learning would enhance my learning effectiveness	1070	4.18	0.756
4	I believe that using mobile learning would enhance my learning efficiency	1070	4.20	0.718
5	I believe that mobile learning would be useful for my studies	1070	4.40	0.754
Total: Perceived usefulness		1070	21.357	2.94057

As shown in Table 13, the means for the items measuring perceived usefulness ranged between 4.18 and 4.40. The highest mean score corresponded to item 5 (M = 4.40, SD = .754), "I believe that mobile learning would be useful for my studies" while the lowest mean score corresponded to item 3 (M = 4.18, SD = .756), "I believe that using mobile learning would enhance my learning effectiveness."

On the scale, a composite mean score of above 15 indicates high perceived usefulness whereas a mean score of less than 15 indicates low perceived usefulness (Hsia, 2016). The composite perceived usefulness mean score was 21.357, while the total scores ranged from 18.42 to 24.30. The results therefore indicated that participants perceived mobile learning to be a useful platform for learning.

Sub-Research Question 3: Do Students Perceive Mobile Learning to be Easy to Use in their Studies?

The Perceived Ease of Use scale consisted of five items and measured whether students believed that using mobile technology will not require much effort. Participants were required to indicate perceived ease of use on a 5-point Likert scale. The Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). Participants could select 3 ('not sure') if they were unsure of their response to an item in the scale. The responses 'strongly disagree' (1) and 'disagree' (2) indicated that students do not perceive the new technology to be easy to use, while those participants that responded with 'agree' (4) and

'strongly agree' (5) consider mobile technology to be easy to use (Hsia, 2016). The scale yielded one composite score for each research participant and a score for each item on the scale.

Table 14 Scale Descriptive: Perceived Ease of Use

Item	Questions	N	Mean	Std. Deviation
1	I think learning to use mobile learning is very simple	1070	4.15	0.769
2	It would be easy for me to become skilful at using mobile learning	1070	4.24	0.697
3	I think using mobile learning is easy	1070	4.14	0.776
4	It is easy to use mobile learning to accomplish my studying tasks	1070	4.19	0.756
5	My interaction with mobile learning would be clear and understandable	1070	4.17	0.708
Total: Perceived ease of use		1070	20.8972	3.08966

As shown in Table 14, the mean perceived ease of use scores ranged between 4.14 and 4.24. The highest mean score related to item 2 (M = 4.24, SD = .697), "It would be easy for me to become skilful at using mobile learning". The lowest mean score related to item 3 (M = 4.14, SD = .776), "I think using mobile learning is easy".

On the scale, a composite mean of above 15 indicates high perceived ease of use whereas a score of below 15 indicates low perceived ease of use (Hsia, 2016). In terms of the composite perceived ease of use score, the mean was 20.8972, while the total scores ranged from 17.81 to 23.99. The results therefore indicated that respondents perceived mobile learning to be easy to use.

Sub-Research Question 4: Do Students Exhibit Positive or Negative Attitudes Towards Mobile Learning?

The Mobile Learning Attitude scale measured students' attitudes towards the use of their mobile device for learning and was measured on a 5-point Likert scale. The responses

'strongly disagree' (1) and 'disagree' (2) represented a negative attitude towards mobile learning, while 'agree' (4) and 'strongly agree' (5) represented a positive attitude towards mobile learning (Yorganci, 2017). Participants could select 3 ('not sure') if they were unsure of their response to an item in the scale. The scale yielded one composite attitude score for each of the research participants and a score for each item on the scale.

Table 15 Scale Descriptive: Attitude Towards Mobile Learning

Item	Questions	N	Mean	Std. Deviation
1	Mobile technology is a useful tool for my studies	1070	4.34	0.699
2	Mobile technology can offer opportunities for communication and teamwork	1070	4.34	0.687
3	Mobile technology can help me find resources related to my studies	1070	4.46	0.577
4	Mobile technology can bring many opportunities to the learning process	1070	4.38	0.609
5	Mobile technology can help me to access the course material, anytime, anywhere	1070	4.46	0.618
6	Mobile technology can be an easy way to get feedback and notifications from my instructors	1070	4.46	0.596
7	Mobile Apps can help me to manage my studies	1070	4.38	0.632
8	Mobile technology can help me to do my coursework	1070	4.36	0.609
9	Mobile technology can help me to develop my learning skills	1070	4.39	0.626
Total: Attitude towards mobile learning		1070	39.5636	4.40567

As shown in Table 15, the mean attitude scores ranged from 4.34 to 4.46. The highest mean score related to item 5 (M = 4.46, SD = .618), "Mobile technology can help me to access the course material, anytime, anywhere" and item 6 (M = 4.46, SD = .596) "Mobile technology can be an easy way to get feedback and notifications from my instructors". The lowest mean scores related to item 1 (M = 4.34, SD = .650), "Mobile technology is a useful tool for my studies" and item 2 (M = 4.34, SD = .687), "Mobile technology can offer opportunities for communication and teamwork".

On the scale, a composite mean score of higher than 27 indicates a positive attitude and a score of less than 27 indicates a negative attitude towards mobile learning (Yorganci, 2017). The composite mean attitude score was 39.5636, while the total scores ranged from 35.16 to 43.97. The results therefore indicated that students displayed a positive attitude towards mobile learning.

Sub-Research Question 5: Do Students Exhibit an Internal or External Locus of Control?

The Locus of Control scale measured whether a student exhibited an internal or external locus of control. The responses 'strongly disagree' (1) and 'disagree' (2) revealed an external locus of control, while those participants that responded with 'agree' (4) and 'strongly agree' (5) displayed an internal locus of control (Hsia, 2016). Participants could select 3 ('not sure') if they were unsure of their response to an item in the scale (Hsia, 2016). The locus of control scale yielded one composite score for each of the research participants and a score for each item on the scale.

Table 16 Scale Descriptive: Locus of Control

Item	Questions	N	Mean	Std. Deviation
1	People's misfortunes result from the mistakes they make	1070	3.72	0.861
2	In the long run, people get the respect they deserve in this world	1070	3.89	0.882
3	Capable people who fail to become leaders have not taken advantage of their opportunities	1070	3.86	0.938
4	Becoming a success is a matter of hard work; luck has little or nothing to do with it	1070	4.40	0.735
5	What happens to me is my own doing	1070	4.09	0.868
6	When I make plans, I am almost certain that I can make them work	1070	4.34	0.619
7	In my case, getting what I want has little or nothing to do with luck	1070	4.23	0.772
8	Getting people to do the right thing depends upon ability; luck has little or nothing to do with it	1070	4.16	0.774
9	There is really no such thing as "luck"	1070	3.40	1.139

10	Most misfortunes are the result of lack of ability, ignorance, laziness or all three	1070	3.98	0.937
11	It is impossible for me to believe that change or luck plays an important role in my life	1070	3.68	1.040
Total: Locus of control		1070	43.7858	5.86669

Table 16 indicates that mean scores ranged from 3.40 to 4.40. The highest mean score related to item 4 (M = 4.40, SD = .735), "Becoming a success is a matter of hard work; luck has little or nothing to do with it", followed by Item 6 (M = 4.34, SD = .619), "When I make plans, I am almost certain that I can make them work". The lowest mean score was yielded by item 9 (M = 3.40, SD = 1.139), "There is really no such thing as "luck"" followed by Item 11 (M = 3.68, SD = 1.040), "It is impossible for me to believe that change or luck plays an important role in my life".

On the scale, a composite mean score of above 33 indicates an internal locus of control whereas a score of below 33 indicates an external locus of control (Hsia, 2016). The composite mean locus of control score was 43.7458, while the total scores ranged from 37.88 to 49.61. The results indicated that the majority of respondents in this study displayed an internal locus of control.

Sub-Research Question 6: What Level of Perceived Behavioural Control do Students Exhibit?

Perceived behavioural control is defined by Doll and Ajzen (1992) as a person's perception of a behaviour as being difficult or easy to perform. Participants were required to indicate perceived behavioural control on a 5-point Likert scale. The Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). The responses 'strongly disagree' (1) and 'disagree' (2) represented low perceived behavioural control, while those participants that responded with 'agree' (4) and 'strongly agree' (5) revealed a high level of perceived

behavioural control (Hsia, 2016). Participants could select 3 (‘not sure’) if they were unsure of their response to an item in the scale (Hsia, 2016).

Table 17 Scale Descriptive: Perceived Behavioural Control

Item	Questions	N	Mean	Std. Deviation
1	I have a sufficient extent of knowledge to use mobile learning	1070	3.98	0.857
2	I have a sufficient extent of control to make a decision to adopt mobile learning	1070	4.11	0.800
3	I have a sufficient extent of self-confidence to make a decision to adopt mobile learning	1070	4.12	0.801
4	I have a sufficient extent of ability to use mobile learning	1070	4.10	0.805
5	I would be able to use mobile learning well for learning process	1070	4.29	0.637
Total: Perceived behavioural control		1070	20.6131	3.24114

Table 17 shows that the mean perceived behavioural control scores ranged between 3.98 and 4.29. The highest mean score related to item 5 (M = 4.29, SD = .637), “I would be able to use mobile learning well for learning process” followed by Item 3 (M = 4.12, SD = .801), “I have a sufficient extent of self-confidence to make a decision to adopt mobile learning”. The lowest mean score related to item 1 (M = 3.98, SD = .857), “I have a sufficient extent of knowledge to use mobile learning” and Item 4 (M = 4.10, SD = .805), “I have a sufficient extent of ability to use mobile learning”.

On the scale a mean composite score of below 15 indicates low perceived behavioural control whereas a mean score of above 15 indicates high perceived behavioural control. In terms of the composite perceived behavioural control score, the mean was 20.6131, while the total scores ranged from 17.37 to 23.85. The results therefore indicated that respondents displayed high levels of perceived behavioural control.

Sub-Research Question 7: What Influence do Significant others have on a Student's Behavioural Intention to Adopt Mobile Learning?

Subjective norm refers to a person's perception that an important person or group of people will approve of and support a particular behaviour (Tagoe & Abakah, 2014). Participants were required to indicate their responses on a 5-point Likert scale. The Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). The responses 'strongly disagree' (1) and 'disagree' (2) revealed that people who influence respondents or who are important to them do not think that mobile learning is important, while those participants that responded with 'agree' (4) and 'strongly agree' (5) believe that people who influence them or are important to them would want them to use mobile learning (dos Santos & Okazaki, 2016). Participants could select 3 ('not sure') if they were unsure of their response to an item in the scale (dos Santos & Okazaki, 2016).

Table 18 Scale Descriptive: Subjective Norm

Item	Questions	N	Mean	Std. Deviation
1	People who influence my behaviour would think that I should use mobile learning	1070	3.60	0.969
2	People who are important to me would think that I should use mobile learning	1070	3.87	0.898
Total: Subjective norm		1070	7.4738	1.68156

Table 18 shows the mean scores for subjective norm ranged from 3.60 to 3.87. The highest mean score for subjective norm related to item 2 (M = 3.87, SD = .898), "People who are important to me would think that I should use mobile learning". The lowest mean score corresponded to item 1 (M = 3.60, SD = .969), "People who influence my behaviour would think that I should use mobile learning".

On the scale a composite mean score of above 6 indicates that significant others have an influence on behavioural intention to adopt mobile learning while a mean score of

below 6 indicates that significant others do not have an influence on their behavioural intention to adopt mobile learning (dos Santos & Okazaki, 2016). The composite mean score was 7.4738, while the total scores ranged from 5.79 to 9.16. These results indicated that the majority of participants considered significant others to have an influence on their behavioural intention to adopt mobile learning.

Sub-Research Question 8: Do Students Display Behavioural Intention to Adopt Mobile Learning?

In order to measure behavioural intention to adopt mobile learning, participants were required to indicate their answers on a 5-point Likert scale. The Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). The responses 'strongly disagree' (1) and 'disagree' (2) indicated that respondents do not display behavioural intention to adopt mobile learning, while 'agree' (4) and 'strongly agree' (5) indicated that they display behavioural intention to adopt mobile learning (Hsia, 2016). Participants could select 3 ('not sure') if they were unsure of how their response to an item in the scale (Hsia, 2016).

Table 19 Scale Descriptive: Behavioural Intention to Adopt Mobile Learning

Item	Questions	N	Mean	Std. Deviation
1	I will use mobile learning for my courses in the future	1070	4.31	0.669
2	I intend to use mobile learning as often as possible	1070	4.28	0.662
Total: Behavioural intention		1070	8.585	1.2279

As can be seen in Table 19, the mean scores for behavioural intention to adopt mobile learning ranged from 4.28 to 4.31. The highest mean score related to item 1 (M = 4.31, SD = .669), "I will use mobile learning for my courses in the future" while the lowest mean score related to item 2 (M = 4.28, SD = .662), "I intend to use mobile learning as often as possible". The first item measured a students' future behavioural intention to use mobile

learning as a platform to study, while the second item measured the frequency of such intention.

On the scale a composite mean score of above 6 indicates the intention to adopt mobile learning while a mean score of below 6 indicates no intention to adopt mobile learning (Hsia, 2016). In terms of the composite behavioural intention score, the mean score was 8.585 while the total scores ranged between 7.36 and 9.81. This result indicated that participants displayed a high level of intention to adopt mobile learning.

Sub-Research Question 9: Are There Any Significant Gender Differences in Mobile Learning Self-Efficacy, Locus of Control, Subjective Norm, Perceived Usefulness, Perceived Ease of Use, Perceived Behavioural Control, Attitude Towards Mobile Learning and Behavioural Intention to Adopt Mobile Learning?

Table 20 shows the mean and standard deviation scores for male and female respondents for each psychological construct included in the hypothesised model.

Table 20 Mean and Standard Deviation for Constructs in Terms of Gender

Construct	Gender	N	Mean	Std. Deviation
Mobile learning self-efficacy	Male	682	75.3856	19.49063
	Female	388	77.3763	17.83002
	Total	1070	76.1075	18.92115
Perceived usefulness	Male	682	21.2082	3.01743
	Female	388	21.6186	2.78495
	Total	1070	21.3570	2.94057
Perceived ease of use	Male	682	20.7566	3.08175
	Female	388	21.1443	3.09201
	Total	1070	20.8972	3.08966
Attitude towards mobile learning	Male	682	39.2991	4.48214
	Female	388	40.0284	4.23371
	Total	1070	39.5636	4.40567
Locus of control	Male	682	43.5117	5.67608
	Female	388	44.1572	6.17351
	Total	1070	43.7458	5.86669
Perceived behavioural control	Male	682	20.3695	3.28769
	Female	388	21.0412	3.11591

	Total	1070	20.6131	3.24114
Subjective norm	Male	682	7.3578	1.69421
	Female	388	7.6778	1.64146
	Total	1070	7.4738	1.68156
Behavioural intention	Male	682	8.5205	1.25478
	Female	388	8.6985	1.17216
	Total	1070	8.5850	1.22790

In this study, female participants obtained the highest mean scores across all the psychological constructs contained in the model.

Multivariate analysis of variance (MANOVA) was carried out to determine if there were any statistically significant gender differences between the mean scores of mobile learning self-efficacy, perceived ease of use, perceived usefulness, mobile learning attitude, locus of control, perceived behaviour control, subjective norm and behavioural intention to adopt mobile learning. The results are displayed in Table 21.

Table 21 Influence of Gender on Psychological Constructs

	Sum of squares	df	Mean square	F	**Sig.**
Mobile learning self-efficacy	979.999	1	979.999	2.742	0.098
Perceived usefulness	41.642	1	41.642	4.833	0.028
Perceived ease of use	37.179	1	37.179	3.905	0.048
Attitude towards mobile learning	131.511	1	131.511	6.812	0.009
Locus of control	103.040	1	103.040	2.999	0.084
Perceived behavioural control	111.591	1	111.591	10.719	0.001
Subjective norm	25.334	1	25.334	9.027	0.003
Behavioural Intention	7.829	1	7.829	5.213	0.023

Results revealed that there were statistically significant differences in terms of gender with regard to perceived usefulness (p = .028, p < .05), perceived ease of use (p = .048, p < .05), attitude towards mobile learning (p = .009, p < .05), perceived behavioural control (p = .001, p < .05), subjective norm (p = .003, p < .05) and behavioural intention (p = .023, p < .05). The effect size for mobile learning self-efficacy (f^2 =.002), perceived usefulness (f^2 =.004), perceived ease of use (f^2 =.003), attitude towards mobile learning (f^2 =.005), locus of control (f^2 =.002), perceived behavioural control (f^2 =.009), subjective norm (f^2 =.007) and

behavioural intention (f^2 =.004) were all below f^2 =.02 which indicates a small effect (Cohen, 1992). With regard to perceived usefulness, perceived ease of use, attitude towards mobile learning, perceived behavioural control, subjective norm and behavioural intention, females scored significantly higher than males.

In terms of gender, no significant differences were evident between males and females with regard to mobile learning self-efficacy or locus of control.

Sub-Research Question 10: Are There Any Significant Age Differences in Mobile Learning Self-Efficacy, Locus of Control, Subjective Norm, Perceived Usefulness, Perceived Ease of Use, Perceived Behavioural Control, Attitude Towards Mobile Learning and Behavioural Intention to Adopt Mobile Learning?

The mean and standard deviation scores relating to the different age groups for each of the psychological constructs assessed are depicted in Table 22.

Table 22 Mean and Standard Deviation of Constructs in Terms of Age

Constructs	Age	N	Mean	Std. Deviation
Mobile learning self-efficacy	18-24	202	74.9406	17.56768
	25-34	572	77.3217	18.52772
	35-44	246	74.7317	20.16405
	45 and older	50	73.7000	21.75021
	Total	1070	76.1075	18.92115
Perceived usefulness	18-24	202	20.9901	3.08582
	25-34	572	21.2500	2.89974
	35-44	246	21.8455	2.70157
	45 and older	50	21.6600	3.62311
	Total	1070	21.3570	2.94057
Perceived ease of use	18-24	202	20.8762	3.06960
	25-34	572	20.9108	3.11554
	35-44	246	20.9228	2.88241
	45 and older	50	20.7000	3.86111
	Total	1070	20.8972	3.08966
Attitude towards mobile learning	18-24	202	39.7574	4.59998
	25-34	572	39.4878	4.30674
	35-44	246	39.5732	4.26193

	45 and older	50	39.6000	5.42857
	Total	1070	39.5636	4.40567
Locus of control	18-24	202	44.1188	5.39170
	25-34	572	43.7483	5.80261
	35-44	246	43.4228	6.14453
	45 and older	50	43.8000	7.02764
	Total	1070	43.7458	586669
Perceived behavioural control	18-24	202	20.5000	3.46159
	25-34	572	20.4493	3.32415
	35-44	246	21.0244	2.84989
	45 and older	50	20.9200	3.05621
	Total	1070	20.6131	3.24114
Subjective norm	18-24	202	7.2673	1.78100
	25-34	572	7.4161	1.68384
	35-44	246	7.7033	1.60527
	45 and older	50	7.8400	1.46190
	Total	1070	7.4738	1.68156
Behavioural intention	18-24	202	8.5891	1.24368
	25-34	572	8.5647	1.24186
	35-44	246	8.6545	1.14932
	45 and older	50	8.4600	1.38814
	Total	1070	8.5850	1.22790

The age group 18 to 24 years had the highest mean score for attitude towards mobile learning, locus of control and behavioural intention, and the lowest mean score for perceived usefulness and subjective norm. The age group 25 to 34 years had the highest mean score for mobile learning self-efficacy, and the lowest mean score for attitude towards mobile learning and perceived behavioural control. The age group 35 to 44 years had the highest mean score for perceived usefulness, perceived ease of use and perceived behavioural control, and the lowest mean score for locus of control. The age group 45 and older had the highest mean score for subjective norm, and the lowest mean score for mobile learning self-efficacy, perceived ease of use and behavioural intention.

Multivariate analysis of variance (MANOVA) was carried out to determine if there were any statistically significant age differences between the mean scores of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, attitude towards mobile

learning, perceived ease of use, perceived behavioural control and behavioural intention to adopt mobile learning. The results are depicted in Table 23.

Table 23 Influence of Age on Psychological Constructs

	Sum of squares	df	Mean square	F	Sig.
Mobile learning self-efficacy	1873.749	3	624.583	1.748	0.155
Perceived usefulness	97.042	3	32.347	3.770	0.010
Perceived ease of use	2.300	3	0.767	0.080	0.971
Attitude towards mobile learning	10.967	3	3.656	0.188	0.905
Locus of control	53.927	3	17.976	0.522	0.668
Perceived behavioural control	64.253	3	21.418	2.045	0.106
Subjective norm	30.174	3	10.058	3.583	0.013
Behavioural Intention	2.208	3	0.736	0.487	0.691

The results indicated that age had a statistically significant influence on perceived usefulness (p = .010, p < .05) and subjective norm (p = .013, p < .05). There were, however, no statistically significant age differences in mobile learning self-efficacy, perceived ease of use, attitude towards mobile learning, locus of control, perceived behavioural control or behavioural intention. The effect size for mobile learning self-efficacy (f^2 =.002), perceived usefulness (f^2 =.008), perceived ease of use (f^2 =.003), attitude towards mobile learning (f^2 =.002), locus of control (f^2 =.001), perceived behavioural control (f^2 =.003), subjective norm (f^2 =.007) and behavioural intention (f^2 =.001) were all below f^2 =.02 which indicates a small effect (Cohen, 1992).

In order to determine where the differences in mean values occurred, the Tukey test for post-hoc comparisons was used. In the table below, the Tukey test illustrates each age group in comparison to the remaining age groups (Fields, 2009). For each pair of age groups, the difference between group mean is displayed with the standard error of that difference, the significance level of that difference and a 95% confidence interval (Fields, 2009).

Table 24 Tukey Test for Age Groups

Dependent Variable			Mean Difference (I-J)	Std Error	Sig	95% Confidence Interval	
						Lower Bound	Upper Bound
Mobile learning self-efficacy	18-24	25-34	-2,3811	1,54699	0,414	-6,3616	1,5995
		35-44	0,2089	1,79468	0,999	-4,4090	4,8268
		45 and older	1,2406	2,98560	0,976	-6,4416	8,9228
	25-34	18-24	2,3811	1,54699	0,414	-1,5995	6,3616
		35-44	2,5900	1,44113	0,275	-1,1182	6,2981
		45 and older	3,6217	2,78743	0,564	-3,5506	10,7940
	35-44	18-24	-0,2089	1,79468	0,999	-4,8268	4,4090
		25-34	-2,5900	1,44113	0,275	-6,2981	1,1182
		45 and older	1,0317	2,93214	0,985	-6,5130	8,5764
	45 and older	18-24	-1,2406	2,98560	0,976	-8,9228	6,4416
		25-34	-3,6217	2,78743	0,564	-10,7940	3,5506
		35-44	-1,0317	2,93214	0,985	-8,5764	6,5130
Perceived usefulness	18-24	25-34	-0,2599	0,23974	0,699	-0,8768	0,3570
		35-44	-.8554*	0,27813	0,012	-1,5711	-0,1398
		45 and older	-0,6699	0,46269	0,470	-1,8604	0,5206
	25-34	18-24	0,2599	0,23974	0,699	-0,3570	0,8768
		35-44	-.5955*	0,22334	0,039	-1,1702	-0,0209
		45 and older	-0,4100	0,43198	0,778	-1,5215	0,7015
	35-44	18-24	.8554*	0,27813	0,012	0,1398	1,5711
		25-34	.5955*	0,22334	0,039	0,0209	1,1702
		45 and older	0,1855	0,45441	0,977	-0,9837	1,3548
	45 and older	18-24	0,6699	0,46269	0,470	-0,5206	1,8604
		25-34	0,4100	0,43198	0,778	-0,7015	1,5215
		35-44	-0,1855	0,45441	0,977	-1,3548	0,9837
Perceived ease of use	18-24	25-34	-0,0346	0,25320	0,999	-0,6861	0,6169
		35-44	-0,0465	0,29374	0,999	-0,8024	0,7093
		45 and older	0,1762	0,48867	0,984	-1,0811	1,4336
	25-34	18-24	0,0346	0,25320	0,999	-0,6169	0,6861
		35-44	-0,0119	0,23588	1,000	-0,6189	0,5950

Dependent Variable			Mean Difference (I-J)	Std Error	Sig	95% Confidence Interval	
						Lower Bound	Upper Bound
		45 and older	0,2108	0,45623	0,967	-0,9631	1,3848
	35-44	18-24	0,0465	0,29374	0,999	-0,7093	0,8024
		25-34	0,0119	0,23588	1,000	-0,5950	0,6189
		45 and older	0,2228	0,47992	0,967	-1,0121	1,4576
	45 and older	18-24	-0,1762	0,48867	0,984	-1,4336	1,0811
		25-34	-0,2108	0,45623	0,967	-1,3848	0,9631
		35-44	-0,2228	0,47992	0,967	-1,4576	1,0121
Attitude towards mobile learning	18-24	25-34	0,2697	0,36100	0,878	-0,6592	1,1985
		35-44	0,1843	0,41880	0,972	-0,8933	1,2619
		45 and older	0,1574	0,69670	0,996	-1,6352	1,9501
	25-34	18-24	-0,2697	0,36100	0,878	-1,1985	0,6592
		35-44	-0,0854	0,33629	0,994	-0,9507	0,7799
		45 and older	-0,1122	0,65046	0,998	-1,7859	1,5614
	35-44	18-24	-0,1843	0,41880	0,972	-1,2619	0,8933
		25-34	0,0854	0,33629	0,994	-0,7799	0,9507
		45 and older	-0,0268	0,68423	1,000	-1,7874	1,7337
	45 and older	18-24	-0,1574	0,69670	0,996	-1,9501	1,6352
		25-34	0,1122	0,65046	0,998	-1,5614	1,7859
		35-44	0,0268	0,68423	1,000	-1,7337	1,7874
Locus of control	18-24	25-34	0,3706	0,48049	0,867	-0,8658	1,6069
		35-44	0,6960	0,55742	0,596	-0,7382	2,1303
		45 and older	0,3188	0,92731	0,986	-2,0672	2,7049
	25-34	18-24	-0,3706	0,48049	0,867	-1,6069	0,8658
		35-44	0,3255	0,44761	0,886	-0,8262	1,4772
		45 and older	-0,0517	0,86576	1,000	-2,2794	2,1759
	35-44	18-24	-0,6960	0,55742	0,596	-2,1303	0,7382
		25-34	-0,3255	0,44761	0,886	-1,4772	0,8262
		45 and older	-0,3772	0,91071	0,976	-2,7206	1,9661
	45 and older	18-24	-0,3188	0,92731	0,986	-2,7049	2,0672
		25-34	0,0517	0,86576	1,000	-2,1759	2,2794
		35-44	0,3772	0,91071	0,976	-1,9661	2,7206

Dependent Variable			Mean Difference (I-J)	Std Error	Sig	95% Confidence Interval	
						Lower Bound	Upper Bound
Perceived behavioural control	18-24	25-34	0,0507	0,26489	0,998	-0,6309	0,7323
		35-44	-0,5244	0,30730	0,321	-1,3151	0,2663
		45 and older	-0,4200	0,51121	0,844	-1,7354	0,8954
	25-34	18-24	-0,0507	0,26489	0,998	-0,7323	0,6309
		35-44	-0,5751	0,24676	0,092	-1,2100	0,0598
		45 and older	-0,4707	0,47728	0,757	-1,6988	0,7574
	35-44	18-24	0,5244	0,30730	0,321	-0,2663	1,3151
		25-34	0,5751	0,24676	0,092	-0,0598	1,2100
		45 and older	0,1044	0,50206	0,997	-1,1875	1,3962
	45 and older	18-24	0,4200	0,51121	0,844	-0,8954	1,7354
		25-34	0,4707	0,47728	0,757	-0,7574	1,6988
		35-44	-0,1044	0,50206	0,997	-1,3962	1,1875
Subjective norm	18-24	25-34	-0,1488	0,13713	0,699	-0,5016	0,2041
		35-44	-.4359*	0,15909	0,032	-0,8453	-0,0266
		45 and older	-0,5727	0,26466	0,134	-1,2537	0,1083
	25-34	18-24	0,1488	0,13713	0,699	-0,2041	0,5016
		35-44	-0,2872	0,12775	0,111	-0,6159	0,0415
		45 and older	-0,4239	0,24709	0,316	-1,0597	0,2119
	35-44	18-24	.4359*	0,15909	0,032	0,0266	0,8453
		25-34	0,2872	0,12775	0,111	-0,0415	0,6159
		45 and older	-0,1367	0,25992	0,953	-0,8055	0,5320
	45 and older	18-24	0,5727	0,26466	0,134	-0,1083	1,2537
		25-34	0,4239	0,24709	0,316	-0,2119	1,0597
		35-44	0,1367	0,25992	0,953	-0,5320	0,8055
Behavioural intention	18-24	25-34	0,0244	0,10057	0,995	-0,2344	0,2832
		35-44	-0,0654	0,11667	0,944	-0,3656	0,2348
		45 and older	0,1291	0,19409	0,910	-0,3703	0,6285
	25-34	18-24	-0,0244	0,10057	0,995	-0,2832	0,2344
		35-44	-0,0898	0,09369	0,773	-0,3309	0,1513
		45 and older	0,1047	0,18121	0,939	-0,3616	0,5710
	35-44	18-24	0,0654	0,11667	0,944	-0,2348	0,3656

Dependent Variable			Mean Difference (I-J)	Std Error	Sig	95% Confidence Interval	
						Lower Bound	Upper Bound
		25-34	0,0898	0,09369	0,773	-0,1513	0,3309
		45 and older	0,1945	0,19062	0,738	-0,2960	0,6850
	45 and older	18-24	-0,1291	0,19409	0,910	-0,6285	0,3703
		25-34	-0,1047	0,18121	0,939	-0,5710	0,3616
		35-44	-0,1945	0,19062	0,738	-0,6850	0,2960

Results indicated that, in terms of perceived usefulness, there were significant age differences between 18 to 24-year olds (M = 20.9901, p = .012) and 35 to 44 year olds (M = 21.8455, p = .012), and between 25 to 34 year olds (M = 21.2500, p = .039) and 35 to 44 year olds (M = 21.8455, p = .039). In terms of subjective norm there were only statistically significant differences between respondents in the age categories 18 to 24 years old (M = 7.2673, p = .032) and 35 to 44-year-old (M = 7.7033, p = .032). Perceived usefulness was statistically significantly higher amongst 35 to 44-year olds as compared to respondents in the other two age groups, while subjective norm was statistically significantly higher in 35 to 44-year olds than in 18 to 24-year olds.

Sub-Research Question 11: Are There Any Significant Differences in Mobile Learning Self-Efficacy, Locus of Control, Subjective Norm, Perceived Usefulness, Perceived Ease of Use, Perceived Behavioural Control, Attitude Towards Mobile Learning and Behavioural Intention to Adopt Mobile Learning, in Terms of Race?

Table 25 reflects a summary of the mean and standard deviation scores for each of the psychological constructs included in the hypothesised model in terms of race.

Table 25 Mean and Standard Deviation of Constructs in Terms of Race

Constructs	Race	N	Mean	Std. Deviation
Mobile learning self-efficacy	African	916	75.8373	19.08115
	Asian	2	77.0000	2.82843

Constructs	Race	N	Mean	Std. Deviation
	Coloured	99	78.0808	17.58923
	Indian	11	71.0000	21.69332
	White	42	78.6429	18.16298
	Total	1070	76.1075	18.92115
Perceived usefulness	African	916	21.4498	2.86351
	Asian	2	19.5000	0.70711
	Coloured	99	20.8182	3.19235
	Indian	11	19.8182	4.46807
	White	42	21.0952	3.38439
	Total	1070	21.3570	2.94057
Perceived ease of use	African	916	20.8985	3.08983
	Asian	2	19.0000	1.41421
	Coloured	99	20.8081	3.02262
	Indian	11	20.2727	3.55221
	White	42	21.3333	3.22087
	Total	1070	20.8972	3.08966
Attitude towards mobile	African	916	39.5666	4.34231
learning	Asian	2	41.5000	0.70711
	Coloured	99	39.2929	4.65603
	Indian	11	38.8182	5.56450
	White	42	40.2381	4.99175
	Total	1070	39.5636	4.40567
Locus of control	African	916	43.8352	5.86106
	Asian	2	47.5000	0.70711
	Coloured	99	43.2222	5.64883
	Indian	11	42.1818	5.67130
	White	42	43.2619	6.64816
	Total	1070	43.7458	5.86669
Perceived behavioural control	African	916	20.5186	3.27746
	Asian	2	22.5000	3.53553
	Coloured	99	21.1717	2.96249
	Indian	11	20.6364	3.32484
	White	42	21.2619	2.93889
	Total	1070	20.6131	3.24114
Subjective norm	African	916	7.5371	1.66341
	Asian	2	7.0000	1.41421
	Coloured	99	7.2222	1.74119
	Indian	11	7.0909	2.21154
	White	42	6.8095	1.65630
	Total	1070	7.4738	1.68156
Behavioural intention	African	916	8.6266	1.19850
	Asian	2	7.5000	0.70711
	Coloured	99	8.3434	1.36398
	Indian	11	8.1818	1.25045

Constructs	Race	N	Mean	Std. Deviation
	White	42	8.4048	1.44930
	Total	1070	8.5850	1.22790

The African group had the highest mean score for perceived usefulness, perceived ease of use, subjective norm and behavioural intention, and the lowest mean score for perceived behavioural control. The Asian group had the highest mean score for attitude towards mobile learning, locus of control and perceived behavioural control, and the lowest mean score for perceived usefulness, perceived ease of use, and behavioural intention. The Indian group had the lowest mean score for mobile learning self-efficacy, attitude towards mobile learning and locus of control. The White race group had the highest mean score for mobile learning self-efficacy, and the lowest mean score for subjective norm.

An analysis of variance (ANOVA) was carried out to determine if there were any statistically significant differences between the mean scores of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention in terms of race.

Table 26 Influence of Race on Psychological Constructs

	Sum of squares	df	Mean square	F	Sig.
Mobile learning self-efficacy	1010.881	4	252.720	0,705	0,588
Perceived usefulness	72.450	4	18.112	2.103	0.078
Perceived ease of use	20.265	4	5.066	0.530	0.714
Attitude towards mobile learning	39.980	4	9.995	0.514	0.725
Locus of control	99.381	4	24.845	0.721	0.578
Perceived behavioural control	63.887	4	15.972	1.523	0.193
Subjective norm	30.533	4	7.633	2.717	0.029
Behavioural Intention	12.872	4	3.218	2.143	0.073

As seen in Table 26, the results indicate that there were no statistically significant differences in terms of race among respondents' mobile learning self-efficacy (p = .588, p < .05), perceived usefulness (p = .078, p < .05), perceived ease of use (p = .714, p < .05) attitude towards mobile learning (p = .725, p < .05), locus of control (p = .578, p < .05), perceived behavioural control (p = .193, p < .05) or behavioural intention to adopt mobile learning (p = .073, p < .05). There was, however, a statistically significant difference in subjective norm (p = .029, p < .05) in terms of race. For subjective norm Africans had the highest mean score (M = 7.5371) followed by Coloureds (M = 7.222), Indians (M = 7.0909), Asians (M = 7.0000) and Whites (M = 6.8095). The effect size for mobile learning self-efficacy (f^2 =.001), perceived usefulness (f^2 =.005), perceived ease of use (f^2 =.001), attitude towards mobile learning (f^2 =.001), locus of control (f^2 =.000), perceived behavioural control (f^2 =.003), subjective norm (f^2 =.008) and behavioural intention (f^2 =.005) were all below f^2 =.02 which indicates a small effect (Cohen, 1992).

Sub-Research Question 12: Are There Any Significant Differences in Mobile Learning Self-Efficacy, Locus of Control, Subjective Norm, Perceived Usefulness, Perceived Ease of Use, Perceived Behavioural Control, Attitude Towards Mobile Learning and Behavioural Intention to Adopt Mobile Learning, in Terms of Household Income?

Table 27 reflects a summary of the mean and standard deviation scores for each household income category for the psychological constructs in the hypothesised model.

Table 27 Mean and Standard Deviation of Constructs in Terms of Household Income

Constructs	Household Income	N	Mean	Std. Deviation
Mobile learning self-efficacy	Less than R5 000 per month	546	75.5256	19.36630
	R5 001 to R10 000 per month	316	76.8228	17.99524
	R10 001 to R15 000 per month	89	77.8764	18.38281
	R15 001 to R20 000 per month	56	76.2857	18.15060

	R20 001 to R25 000 per month	19	76.9474	18.14287
	R25 001 to R30 000 per month	22	73.9091	25.86579
	More than R30 000 per month	22	74.1364	19.07203
	Total	1070	76.1075	18.92115
Perceived usefulness	Less than R5 000 per month	546	21.2967	2.92786
	R5 001 to R10 000 per month	316	21.2152	2.92844
	R10 001 to R15 000 per month	89	21.5281	2.95069
	R15 001 to R20 000 per month	56	22.3750	2.68709
	R20 001 to R25 000 per month	19	21.0000	3.51188
	R25 001 to R30 000 per month	22	22.0000	3.42261
	More than R30 000 per month	22	21.2727	2.74611
	Total	1070	21.3570	2.94057
Perceived ease of use	Less than R5 000 per month	546	20.9469	3.01417
	R5 001 to R10 000 per month	316	20.6392	3.22139
	R10 001 to R15 000 per month	89	21.0449	2.87193
	R15 001 to R20 000 per month	56	21.7500	2.93722
	R20 001 to R25 000 per month	19	19.6842	3.81594
	R25 001 to R30 000 per month	22	21.8636	3.73268
	More than R30 000 per month	22	20.6818	2.33781
	Total	1070	20.8972	3.08966
Attitude towards mobile learning	Less than R5 000 per month	546	39.4597	4.42006
	R5 001 to R10 000 per month	316	39.3797	4.45023
	R10 001 to R15 000 per month	89	39.8876	4.15451
	R15 001 to R20 000 per month	56	40.7500	4.26508
	R20 001 to R25 000 per month	19	38.1053	4.12169
	R25 001 to R30 000 per month	22	41.4091	4.66659
	More than R30 000 per month	22	39.8636	4.13228
	Total	1070	39.5636	4.40567
Locus of control	Less than R5 000 per month	546	44.0733	5.67839
	R5 001 to R10 000 per month	316	43.5570	5.76689
	R10 001 to R15 000 per month	89	44.0112	5.99525
	R15 001 to R20 000 per month	56	42.1250	6.67985
	R20 001 to R25 000 per month	19	41.5263	7.16758
	R25 001 to R30 000 per month	22	44.0000	6.38451
	More than R30 000 per month	22	43.0455	6.95891
	Total	1070	43.7458	5.86669
Perceived behavioural control	Less than R5 000 per month	546	20.2125	3.36287
	R5 001 to R10 000 per month	316	20.7405	3.12121
	R10 001 to R15 000 per month	89	21.3034	2.98254
	R15 001 to R20 000 per month	56	21.8214	2.88638
	R20 001 to R25 000 per month	19	21.0000	2.84800
	R25 001 to R30 000 per month	22	21.5909	2.97064
	More than R30 000 per month	22	21.5455	2.80692
	Total	1070	20.6131	3.24114
Subjective norm	Less than R5 000 per month	546	7.4579	1.69918
	R5 001 to R10 000 per month	316	7.4146	1.68343
	R10 001 to R15 000 per month	89	7.5393	1.60295

	R15 001 to R20 000 per month	56	7.6964	1.55995
	R20 001 to R25 000 per month	19	7.1579	1.64192
	R25 001 to R30 000 per month	22	7.7273	1.88179
	More than R30 000 per month	22	7.9091	1.71573
	Total	1070	7.4738	1.68156
Behavioural intention	Less than R5 000 per month	546	8.5623	1.20274
	R5 001 to R10 000 per month	316	8.5411	1.26549
	R10 001 to R15 000 per month	89	8.6966	1.13222
	R15 001 to R20 000 per month	56	9.0536	1.01658
	R20 001 to R25 000 per month	19	8.1579	1.38497
	R25 001 to R30 000 per month	22	8.9091	1.47710
	More than R30 000 per month	22	8.1818	1.46828
	Total	1070	8.5850	1.22790

Participants with a household income less than R5 000 per month had the highest mean score for locus of control, and the lowest mean score for perceived behavioural control. Participants with a household income of R10 001 to R15 000 per month had the highest mean score for mobile learning self-efficacy. Participants with a household income of R15 001 to R20 000 per month had the highest mean score for perceived usefulness, perceived behavioural control and behavioural intention. Participants with a household income of R20 001 to 25 000 per month had the lowest mean score for perceived usefulness, perceived ease of use, attitude towards mobile learning, locus of control, subjective norm and behavioural intention. Participants with a household income of R25 001 to R30 000 per month had the highest mean score for perceived ease of use and attitude towards mobile learning, and the lowest mean score for mobile learning self-efficacy. Participants with a household income of more than R30 000 per month had the highest mean score for subjective norm.

Multivariate analysis of variance (MANOVA) was carried out to determine if there were any statistically significant differences, in terms of household income, between the mean scores of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile

learning and behavioural intention to adopt mobile learning. Table 28 depicts the results of the MANOVA.

Table 28 Influence of Household Income on Psychological Constructs

	Sum of squares	df	Mean square	F	Sig.
Mobile learning self-efficacy	831,998	6	138,666	0,386	0,888
Perceived usefulness	80,653	6	13,442	1,559	0,156
Perceived ease of use	114,569	6	19,095	2,012	0,061
Attitude towards mobile learning	222.060	6	37.010	1.917	0.075
Locus of control	329.007	6	54.834	1.599	0.144
Perceived behavioural control	259.944	6	43.324	4.198	0.000
Subjective norm	11.883	6	1.981	0.699	0.650
Behavioural Intention	23.647	6	3.941	2.638	0.015

Results indicated that there were statistically significant differences between perceived behavioural control (p = .000, p < .05) and behavioural intention (p = .015, p < .05) in terms of household income. There were, however, no statistically significant differences in terms of household income in mobile learning self-efficacy, perceived usefulness, perceived ease of use, attitude towards mobile learning, locus of control or subjective norm. The effect size for mobile learning self-efficacy (f^2 = -.003), perceived usefulness (f^2 =.003), perceived ease of use (f^2 =.006), attitude towards mobile learning (f^2 =.005), locus of control (f^2 =.003), perceived behavioural control (f^2 =.02), subjective norm (f^2 =.002) and behavioural intention (f^2 =.009) were either f^2 =.02 or below which indicates a small effect (Cohen, 1992).

In order to determine where the differences in mean values occurred, the Tukey test for post-hoc comparison was used. The table below shows the results of the analysis. For each household income category group, the difference between group mean is displayed with the standard error of that difference, the significance level of that difference and a 95% confidence interval (Fields, 2009).

Table 29 Tukey Test for Household Income

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Mobile learning self-efficacy	Less than R5 000 per month	R5 001 to R10 000 per month	-1.2971	1.33971	0.961	-5.2546	2.6603
		R10 001 to R15 000 per month	-2.3508	2.16667	0.933	-8.7511	4.0496
		R15 001 to R20 000 per month	-0.7601	2.65953	1.000	-8.6163	7.0962
		R20 001 to R25 000 per month	-1.4217	4.42332	1.000	-14.4882	11.6447
		R25 001 to R30 000 per month	1.6166	4.12158	1.000	-10.5586	13.7917
		More than R30 000 per month	1.3893	4.12158	1.000	-10.7858	13.5644
	R5 001 to R10 000 per month	Less than R5 000 per month	1.2971	1.33971	0.961	-2.6603	5.2546
		R10 001 to R15 000 per month	-1.0536	2.27450	0.999	-7.7725	5.6652
		R15 001 to R20 000 per month	0.5371	2.74809	1.000	-7.5808	8.6549
		R20 001 to R25 000 per month	-0.1246	4.47713	1.000	-13.3500	13.1008
		R25 001 to R30 000 per month	2.9137	4.17927	0.993	-9.4318	15.2592
		More than R30 000 per month	2.6864	4.17927	0.995	-9.6591	15.0320
	R10 001 to R15 000 per month	Less than R5 000 per month	2.3508	2.16667	0.933	-4.0496	8.7511
		R5 001 to R10 000 per month	1.0536	2.27450	0.999	-5.6652	7.7725
		R15 001 to R20 000 per month	1.5907	3.23290	0.999	-7.9593	11.1406
		R20 001 to R25 000 per month	0.9290	4.79002	1.000	-13.2206	15.0787

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R25 001 to R30 000 per month	3.9673	4.51286	0.976	-9.3636	17.2983
		More than R30 000 per month	3.7400	4.51286	0.982	-9.5909	17.0710
	R15 001 to R20 000 per month	Less than R5 000 per month	0.7601	2.65953	1.000	-7.0962	8.6163
		R5 001 to R10 000 per month	-0.5371	2.74809	1.000	-8.6549	7.5808
		R10 001 to R15 000 per month	-1.5907	3.23290	0.999	-11.1406	7.9593
		R20 001 to R25 000 per month	-0.6617	5.03219	1.000	-15.5267	14.2034
		R25 001 to R30 000 per month	2.3766	4.76913	0.999	-11.7113	16.4646
		More than R30 000 per month	2.1494	4.76913	0.999	-11.9386	16.2373
	R20 001 to R25 000 per month	Less than R5 000 per month	1.4217	4.42332	1.000	-11.6447	14.4882
		R5 001 to R10 000 per month	0.1246	4.47713	1.000	-13.1008	13.3500
		R10 001 to R15 000 per month	-0.9290	4.79002	1.000	-15.0787	13.2206
		R15 001 to R20 000 per month	0.6617	5.03219	1.000	-14.2034	15.5267
		R25 001 to R30 000 per month	3.0383	5.93610	0.999	-14.4969	20.5735
		More than R30 000 per month	2.8110	5.93610	0.999	-14.7242	20.3462
	R25 001 to R30 000 per month	Less than R5 000 per month	-1.6166	4.12158	1.000	-13.7917	10.5586
		R5 001 to R10 000 per month	-2.9137	4.17927	0.993	-15.2592	9.4318

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R10 001 to R15 000 per month	-3.9673	4.51286	0.976	-17.2983	9.3636
		R15 001 to R20 000 per month	-2.3766	4.76913	0.999	-16.4646	11.7113
		R20 001 to R25 000 per month	-3.0383	5.93610	0.999	-20.5735	14.4969
		More than R30 000 per month	-0.2273	5.71480	1.000	-17.1087	16.6542
	More than R30 000 per month	Less than R5 000 per month	-1.3893	4.12158	1.000	-13.5644	10.7858
		R5 001 to R10 000 per month	-2.6864	4.17927	0.995	-15.0320	9.6591
		R10 001 to R15 000 per month	-3.7400	4.51286	0.982	-17.0710	9.5909
		R15 001 to R20 000 per month	-2.1494	4.76913	0.999	-16.2373	11.9386
		R20 001 to R25 000 per month	-2.8110	5.93610	0.999	-20.3462	14.7242
		R25 001 to R30 000 per month	0.2273	5.71480	1.000	-16.6542	17.1087
Perceived usefulness	Less than R5 000 per month	R5 001 to R10 000 per month	0.0815	0.20752	1.000	-0.5315	0.6945
		R10 001 to R15 000 per month	-0.2314	0.33562	0.993	-1.2228	0.7600
		R15 001 to R20 000 per month	-1.0783	0.41196	0.122	-2.2952	0.1386
		R20 001 to R25 000 per month	0.2967	0.68518	0.999	-1.7273	2.3207
		R25 001 to R30 000 per month	-0.7033	0.63844	0.928	-2.5892	1.1826
		More than R30 000 per month	0.0240	0.63844	1.000	-1.8620	1.9099

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	R5 001 to R10 000 per month	Less than R5 000 per month	-0.0815	0.20752	1.000	-0.6945	0.5315
		R10 001 to R15 000 per month	-0.3129	0.35232	0.974	-1.3537	0.7279
		R15 001 to R20 000 per month	-1.1598	0.42568	0.093	-2.4173	0.0977
		R20 001 to R25 000 per month	0.2152	0.69351	1.000	-1.8334	2.2638
		R25 001 to R30 000 per month	-0.7848	0.64737	0.890	-2.6971	1.1275
		More than R30 000 per month	-0.0575	0.64737	1.000	-1.9699	1.8548
	R10 001 to R15 000 per month	Less than R5 000 per month	0.2314	0.33562	0.993	-0.7600	1.2228
		R5 001 to R10 000 per month	0.3129	0.35232	0.974	-0.7279	1.3537
		R15 001 to R20 000 per month	-0.8469	0.50078	0.622	-2.3262	0.6324
		R20 001 to R25 000 per month	0.5281	0.74198	0.992	-1.6637	2.7199
		R25 001 to R30 000 per month	-0.4719	0.69905	0.994	-2.5369	1.5931
		More than R30 000 per month	0.2554	0.69905	1.000	-1.8096	2.3203
	R15 001 to R20 000 per month	Less than R5 000 per month	1.0783	0.41196	0.122	-0.1386	2.2952
		R5 001 to R10 000 per month	1.1598	0.42568	0.093	-0.0977	2.4173
		R10 001 to R15 000 per month	0.8469	0.50078	0.622	-0.6324	2.3262
		R20 001 to R25 000 per month	1.3750	0.77949	0.573	-0.9276	3.6776

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R25 001 to R30 000 per month	0.3750	0.73874	0.999	-1.8072	2.5572
		More than R30 000 per month	1.1023	0.73874	0.750	-1.0800	3.2845
	R20 001 to R25 000 per month	Less than R5 000 per month	-0.2967	0.68518	0.999	-2.3207	1.7273
		R5 001 to R10 000 per month	-0.2152	0.69351	1.000	-2.2638	1.8334
		R10 001 to R15 000 per month	-0.5281	0.74198	0.992	-2.7199	1.6637
		R15 001 to R20 000 per month	-1.3750	0.77949	0.573	-3.6776	0.9276
		R25 001 to R30 000 per month	-1.0000	0.91951	0.932	-3.7162	1.7162
		More than R30 000 per month	-0.2727	0.91951	1.000	-2.9889	2.4435
	R25 001 to R30 000 per month	Less than R5 000 per month	0.7033	0.63844	0.928	-1.1826	2.5892
		R5 001 to R10 000 per month	0.7848	0.64737	0.890	-1.1275	2.6971
		R10 001 to R15 000 per month	0.4719	0.69905	0.994	-1.5931	2.5369
		R15 001 to R20 000 per month	-0.3750	0.73874	0.999	-2.5572	1.8072
		R20 001 to R25 000 per month	1.0000	0.91951	0.932	-1.7162	3.7162
		More than R30 000 per month	0.7273	0.88523	0.983	-1.8877	3.3422
	More than R30 000 per month	Less than R5 000 per month	-0.0240	0.63844	1.000	-1.9099	1.8620
		R5 001 to R10 000 per month	0.0575	0.64737	1.000	-1.8548	1.9699

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R10 001 to R15 000 per month	-0.2554	0.69905	1.000	-2.3203	1.8096
		R15 001 to R20 000 per month	-1.1023	0.73874	0.750	-3.2845	1.0800
		R20 001 to R25 000 per month	0.2727	0.91951	1.000	-2.4435	2.9889
		R25 001 to R30 000 per month	-0.7273	0.88523	0.983	-3.3422	1.8877
Perceived ease of use	Less than R5 000 per month	R5 001 to R10 000 per month	0.3076	0.21777	0.795	-0.3356	0.9509
		R10 001 to R15 000 per month	-0.0981	0.35219	1.000	-1.1384	0.9423
		R15 001 to R20 000 per month	-0.8031	0.43230	0.509	-2.0801	0.4739
		R20 001 to R25 000 per month	1.2627	0.71901	0.578	-0.8613	3.3866
		R25 001 to R30 000 per month	-0.9167	0.66996	0.819	-2.8958	1.0623
		More than R30 000 per month	0.2651	0.66996	1.000	-1.7140	2.2441
	R5 001 to R10 000 per month	Less than R5 000 per month	-0.3076	0.21777	0.795	-0.9509	0.3356
		R10 001 to R15 000 per month	-0.4057	0.36972	0.929	-1.4978	0.6864
		R15 001 to R20 000 per month	-1.1108	0.44670	0.165	-2.4303	0.2088
		R20 001 to R25 000 per month	0.9550	0.72775	0.846	-1.1947	3.1048
		R25 001 to R30 000 per month	-1.2244	0.67934	0.547	-3.2312	0.7824
		More than R30 000 per month	-0.0426	0.67934	1.000	-2.0493	1.9642

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	R10 001 to R15 000 per month	Less than R5 000 per month	0.0981	0.35219	1.000	-0.9423	1.1384
		R5 001 to R10 000 per month	0.4057	0.36972	0.929	-0.6864	1.4978
		R15 001 to R20 000 per month	-0.7051	0.52550	0.832	-2.2574	0.8473
		R20 001 to R25 000 per month	1.3607	0.77861	0.584	-0.9393	3.6607
		R25 001 to R30 000 per month	-0.8187	0.73356	0.923	-2.9856	1.3482
		More than R30 000 per month	0.3631	0.73356	0.999	-1.8038	2.5301
	R15 001 to R20 000 per month	Less than R5 000 per month	0.8031	0.43230	0.509	-0.4739	2.0801
		R5 001 to R10 000 per month	1.1108	0.44670	0.165	-0.2088	2.4303
		R10 001 to R15 000 per month	0.7051	0.52550	0.832	-0.8473	2.2574
		R20 001 to R25 000 per month	2.0658	0.81798	0.151	-0.3505	4.4821
		R25 001 to R30 000 per month	-0.1136	0.77522	1.000	-2.4036	2.1763
		More than R30 000 per month	1.0682	0.77522	0.814	-1.2218	3.3582
	R20 001 to R25 000 per month	Less than R5 000 per month	-1.2627	0.71901	0.578	-3.3866	0.8613
		R5 001 to R10 000 per month	-0.9550	0.72775	0.846	-3.1048	1.1947
		R10 001 to R15 000 per month	-1.3607	0.77861	0.584	-3.6607	0.9393
		R15 001 to R20 000 per month	-2.0658	0.81798	0.151	-4.4821	0.3505

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R25 001 to R30 000 per month	-2.1794	0.96491	0.265	-5.0298	0.6709
		More than R30 000 per month	-0.9976	0.96491	0.946	-3.8479	1.8527
	R25 001 to R30 000 per month	Less than R5 000 per month	0.9167	0.66996	0.819	-1.0623	2.8958
		R5 001 to R10 000 per month	1.2244	0.67934	0.547	-0.7824	3.2312
		R10 001 to R15 000 per month	0.8187	0.73356	0.923	-1.3482	2.9856
		R15 001 to R20 000 per month	0.1136	0.77522	1.000	-2.1763	2.4036
		R20 001 to R25 000 per month	2.1794	0.96491	0.265	-0.6709	5.0298
		More than R30 000 per month	1.1818	0.92893	0.865	-1.5622	3.9259
	More than R30 000 per month	Less than R5 000 per month	-0.2651	0.66996	1.000	-2.2441	1.7140
		R5 001 to R10 000 per month	0.0426	0.67934	1.000	-1.9642	2.0493
		R10 001 to R15 000 per month	-0.3631	0.73356	0.999	-2.5301	1.8038
		R15 001 to R20 000 per month	-1.0682	0.77522	0.814	-3.3582	1.2218
		R20 001 to R25 000 per month	0.9976	0.96491	0.946	-1.8527	3.8479
		R25 001 to R30 000 per month	-1.1818	0.92893	0,865	-3.9259	1.5622
Attitude towards mobile learning	Less than R5 000 per month	R5 001 to R10 000 per month	0.0800	0.31061	1.000	-0.8376	0.9975
		R10 001 to R15 000 per month	-0.4279	0.50233	0.979	-1.9118	1.0560

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R15 001 to R20 000 per month	-1.2903	0.61660	0.358	-3.1117	0.5311
		R20 001 to R25 000 per month	1.3544	1.02553	0.842	-1.6750	4.3839
		R25 001 to R30 000 per month	-1.9494	0.95557	0.390	-4.721	0.8734
		More than R30 000 per month	-0.4039	0.95557	1.000	-3.2267	2.4188
	R5 001 to R10 000 per month	Less than R5 000 per month	-0.0800	0.31061	1.000	-0.9975	0.8376
		R10 001 to R15 000 per month	-0.5079	0.52733	0.962	-2.0656	1.0498
		R15 001 to R20 000 per month	-1.3703	0.63713	0.324	-3.2523	0.5118
		R20 001 to R25 000 per month	1.2745	1.03800	0.883	-1.7918	4.3407
		R25 001 to R30 000 per month	-2.0293	0.96895	0.357	-4.8916	0.8329
		More than R30 000 per month	-0.4839	0.96895	0.999	-3.3462	2.3784
	R10 001 to R15 000 per month	Less than R5 000 per month	0.4279	0.50233	0.979	-1.0560	1.9118
		R5 001 to R10 000 per month	0.5079	052733	0.962	-1.0498	2.0656
		R15 001 to R20 000 per month	-0.8624	0.74954	0.912	-3.0765	1.3518
		R20 001 to R25 000 per month	1.7824	1.11055	0.679	-1.4982	5.0629
		R25 001 to R30 000 per month	-1.5215	1.04629	0.772	-4.6122	1.5693
		More than R30 000 per month	0.0240	1.04629	1.000	-3.0667	3.1147

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	R15 001 to R20 000 per month	Less than R5 000 per month	1.2903	0.61660	0.358	-0.5311	3.1117
		R5 001 to R10 000 per month	1.3703	0.63713	0.324	-0.5118	3.2523
		R10 001 to R15 000 per month	0.8624	0.74954	0.912	-1.3518	3.0765
		R20 001 to R25 000 per month	2.6447	1.16669	0.261	-0.8017	6.0911
		R25 001 to R30 000 per month	-0.6591	1.10571	0.997	-3.9253	2.6072
		More than R30 000 per month	0.8864	1.10571	0.985	-2.3799	4.1526
	R20 001 to R25 000 per month	Less than R5 000 per month	-1.3544	1.02553	0.842	-4.3839	1.6750
		R5 001 to R10 000 per month	-1.2745	1.03800	0.883	-4.3407	1.7918
		R10 001 to R15 000 per month	-1.7824	1.11055	0.679	-5.0629	1.4982
		R15 001 to R20 000 per month	-2.6447	1.16669	0.261	-6.0911	0.8017
		R25 001 to R30 000 per month	-3.3038	1.37626	0.199	-7.3693	0.7616
		More than R30 000 per month	-1.7584	1.37626	0.862	-5.8238	2.3071
	R25 001 to R30 000 per month	Less than R5 000 per month	1.9494	0.95557	0.390	-0.8734	4.7721
		R5 001 to R10 000 per month	2.0293	0.96895	0.357	-0.8329	4.8916
		R10 001 to R15 000 per month	1.5215	1.04629	0.772	-1.5693	4.6122
		R15 001 to R20 000 per month	0.6591	1.10571	0.997	-2.6072	3.9253

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R20 001 to R25 000 per month	3.3038	1.37626	0.199	-0.7616	7.3693
		More than R30 000 per month	1.5455	1.32495	0.907	-2.3684	5.4594
	More than R30 000 per month	Less than R5 000 per month	0.4039	0.95557	1.000	-2.4188	3.2267
		R5 001 to R10 000 per month	0.4839	0.96895	0.999	-2.3784	3.3462
		R10 001 to R15 000 per month	-0.0240	1.04629	1.000	-3.1147	3.0667
		R15 001 to R20 000 per month	-0.8864	1.10571	0.985	-4.1526	2.3799
		R20 001 to R25 000 per month	1.7584	1.37626	0.862	-2.3071	5.8238
		R25 001 to R30 000 per month	-1.5455	1.32495	0.907	-5.4594	2.3684
Locus of Control	Less than R5 000 per month	R5 001 to R10 000 per month	0.5163	0.41398	0.875	-0.7066	1.7392
		R10 001 to R15 000 per month	0.0620	0.66951	1.000	-1.9157	2.0398
		R15 001 to R20 000 per month	1.9483	0.82181	0.212	-0.4794	4.3759
		R20 001 to R25 000 per month	2.5469	1.36683	0.505	-1.4907	6.5846
		R25 001 to R30 000 per month	0.0733	1.27359	1.000	-3.6889	3.8354
		More than R30 000 per month	1.0278	1.27359	0.984	-2.7344	4.7900
	R5 001 to R10 000 per month	Less than R5 000 per month	-0.5163	0.41398	0.875	-1.7392	0.7066
		R10 001 to R15 000 per month	-0.4543	0.70284	0.995	-2.5304	1.6219

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R15 001 to R20 000 per month	1.4320	0.84918	0.625	-1.0765	3.9404
		R20 001 to R25 000 per month	2.0306	1.38346	0.764	-2.0561	6.1174
		R25 001 to R30 000 per month	-0.4430	1.29142	1.000	-4.2579	3.3718
		More than R30 000 per month	0.5115	1.29142	1.000	-3.3033	4.3264
	R10 001 to R15 000 per month	Less than R5 000 per month	-0.0620	0.66951	1.000	-2.0398	1.9157
		R5 001 to R10 000 per month	0.4543	0.70284	0.995	-1.6219	2.5304
		R15 001 to R20 000 per month	1.8862	0.99899	0.489	-1.0648	4.8372
		R20 001 to R25 000 per month	2.4849	1.48015	0.630	-1.8874	6.8573
		R25 001 to R30 000 per month	0.0112	1.39450	1.000	-4.1081	4.1306
		More than R30 000 per month	0.9658	1.39450	0.993	-3.1536	5.0851
	R15 001 to R20 000 per month	Less than R5 000 per month	-1.9483	0.82181	0.212	-4.3759	0.4794
		R5 001 to R10 000 per month	-1.4320	0.84918	0.625	-3.9404	1.0765
		R10 001 to R15 000 per month	-1.8862	0.99899	0.489	-4.8372	1.0648
		R20 001 to R25 000 per month	0.5987	1.55498	1.000	-3.9947	5.1921
		R25 001 to R30 000 per month	-1.8750	1.47369	0.865	-6.2283	2.4783
		More than R30 000 per month	-0.9205	1.47369	0.996	-5.2737	3.4328

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	R20 001 to R25 000 per month	Less than R5 000 per month	-2.5469	1.36683	0.505	-6.5846	1.4907
		R5 001 to R10 000 per month	-2.0306	1.38346	0.764	-6.1174	2.0561
		R10 001 to R15 000 per month	-2.4849	1.48015	0.630	-6.8573	1.8874
		R15 001 to R20 000 per month	-0.5987	1.55498	1.000	-5.1921	3.9947
		R25 001 to R30 000 per month	-2.4737	1.83429	0.829	-7.8922	2.9448
		More than R30 000 per month	-1.5191	1.83429	0.982	-6.9376	3.8993
	R25 001 to R30 000 per month	Less than R5 000 per month	-0.0733	1.27359	1.000	-3.8354	3.6889
		R5 001 to R10 000 per month	0.4430	1.29142	1.000	-3.3718	4.2579
		R10 001 to R15 000 per month	-0.0112	1.39450	1.000	-4.1306	4.1081
		R15 001 to R20 000 per month	1.8750	1.47369	0.865	-2.4783	6.2283
		R20 001 to R25 000 per month	2.4737	1.83429	0.829	-2.9448	7.8922
		More than R30 000 per month	0.9545	1.76591	0.998	-4.2619	6.1710
	More than R30 000 per month	Less than R5 000 per month	-1.0278	1.27359	0.984	-4.7900	2.7344
		R5 001 to R10 000 per month	-0.5115	1.29142	1.000	-4.3264	3.3033
		R10 001 to R15 000 per month	-0.9658	1.39450	0.993	-5.0851	3.1536
		R15 001 to R20 000 per month	0.9205	1.47369	0.996	-3.4328	5.2737

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R20 001 to R25 000 per month	1.5191	1.83429	0.982	-3.8993	6.9376
		R25 001 to R30 000 per month	-0.9545	1.76591	0.998	-6.1710	4.2619
Perceived behavioural control	Less than R5 000 per month	R5 001 to R10 000 per month	-0.5281	0.22706	0.233	-1.1988	0.1427
		R10 001 to R15 000 per month	-1.0909*	0.36722	0.048	-2.1757	-0.0061
		R15 001 to R20 000 per month	-1.6090*	0.45076	0.007	-2.9405	-0.2774
		R20 001 to R25 000 per month	-0.7875	0.74970	0.942	-3.0021	1.4270
		R25 001 to R30 000 per month	-1.3785	0.69856	0.432	-3.4420	0.6851
		More than R30 000 per month	-1.3330	0.69856	0.475	-3.3965	0.7305
	R5 001 to R10 000 per month	Less than R5 000 per month	0.5281	0.22706	0.233	-0.1427	1.1988
		R10 001 to R15 000 per month	-0.5629	0.38550	0.768	-1.7016	0.5759
		R15 001 to R20 000 per month	-1.0809	0.46577	0.235	-2.4568	0.2949
		R20 001 to R25 000 per month	-0.2595	0.75882	1.000	-2.5010	1.9820
		R25 001 to R30 000 per month	-0.8504	0.70833	0.894	-2.9428	1.2420
		More than R30 000 per month	-0.8049	0.70833	0.917	-2.8974	1.2875
	R10 001 to R15 000 per month	Less than R5 000 per month	1.0909*	0.36722	0.048	0.0061	2.1757
		R5 001 to R10 000 per month	0.5629	0.38550	0.768	-0.5759	1.7016

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R15 001 to R20 000 per month	-0.5181	0.54794	0.965	-2.1367	1.1005
		R20 001 to R25 000 per month	0.3034	0.81185	1.000	-2.0948	2.7016
		R25 001 to R30 000 per month	-0.2875	0.76487	1.000	-2.5470	1.9719
		More than R30 000 per month	-0.2421	0.76487	1.000	-2.5015	2.0173
	R15 001 to R20 000 per month	Less than R5 000 per month	1.6090*	0.45076	0.007	0.2774	2.9405
		R5 001 to R10 000 per month	1.0809	0.46577	0.235	-0.2949	2.4568
		R10 001 to R15 000 per month	0.5181	0.54794	0.965	-1.1005	2.1367
		R20 001 to R25 000 per month	0.8214	0.85289	0.962	-1.6980	3.3409
		R25 001 to R30 000 per month	0.2305	0.80831	1.000	-2.1572	2.6182
		More than R30 000 per month	0.2760	0.80831	1.000	-2.1118	2.6637
	R20 001 to R25 000 per month	Less than R5 000 per month	0.7875	0.74970	0.942	-1.4270	3.0021
		R5 001 to R10 000 per month	0.2595	0.75882	1.000	-1.9820	2.5010
		R10 001 to R15 000 per month	-0.3034	0.81185	1.000	-2.7016	2.0948
		R15 001 to R20 000 per month	-0.8214	0.85289	0.962	-3.3409	1.6980
		R25 001 to R30 000 per month	-0.5909	1.00609	0.997	-3.5629	2.3811
		More than R30 000 per month	-0.5455	1.00609	0.998	-3.5174	2.4265

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	R25 001 to R30 000 per month	Less than R5 000 per month	1.3785	0.69856	0.432	-0.6851	3.4420
		R5 001 to R10 000 per month	0.8504	0.70833	0.894	-1.2420	2.9428
		R10 001 to R15 000 per month	0.2875	0.76487	1.000	-1.9719	2.5470
		R15 001 to R20 000 per month	-0.2305	0.80831	1.000	-2.6182	2.1572
		R20 001 to R25 000 per month	0.5909	1.00609	0.997	-2.3811	3.5629
		More than R30 000 per month	0.0455	0.96859	1.000	-2.8157	2.9066
	More than R30 000 per month	Less than R5 000 per month	1.3330	0.69856	0.475	-0.7305	3.3965
		R5 001 to R10 000 per month	0.8049	0.70833	0.917	-1.2875	2.8974
		R10 001 to R15 000 per month	0.2421	0.76487	1.000	-2.0173	2.5015
		R15 001 to R20 000 per month	-0.2760	0.80831	1.000	-2.6637	2.1118
		R20 001 to R25 000 per month	0.5455	1.00609	0.998	-2.4265	3.5174
		R25 001 to R30 000 per month	-0.0455	0.96859	1.000	-2.9066	2.8157
Subjective norm	Less than R5 000 per month	R5 001 to R10 000 per month	0.0433	0.11896	1.000	-0.3081	0.3947
		R10 001 to R15 000 per month	-0.0815	0.19239	1.000	-0.6498	0.4869
		R15 001 to R20 000 per month	-0.2386	0.23615	0.952	-0.9361	0.4590
		R20 001 to R25 000 per month	0.3000	0.39276	0.988	-0.8602	1.4602

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R25 001 to R30 000 per month	-0.2694	0.36597	0.990	-1.3505	0.8117
		More than R30 000 per month	-0.4512	0.36597	0.881	-1.5323	0.6299
	R5 001 to R10 000 per month	Less than R5 000 per month	-0.0433	0.11896	1.000	-0.3947	0.3081
		R10 001 to R15 000 per month	-0.1248	0.20196	0.996	-0.7214	0.4718
		R15 001 to R20 000 per month	-0.2819	0.24401	0.911	-1.0027	0.4389
		R20 001 to R25 000 per month	0.2567	0.39754	0.995	-0.9177	1.4310
		R25 001 to R30 000 per month	-0.3127	0.37109	0.980	-1.4089	0.7835
		More than R30 000 per month	-0.4945	0.37109	0.837	-1.5907	0.6017
	R10 001 to R15 000 per month	Less than R5 000 per month	0.0815	0.19239	1.000	-0.4869	0.6498
		R5 001 to R10 000 per month	0.1248	0.20196	0.996	-0.4718	0.7214
		R15 001 to R20 000 per month	-0.1571	0.28706	0.998	-1.0051	0.6909
		R20 001 to R25 000 per month	0.3814	0.42532	0.973	-0.8750	1.6378
		R25 001 to R30 000 per month	-0.1879	0.40071	0.999	-1.3717	0.9958
		More than R30 000 per month	-0.3698	0.40071	0.969	-1.5535	0.8139
	R15 001 to R20 000 per month	Less than R5 000 per month	0.2386	0.23615	0.952	-0.4590	0.9361
		R5 001 to R10 000 per month	0.2819	0.24401	0.911	-0.4389	1.0027

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R10 001 to R15 000 per month	0.1571	0.28706	0.998	-0.6909	1.0051
		R20 001 to R25 000 per month	0.5385	0.44683	0.892	-0.7814	1.8585
		R25 001 to R30 000 per month	-0.0308	0.42347	1.000	-1.2818	1.2201
		More than R30 000 per month	-0.2127	0.42347	0.999	-1.4636	1.0383
	R20 001 to R25 000 per month	Less than R5 000 per month	-0.3000	0.39276	0.988	-1.4602	0.8602
		R5 001 to R10 000 per month	-0.2567	0.39754	0.995	-1.4310	0.9177
		R10 001 to R15 000 per month	-0.3814	0.42532	0.973	-1.6378	0.8750
		R15 001 to R20 000 per month	-0.5385	0.44683	0.892	-1.8585	0.7814
		R25 001 to R30 000 per month	-0.5694	0.52709	0.934	-2.1264	0.9876
		More than R30 000 per month	-0.7512	0.52709	0.788	-2.3082	0.8058
	R25 001 to R30 000 per month	Less than R5 000 per month	0.2694	0.36597	0.990	-0.8117	1.3505
		R5 001 to R10 000 per month	0.3127	0.37109	0.980	-0.7835	1.4089
		R10 001 to R15 000 per month	0.1879	0.40071	0.999	-0.9958	1.3717
		R15 001 to R20 000 per month	0.0308	0.42347	1.000	-1.2201	1.2818
		R20 001 to R25 000 per month	0.5694	0.52709	0.934	-0.9876	2.1264
		More than R30 000 per month	-0.1818	0.50744	1.000	-1.6808	1.3172

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	More than R30 000 per month	Less than R5 000 per month	0.4512	0.36597	0.881	-0.6299	1.5323
		R5 001 to R10 000 per month	0.4945	0.37109	0.837	-0.6017	1.5907
		R10 001 to R15 000 per month	0.3698	0.40071	0.969	-0.8139	1.5535
		R15 001 to R20 000 per month	0.2127	0.42347	0.999	-1.0383	1.4636
		R20 001 to R25 000 per month	0.7512	0.52709	0.788	-0.8058	2.3082
		R25 001 to R30 000 per month	0.1818	0.50744	1.000	-1.3172	1.6808
Behavioural intention	Less than R5 000 per month	R5 001 to R10 000 per month	0.0211	0.08639	1.000	-0.2341	0.2763
		R10 001 to R15 000 per month	-0.1344	0.13972	0.962	-0.5471	0.2784
		R15 001 to R20 000 per month	-0.4913	0.17151	0.064	-0.9979	0.0153
		R20 001 to R25 000 per month	0.4044	0.28525	0.792	-0.4382	1.2470
		R25 001 to R30 000 per month	-0.3468	0.26579	0.850	-1.1320	0.4383
		More than R30 000 per month	03805	0.26579	0.785	-0.4047	1.1656
	R5 001 to R10 000 per month	Less than R5 000 per month	-0.0211	0.08639	1.000	-0.2763	0.2341
		R10 001 to R15 000 per month	-0.1555	0.14668	0.939	-0.5888	0.2778
		R15 001 to R20 000 per month	-0.5124	0.17722	0.060	-1.0359	0.0111
		R20 001 to R25 000 per month	0.3832	0.28872	0.839	-0.4696	1.2361

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R25 001 to R30 000 per month	-0.3680	0.26951	0.820	-1.1641	0.4282
		More than R30 000 per month	0.3593	0.26951	0.836	-0.4368	1.1555
	R10 001 to R15 000 per month	Less than R5 000 per month	0.1344	0.13972	0.962	-0.2784	0.5471
		R5 001 to R10 000 per month	0.1555	0.14668	0.939	-0.2778	0.5888
		R15 001 to R20 000 per month	-0.3569	0.20848	0.608	-0.9728	0.2589
		R20 001 to R25 000 per month	0.5387	0.30890	0.586	-0.3737	1.4512
		R25 001 to R30 000 per month	-0.2125	0.29102	0.991	-1.0721	0.6472
		More than R30 000 per month	0.5148	0.29102	0.569	-0.3449	1.3745
	R15 001 to R20 000 per month	Less than R5 000 per month	0.4913	0.17151	0.064	-0.0153	0.9979
		R5 001 to R10 000 per month	0.5124	0.17722	0.060	-0.0111	1.0359
		R10 001 to R15 000 per month	0.3569	0.20848	0.608	-0.2589	0.9728
		R20 001 to R25 000 per month	0.8957	0.32451	0.085	-0.0629	1.8543
		R25 001 to R30 000 per month	0.1445	0.30755	0.999	-0.7640	1.0530
		More than R30 000 per month	0.8718	0.30755	0.070	-0.0367	1.7803
	R20 001 to R25 000 per month	Less than R5 000 per month	-0.4044	0.28525	0.792	-1.2470	0.4382
		R5 001 to R10 000 per month	-0.3832	0.28872	0.839	-1.2361	0.4696

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		R10 001 to R15 000 per month	-0.5387	0.30890	0.586	-1.4512	0.3737
		R15 001 to R20 000 per month	-0.8957	0.32451	0.085	-1.8543	0.0629
		R25 001 to R30 000 per month	-0.7512	0.38281	0.440	-1.8820	0.3796
		More than R30 000 per month	-0.0239	0.38281	1.000	-1.1547	1.1069
	R25 001 to R30 000 per month	Less than R5 000 per month	0.3468	0.26579	0.850	-0.4383	1.1320
		R5 001 to R10 000 per month	0.3680	0.26951	0.820	-0.4282	1.1641
		R10 001 to R15 000 per month	0.2125	0.29102	0.991	-0.6472	1.0721
		R15 001 to R20 000 per month	-0.1445	0.30755	0.999	-1.0530	0.7640
		R20 001 to R25 000 per month	0.7512	0.38281	0.440	-0.3796	1.8820
		More than R30 000 per month	0.7273	0.36853	0.432	-0.3614	1.8159
	More than R30 000 per month	Less than R5 000 per month	-0.3805	0.26579	0.785	-1.1656	0.4047
		R5 001 to R10 000 per month	-0.3593	0.26951	0.836	-1.1555	0.4368
		R10 001 to R15 000 per month	-0.5148	0.29102	0.569	-1.3745	0.3449
		R15 001 to R20 000 per month	-0.8718	0.30755	0.070	-1.7803	0.0367
		R20 001 to R25 000 per month	0.0239	0.38281	1.000	-1.1069	1.1547
		R25 001 to R30 000 per month	-0.7273	0.36853	0.432	-1.8159	0.3614

Results indicated that, in terms of perceived behavioural control, there were statistically significant differences between the category of household income less than R5 000 per month and household income of R10 001 to R15 000 per month (p = .048). In addition, there was also a statistically significant difference between the category of household income less than R5 000 per month and household income of R15 001 to R20 000 per month (p = .007). The mean score for the two higher income categories were both higher than the mean score for those respondents earning less than R5 000 per month, indicating that respondents in the two higher income categories have higher perceived behavioural control than those respondents earning less than R5 000 per month.

Summary of the Results Pertaining to the Research Questions

Table 30 provides a summary of the results related to the central research question as well as each of the sub-research questions posed in this study.

Table 30 Summary of main research findings

Research Question	Finding
Central research question: What is the influence of locus of control, mobile learning self-efficacy, attitude towards mobile learning, perceived usefulness, perceived ease of use, perceived behavioural control and subjective norm on students' behavioural intention to adopt mobile learning?	Locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning accounted for 44.8% of the variance in behavioural intention to adopt mobile learning. Perceived ease of use made the highest significant contribution followed by attitude towards mobile learning, subjective norm, perceived usefulness, perceived behavioural control and locus of control. Mobile learning self-efficacy did not make a statistically significant contribution to behavioural intention to adopt mobile learning.
Sub-research question 1: Do students display high or low self-efficacy beliefs about learning with mobile learning?	Respondents displayed above moderate to high self-efficacy beliefs about learning with mobile technology.
Sub-research question 2: Do students perceive mobile learning to be useful as a platform for learning?	Respondents perceived mobile learning to be a useful platform for learning.

Research Question	Finding
Sub-research question 3: Do students perceive mobile learning to be easy to use in their studies?	Respondents perceived mobile learning to be easy to use.
Sub-research question 4: Do students exhibit positive or negative attitudes towards mobile learning?	Respondents displayed a positive attitude towards mobile learning.
Sub-research question 5: Do students exhibit an internal or external locus of control?	Majority of respondents displayed an internal locus of control.
Sub-research question 6: What level of perceived behavioural control do students exhibit?	Respondents displayed high levels of perceived behavioural control.
Sub-research question 7: What influence do significant others have on students' behavioural intention to adopt mobile learning?	Majority of respondents considered significant others to have an influence on their behavioural intention to adopt mobile learning.
Sub-research question 8: Do students display behavioural intention to adopt mobile learning?	Respondents displayed high levels of intention to adopt mobile learning.
Sub-research question 9: Are there any significant gender differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning?	Results indicated that gender had a significant influence on perceived usefulness, perceived ease of use, attitude towards mobile learning, perceived behavioural control, subjective norm and behavioural intention. Females' mean scores were significantly higher than males.
Sub-research question 10: Are there any significant age differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning?	Results indicated that age had a significant influence on perceived usefulness and subjective norm. In terms of perceived usefulness, 35 to 44-year olds had a significant higher mean score than 18 to 24 and 25 to 34-year olds. In terms of subjective norm, 35 to 44-year olds had a significant higher mean score than 18 to 24-year olds.
Sub-research question 11: Are there any significant differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning, in terms of race?	Results indicated that race had a significant influence on subjective norm. Africans had the highest mean score, followed by Coloureds, Indians, Asians and Whites.
Sub-research question 12: Are there any significant differences in mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use,	Results indicated that household income had a significant influence on perceived behavioural control. In terms of perceived behavioural control, the mean scores for

Research Question	Finding
perceived behavioural control, attitude towards mobile learning and behavioural intention to adopt mobile learning, in terms of household income?	R10001 to R15000 income per month and R15001 to R20000 income per month were both higher than the category of less than R5000 income per month. This indicated that respondents in the higher income categories displayed higher perceived behavioural control than those in the lower income groups.

Structural Model and Hypotheses

In this study, the TPB and TAM models were combined and then extended to include two additional constructs, namely mobile learning self-efficacy and locus of control. Both theory and previous research results pertaining to the adoption of mobile learning (as discussed in the literature review chapter) were used to guide the location of constructs in the hypothesised model. A path diagram (Figure 4) was constructed in which the rectangle boxes represented the constructs (Hox & Bechger, 1999). The single headed arrows illustrated relationships in the model, with the construct at the tail of the arrows hypothesised to influence the construct at the point (Hox & Bechger, 1999). The number of each hypothesis statement was then added to the model to create a holistic view of the proposed theoretical model.

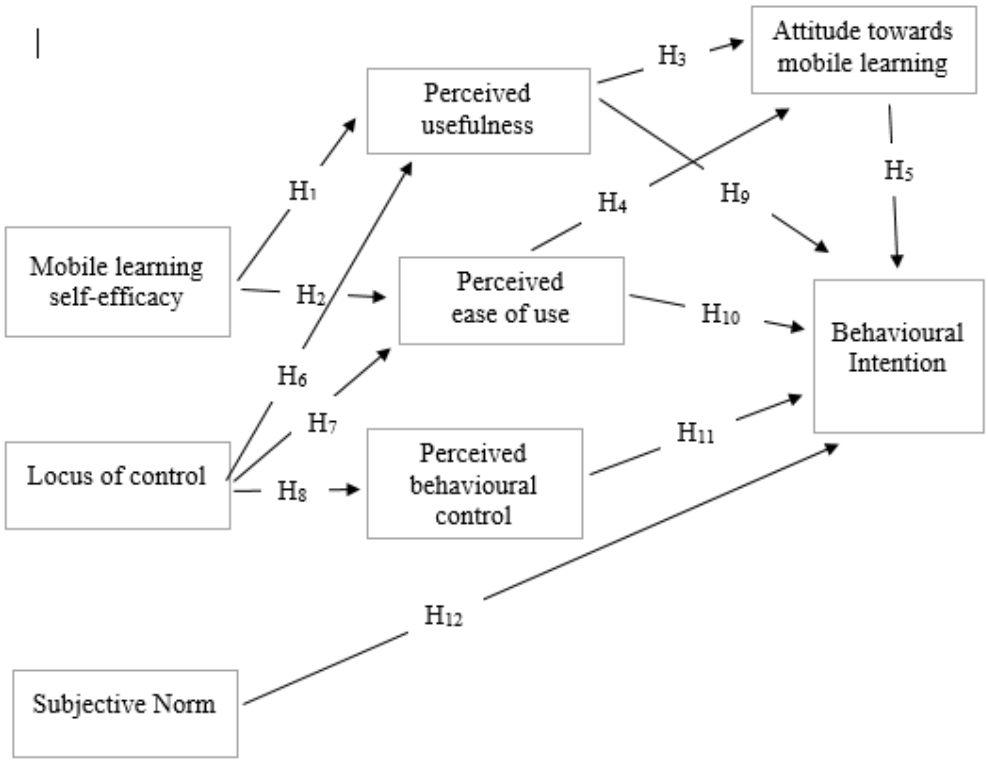
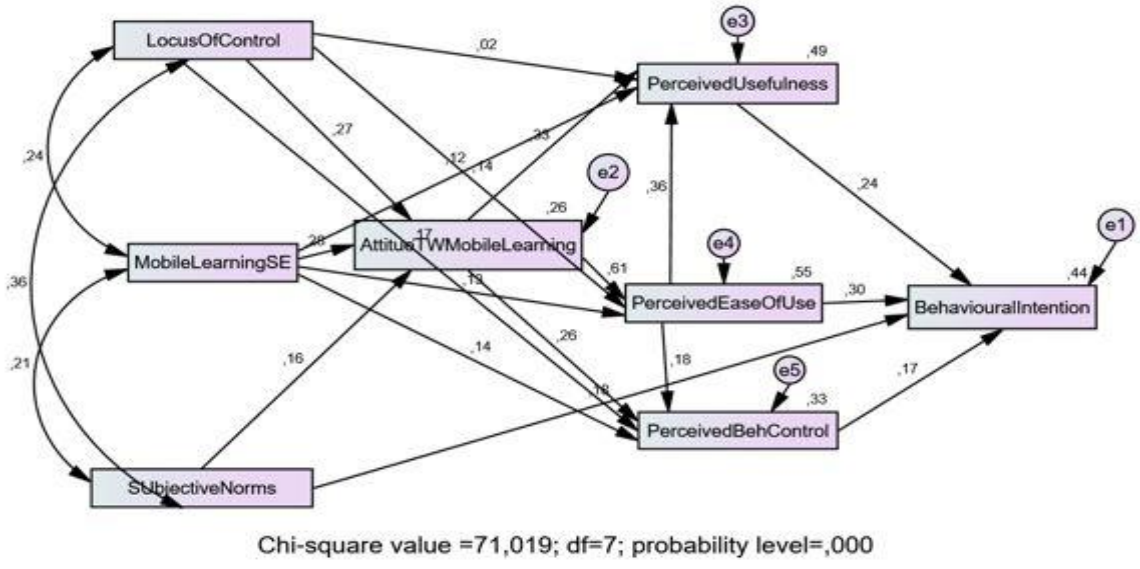


Figure 4 Proposed Theoretical Model

The first step in the Structural Equation Modelling (SEM) analysis was to draw the path diagram in SPSS software. SEM software then used complex algorithms to maximise the fit of the hypothesised model. Figure 5 illustrates the path diagram that best fitted the data.

Figure 5 Path Diagram



The results indicated that locus of control had the greatest significant positive influence on subjective norm (β = .356, $p < .001$), followed by attitude towards mobile learning (β = .271, $p < .001$), perceived behavioural control (β = .170, $p < .001$) and perceived ease of use (β = .138, $p < .001$). Locus of control had a positive, but statistically insignificant, influence on perceived usefulness (β = .019, $p = .436$). Furthermore, a covariance relationship between locus of control and mobile learning self-efficacy was identified (β = .242, $p < .001$) and between locus of control and subjective norm (β = .356, $p < .001$).

Mobile learning self-efficacy had the greatest statistically significant positive influence on attitude towards mobile learning (β = .277, $p < .001$), followed by perceived behavioural control (β = .137, $p < 0.001$), perceived ease of use (β = .133, $p < .001$), and perceived usefulness (β = .121, $p < .001$). Furthermore, a covariance relationship was also identified between subjective norm and mobile learning self-efficacy (β = .213, $p < 0.001$).

Subjective norm had the greatest statistically significant positive influence on behavioural intention (β = .183, $p < .001$) followed by attitude towards mobile learning (β = .158, $p < .001$).

In this study attitude towards mobile learning had the greatest statistically significant positive influence on perceived ease of use (β = .614, $p < .001$), followed by perceived usefulness (β = .326, $p < .001$), and perceived behavioural control (β = .259, $p < .001$).

Perceived usefulness had a statistically significant positive influence on behavioural intention. Perceived ease of use had the greatest statistically significant positive influence on perceived usefulness (β = .356, $p < .001$) followed by, behavioural intention (β = .301, $p < .001$), and perceived behavioural control (β = .180, $p < .001$).

Perceived behavioural control had a statistically significant positive influence on behavioural intention (β = .171, $p < .001$).

The table below is a summary of the error variance identified in the path diagram.

Table 31 Variances: (Group number 1 – Default model)

	Estimate	S.E.	C.R.	P	Label
Locus of control	36.477	1.558	23.409	***	
Mobile learning self-efficacy	361.940	15.461	23.409	***	
Subjective norm	2.921	.125	23.409	***	
e2	18.145	.775	23.409	***	
e4	5.093	.218	23.409	***	
e3	5.594	.239	23.409	***	
e5	7.757	.331	23.409	***	
e1	.948	.041	23.409	***	

In the hypothesised model, perceived usefulness, perceived ease of use, attitude towards mobile learning, perceived behavioural control and behavioural intention were identified as endogenous variables. Endogenous variables are influenced by other variables in the model (Hooper et al., 2008). An endogenous variable consists of an observed score (β) plus an error variance (e2). Error variance, also called measurement error, refers to factors and unidentified variables that influence the endogenous variable (Hooper et al., 2008). In the path diagram, when fitting the data to the model, locus of control, mobile learning self-efficacy, subjective norm, attitude towards mobile learning, perceived usefulness, perceived ease of use, perceived behavioural control and behavioural intention were identified as endogenous variables. In the path diagram other variables in the model accounted for 26% ($R^2 = 0.26$) of the variance in attitude towards mobile learning, 49% ($R^2 = 0.49$) of the variance in perceived usefulness, 55% ($R^2 = 0.55$) of the variance in perceived ease of use and 33% ($R^2 = 0.33$) of the variance in perceived behavioural control. Other factors and unidentified variables accounted for error variance of 77.5% (e2 = .775) in attitude towards mobile learning, 23.9% (e3 = .239) in perceived usefulness, 21.8% (e4 = .218) in perceived ease of use and 33.1% (e5 = .331) in perceived behavioural control. Overall the hypothesised model was able to account for 44.8% of variance in behavioural intention to adopt mobile learning. In the hypothesised model, perceived ease of use had the greatest statistically significant influence

on behavioural intention (β = .301, $p < 0.001$). Perceived usefulness had the second greatest influence on behavioural intention (β = .235, $p < .001$) followed by subjective norm (β = .183, $p < .001$) and perceived behavioural control (β = .171, $p < .001$). Other factors and unidentified variables account for error variance of 4.10% (e1 = .041). All error variances were identified to be significant at $p < .001$. The effect size for perceived ease of use ($f^2 = 1.22$), perceived usefulness ($f^2 = .96$) and perceived behavioural control ($f^2 = .049$), were all above $f^2 = .35$ which indicates a large effect (Cohen, 1992).

A Chi square goodness for fit test was conducted to examine whether the hypothesised model fitted the data. In the case where the Chi square is statistically significant, the hypothesised model is rejected, and the research must search for a better model (Hox & Bechger, 1999). According to Hox and Bechger (1999), one of the problems with the Chi square test is that when the sample size is very large, which is the case in this study (N = 1070), the test will almost certainly be significant and therefore the model will be rejected. In this study the chi square statistic produced a result of 71.019 with 7 degrees of freedom and a probability level of .000. The model did not show a good fit. Given the sensitivity of the chi square test to sample size, alternative fit indices were used to assess model fit, namely: The Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Normed Fit Index (NFI) and Comparative Fit Index (CFI) and Parsimony normed fit index (PNFI). Table 31 below contains a summary of the results (referred to as model statistics) with the recommended value for each test.

Table 32 Goodness-of-fit measures (Hooper et al., 2008)

Goodness-of-fit measure	Recommended value	Model statistic
Root mean square error of approximation (RMSEA)	≤ 0.05	0.091
Goodness of fit index (GFI)	≥ 0.90	0.983

Adjusted goodness of fit index (AGFI)	≥ 0.90	0.915
Normed fit index (NFI)	≥ 0.90	0.979
Comparative fit index (CFI)	≥ 0.90	0.981
Parsimony normed fit index (PNFI)	No threshold levels recommended	0.245

According to Hooper et al. (2008), a RMSEA result of 0.05 or less indicates good fit, and 0.08 or less adequate fit. However, the RMSEA is sensitive towards models with a high number of constructs and relationships (Hooper et al., 2008). In this study, the model consisted of eight constructs and twelve hypothesised relationships. It is then no surprise that the RMSEA = 0.091 result was higher than 0.08 indicating inadequate fit. Given the sensitivity of RMSEA to number of constructs and relationships indicated in a model, the GFI, AGFI, NFI and CFI fit indices were used to identify model fit. The results from the GFI, AGFI, NFI and CFI all exceeded their respective acceptable levels. According to these indices the model exhibited a good fit with the data. If the fit indices have a value of 1, then the model is a perfect fit to the data (Hox & Bechger, 1999). Hooper et al. (2008) suggested the use of CFI and PNFI when exploring goodness-of-fit as these indices have been found to be the most insensitive to sample size, model misspecification and parameter estimates.

Table 32 contains a summary of the hypotheses posed in this study together with the results produced by the analyses of the proposed relationships between the variables included in the model. As is shown, in this study H_1, H_2, H_7, H_8, H_9, H_{10}, H_{11} and H_{12} were supported while H_6 was partially supported and H_3, H_4 and H_5 were not supported.

Table 33 Summary of hypothesis findings

Hypothesis	Finding	Hypothesis Supported or Not Supported
Hypothesis 1: Mobile learning self-efficacy positively influences perceived usefulness	Mobile learning self-efficacy had a statistically significant positive effect on perceived usefulness ($\beta = .121$, $p < .001$).	Supported

Hypothesis 2: Mobile learning self-efficacy positively influences perceived ease of use	Mobile learning self-efficacy had a statistically significant positive effect on perceived ease of use (β = .133, p < .001).	Supported
Hypothesis 3: Perceived usefulness positively influences attitude towards mobile learning	Perceived usefulness had no influence on attitude towards mobile learning. The model did, however, identify that attitude towards mobile learning had a significant positive influence on perceived usefulness (β = .326, p < .001).	Not Supported
Hypothesis 4: Perceived ease of use positively influences attitude towards mobile learning	Perceived ease of use had no influence on attitude towards mobile learning. The model did, however, identify that attitude towards mobile learning had a significant positive influence on perceived ease of use (β = .614, p < .001).	Not Supported
Hypothesis 5: Attitude towards mobile learning positively influences behavioural intention to adopt mobile learning	Attitude towards mobile learning did not directly influence behavioural intention in this study. Attitude towards mobile learning indirectly influenced behavioural intention through perceived ease of use, perceived usefulness and perceived behavioural control. The model identified that attitude towards mobile learning had a significant positive influence on perceived usefulness (β = .326, p < .001) and perceived ease of use (β = .614, p < .001).	Not Supported
Hypothesis 6: Internal locus of control positively influences perceived usefulness	Internal locus of control had a positive, but not a significant effect on perceived usefulness (β = .019, p = .436).	Partially supported
Hypothesis 7: Internal locus of control positively influences perceived ease of use	Internal locus of control had a significant positive influence on perceived ease of use (β = .138, p < .001).	Supported
Hypothesis 8: Internal locus of control positively influences perceived behavioural control	Internal locus of control had a significant positive impact on perceived behavioural control (β = .170, p < .001).	Supported
Hypothesis 9: Perceived usefulness positively influences behavioural intention to adopt mobile learning	Perceived usefulness had a significant positive influence on behavioural intention (β = .235, p < .001),	Supported
Hypothesis 10: Perceived ease of use positively influences behavioural intention to adopt mobile learning	Perceived ease of use had a significant positive influence on behavioural intention (β = .301, p < .001)	Supported

Hypothesis 11: Perceived behavioural control positively influences behavioural intention to adopt mobile learning	Perceived behavioural control had a significant positive influence on behavioural intention (β = .171, $p < .001$).	Supported
Hypothesis 12: Subjective norm positively influences behavioural intention to adopt mobile learning	Subjective norm had a significant positive influence on behavioural intention (β = .183, $p < .001$).	Supported

Summary

This chapter presented the results of the analyses performed in this study. The chapter began with a brief description of the demographic profile of the research respondents, followed by a discussion of the results related to the central research question and each sub-research research question. The remainder of the chapter provided insights into the results related to the analysis of the model fit as well as the results pertaining to the hypotheses posed in this study.

Chapter 5: Discussion

The aim of this study was to examine the influence of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning on students' behavioural intention to adopt mobile learning. In addition, this study aimed to test the goodness of fit of a theoretical model. The hypothesised model combined the TAM and TPB and also included locus of control and mobile learning self-efficacy in order to predict students' behavioural intention to adopt mobile learning.

This chapter provides a discussion of the results presented in Chapter 4. A brief summary concludes the chapter.

The Influence of the Constructs in the TAM and TPB on Behavioural Intention to Adopt Mobile Learning

The findings from this study indicated that, collectively, the constructs in the TAM (perceived ease of use and perceived usefulness) and those contained in the TPB (attitude towards mobile learning, subjective norm and perceived behavioural control) accounted for the most significant proportion of the variance (44.8%) in behavioural intention to adopt mobile learning. The predictive power of the constructs contained in the TAM and TPB has been well documented in technology adoption literature. Yeap and Soto-Acosta (2016) found that the constructs in the TPB explained 71.6% of the variance in behavioural intention. Similarly, Mutono and Dagada (2016) found that the TAM contributed towards 86.2% of the variance in behavioural intention. These, and other studies, have confirmed the predictive power of both models (Chu & Chen, 2016). Given that, in this study, the greatest proportion of the variance in behavioural intention was explained by the constructs contained in the TAM and the TPB, these results concur with findings reported in the literature that cite the importance of perceived ease of use,

perceived usefulness, attitude towards mobile learning, subjective norm and perceived behavioural control in predicting behavioural intention to adopt mobile learning.

In this study, perceived ease of use made the most significant contribution to behavioural intention to adopt mobile learning. It can, then, be inferred that for participants in this study it was more important that mobile learning be easy to use than useful (i.e. towards some end). This finding is similar to a study conducted in Pakistan among higher education students where perceived ease of use had a greater influence on behavioural intention than perceived usefulness (Iqbal & Bhatti, 2015). However, other studies have found perceived usefulness to have had a greater influence on behavioural intention than perceived ease of use (Hsia, 2016; Hsia et al., 2016). In a South African context, Mutono and Dagada (2016) also identified perceived usefulness to contribute most significantly to the behavioural intention of higher education students, suggesting that, for the participants in their study, the perception of mobile learning as being useful towards some end was more important than the perception of mobile learning as being easy to use. In this study, perceived usefulness did not have as strong an influence on behavioural intention as perceived ease of use, but it still accounted for a significant amount of the variance in behavioural intention. Interestingly, in their study, Mutono and Dagada (2016) found that perceived ease of use made the least substantial contribution to behavioural intention.

In this study, attitude towards mobile learning accounted for the second greatest proportion of the variance in behavioural intention to adopt mobile learning, followed by subjective norm and perceived behavioural control. Of these three variables, having a positive attitude towards studying with a mobile device therefore had the greatest influence on students' behavioural intention to adopt mobile learning. Research conducted in Taiwan (Chu & Chen, 2016) and Brazil (dos Santos & Okazaki, 2016) also found that attitude was the most

significant predictor of behavioural intention, followed by subjective norm and perceived behavioural control.

Interestingly, in this study, the influence of the opinions of significant others as to whether participants should use mobile learning carried more weight with regard to predicting behavioural intention than whether participants perceived a sufficient amount of control over the ability to learn using a mobile device (perceived behavioural control). Given that the majority of participants in this study were Black Africans, this finding could point to the influence of the predominantly collectivist culture among Black South Africans. Collectivist cultures stress the importance of the collective over the individual (Moore, Viljoen, & Meyer, 2017). It is therefore plausible that, given the premium that is placed on communality and agreement in African cultures, the respondents in this study considered the influence of the views and opinions of significant others (friends, family members, fellow students, lecturers etc.) to be a more important influence on behavioural intention than whether or not respondents perceived a sufficient amount of control over their ability to use mobile learning. This result concurs with the findings from a study conducted at a Malaysian university which found that subjective norm had the greatest significant influence on behavioural intention followed by perceived behavioural control and attitude towards mobile learning (Yeap & Soto-Acosta, 2016). Malaysia, like South Africa, is also considered to be a predominantly collectivist culture (Triandis & Suh, 2002).

The findings from this study indicated that behavioural intention to adopt mobile learning was primarily driven by the perception of how easy it is to use mobile technology to learn, a positive attitude towards mobile learning as well as the opinions and influence of others.

Extending the TAM and TPB: The Influence of Locus of Control and Mobile Learning Self-efficacy on Behavioural Intention to Adopt Mobile Learning

In attempts to test more comprehensive models of readiness to adopt mobile learning, researchers have combined the TAM and TPB, and extended the (combined) model with several additional variables. Cheon et al. (2012) conducted research at a university in America and hypothesised a model in which the TAM and TPB models were combined and extended to include instructor readiness, students' readiness, perceived self-efficacy and learning autonomy. Results indicated that the constructs in this hypothesised model contributed 87.2% towards the variance in behavioural intention (Cheon et al., 2012). However, in a study conducted among university students in Pakistan, the same model only contributed 53.7% towards the variance in behavioural intention to adopt mobile learning (Raza et al., 2018). Considering that Pakistan, like South Africa, is a developing country, while the United States is a developed country, the results may have been influenced by cultural differences and social influences (Ali, Raza, Qazi, & Puah, 2018).

In this study, the TAM and TPB were combined and extended to include locus of control and mobile learning self-efficacy. Findings indicated that, even though its contribution was significant in predicting behavioural intention, locus of control explained the least amount of variance in the model, accounting for only 0.4%. Interestingly, the covariance relationship that was identified between locus of control and subjective norm indicated that an increase in locus of control scores (where higher locus of control scores were indicative of internality) saw an increase in subjective norm scores. This implies that the more internal an individual's locus of control orientation, the greater the influence of the opinions of significant others with regard to whether or not participants should adopt mobile learning. This seems counter-intuitive: Individuals with an internal locus of control perceive that they themselves are in control of the outcomes of their behaviour rather than attributing the outcomes of their

behaviour to some external factor (such as the influence of significant others). One would, therefore, expect that internals will place less emphasis on the opinions of others with regard to adopting a specific behaviour (such as mobile learning). Furthermore, this result also seems counter-intuitive given the significant relationship identified between locus of control and perceived behavioural control: Locus of control had a significant positive influence on perceived behavioural control, indicating that as locus of control scores increased, thus becoming more internal, the perception of control over the ability to learn using mobile technology also increased. Given the nature of these constructs, this relationship is to be expected between locus of control and perceived behavioural control. The finding that an increase in locus of control scores (indicating higher levels of internality) was related to an increase in subjective norm scores suggests that, even though the majority of respondents displayed an internal locus of control, the influence of the views/opinions of significant others with regard to whether or not participants should adopt mobile learning had a significant influence on whether or not participants would consider adopting mobile learning.

Mobile learning readiness literature that investigated students' mobile learning self-efficacy, measured students self-efficacy levels. Few studies have considered the influence of mobile learning self-efficacy on behavioural intention (Ayub, & Luan, 2012; Mahat, et al., 2012; Yang, 2012; Yorganci, 2017). In this study, mobile learning self-efficacy only partially correlated with behavioural intention. Mobile learning self-efficacy was therefore not included in the regression model as the influence it had on the intention to adopt mobile learning was insignificant. This result stands in contrast to a study conducted by Hsia et al. (2014) in which computer self-efficacy accounted for the second greatest proportion of the variance in behavioural intention.

Together, the predictor variables, namely locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning accounted for 44.8% of the variance in behavioural intention to adopt mobile learning, while other factors and unidentified variables contributed 55.2% towards the variance in behavioural intention.

Model-Fit Analysis

Goodness-of-fit indices.

In this study, a model of behavioural intention to adopt mobile learning was specified based on a combination of theory and research results from previous studies. The model consisted of eight psychological constructs (mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control, attitude towards mobile learning and behavioural intention) together with twelve hypothesised relationships between the constructs contained in the model. This model was specified in structural equation modelling software. Goodness-of-fit indices were used to identify the fit between the model and data. These goodness-of-fit indices provided mixed results: The chi square result led to the rejection of the model. According to Hox and Bechger (1999), this result is to be expected when the sample size is large as the chi square test is sensitive to sample size. A sample size of about 200 cases is recommended when using the chi square test (Hox & Bechger, 1999). When the sample size is smaller than 200 the model will always be accepted, even if there is a bad fit to data. Similarly, when the sample size is large, the model is always rejected (Hox & Bechger, 1999). In this study, the sample size was 1070 participants. Given the sensitivity of the chi square statistic, Hox and Bechger (1999) suggest that researchers administer alternative fit indices that are less sensitive to sample size.

Next, the Root Mean Square Error (RMSEA) was used to identify model fit. A RMSEA result of 0.05 or less indicates good fit, and 0.08 or less adequate fit (Hooper et al., 2008).

The RMSEA result was higher than 0.08, providing a mediocre fit. However, one of the disadvantages of the RMSEA is that it has been found to be sensitive to the number of constructs and relationships in a model (Hooper et al., 2008). The RMSEA favours models with fewer constructs and hypothesised relationships (Hooper et al., 2008). In this study, the model consisted of eight constructs and twelve hypothesised relationships. This may be a reason why RMSEA identified an inadequate fit between data and model.

In an attempt to reduce the impact of sample size and model complexity on the analysis of fit between the model and the data, alternative goodness-for-fit indices were selected. In this study the GFI, AGFI, NFI and CFI were all run in structural equation modelling software. These results all exceeded the indices' acceptable levels, indicating a good fit with the data. In addition, Hooper et al. (2008) stated that CFI and PNFI indices have been found to be the most insensitive to sample size, model misspecification and parameter estimates. In this study, both these indices have an acceptable result, indicating a good fit.

Examining the relationships between the constructs in the model.

Mobile learning self-efficacy.

Limited research exists on the relationship between mobile learning self-efficacy and behavioural intention. In a study conducted in Taiwan in which the effects of individuals' computer self-efficacy were analysed to determine e-learning acceptance, it was found that computer self-efficacy had a significant influence on behavioural intention (Hsia et al., 2014). However, this was not the case in this study, as mobile learning self-efficacy did not significantly influence behavioural intention to adopt mobile learning and it was therefore removed from the regression model.

In the model used in this study it was hypothesised that mobile learning self-efficacy influenced perceived usefulness and perceived ease of use. The results confirmed this

expectation. Mobile learning self-efficacy had the greatest significant positive influence on attitude towards mobile learning, followed by perceived behavioural control, perceived ease of use and perceived usefulness. The positive relationship between mobile learning self-efficacy and attitude towards mobile learning indicated that as mobile learning self-efficacy increased, attitudes towards mobile learning became more positive. Similarly, when mobile learning self-efficacy increased, so too did perceived behavioural control, perceived ease of use and perceived usefulness. The covariance relationship between mobile learning self-efficacy and subjective norm that was identified indicates that when mobile learning self-efficacy increased, subjective norm also increased, and vice versa. Therefore, the greater the faith participants had in their own abilities to use mobile learning, the greater the influence of the views/opinions of significant others as to whether or not to adopt mobile learning. However, one would expect that students who have faith in their own abilities to perform a behaviour would be less dependent on the influence and opinions of others with regard to performing the behaviour. This finding in the South African context could be related to the predominance of the collectivist culture in South Africa that emphasises psychological modalities such as communality, group orientation and agreement, and values related to cooperation, collective responsibility and interdependence (Moore, et al., 2017). This could account for the importance that participants placed on the views/opinions of significant others with respect to whether or not to adopt mobile learning.

Locus of control.

In a study conducted in Taiwan, Hsia et al. (2014) identified locus of control to have a positive influence on perceived usefulness and perceived ease of use. Locus of control had the greatest influence on perceived usefulness followed by perceived ease of use (Hsia et al., 2014). Similarly, a study conducted at a higher education institution in Taiwan found that locus of control related directly to perceived usefulness, perceived ease of use and perceived

behavioural control, thereby influencing behavioural intention to adopt mobile learning (Hsia, 2016). Locus of control was found to have the greatest influence on perceived usefulness, followed by perceived ease of use and perceived behavioural control (Hsia, 2016). In this study, it was therefore hypothesised that internal locus of control positively influenced perceived usefulness, perceived ease of use and perceived behavioural control. Findings indicated that internal locus of control had a positive, but not significant, influence on perceived usefulness. The hypothesis was therefore only partially supported as the trend of influence was in the expected direction. This is in contrast to the findings by Hsia et al. (2014) and Hsia (2016). Results from this study showed that internal locus of control had the greatest significant positive influence on perceived ease of use and perceived behavioural control, thus supporting the hypothesised relationships between these constructs. This indicates that, the more internal an individual's locus of control, the easier s/he perceived mobile learning to be and the more control s/he perceived to have with regard to using mobile learning.

In addition to these relationships, results also indicated that internal locus of control had a significant positive influence on attitude towards mobile learning. Thus, internals held more positive attitudes towards mobile learning than externals. Covariance relationships were also identified between locus and control and mobile learning self-efficacy and between locus of control and subjective norm. Therefore, the more internal an individual's locus of control, the higher his/her self-efficacy beliefs regarding the use of mobile learning. Conversely, the more external an individual's locus of control, the lower his/her mobile learning self-efficacy. Thus, the more control students perceived to have over the outcomes of their behaviour (internal locus of control), the higher their faith in the abilities to perform a behaviour. Similarly, the less they feel in control over life events, the lower their self-efficacy. As noted, the covariance between locus of control and subjective norm

indicates that the more internal an individual's locus of control, the greater the influence that subjective norm had on whether or not s/he is likely to adopt mobile learning.

In this study, locus of control had the greatest influence on subjective norm, followed by attitude towards mobile learning, perceived behavioural control and perceived ease of use.

Subjective norm.

In this study, subjective norm had the most significant influence on behavioural intention, followed by attitude towards mobile learning. This result confirmed the importance of the influence of the opinions of significant others on behavioural intention to adopt mobile learning. The greater the perception held by participants that significant others believe that mobile learning should be adopted, the greater the behavioural intention to adopt mobile learning. A study conducted in the United States among higher education students, identified subjective norm to have a significant positive influence on behavioural intention (Cheon et al., 2012). Similarly, studies conducted among higher education students in Malaysia (Yeap & Soto-Acosta, 2016), Brazil (dos Santos & Okazaki, 2016), Pakistan (Raza et al., 2018) and Taiwan (Chu & Chen, 2016) found that subjective norm had a significant positive influence on behavioural intention. In the study conducted by Yeap and Soto-Acosta (2016), subjective norm was the strongest predictor of behavioural intention. Furthermore, this study identified that the greater the participants' perception that significant others believe that mobile learning should be adopted, the more positive respondents' attitudes were towards mobile learning. This further supports the emphasis on communality, agreement and interdependence prevalent in collectivist cultures (Moore, et al., 2017). If the collective approves of a particular behaviour, the more positive an individual's attitude towards the behaviour. Similarly, the greater the perception that significant others do not think that mobile learning should be adopted, the less positive respondents' attitudes towards mobile learning. Other

studies in which subjective norm and attitude were included as variables to predict behavioural intention to adopt mobile learning, however, did not find a relationship between subjective norm and attitude towards mobile learning (Cheon et al., 2012; Chu & Chen, 2016; dos Santos & Okazaki, 2016; Raza et al., 2018; Yeap & Soto-Acosta, 2016). Furthermore, as noted, covariance relationships were also identified between subjective norm and mobile learning self-efficacy and between subjective norm and locus of control.

Perceived usefulness.

In this study, perceived usefulness had a significant influence on behavioural intention. In studies where perceived usefulness was hypothesised to have a direct, positive, significant influence on behavioural intention, these hypotheses were supported (Ali, Raza, Qazi & Puah, 2018; Joo et al., 2016; Hsia et al., 2014; Hsia, 2016; Iqbal & Bhatti, 2015; Mutono & Dagada, 2016). In five of these six studies, perceived usefulness had the greatest positive influence on behavioural intention. In this study, it was hypothesised that perceived usefulness also had a positive influence on attitude towards mobile learning. This prediction was not confirmed. This is contrary to findings from previous studies where perceived usefulness was found to have the greatest positive influence on attitude (Cheon et al., 2012; dos Santos & Okazaki, 2016; Raza et al., 2018; Yeap & Soto-Acosta, 2016).

Perceived ease of use.

In this study, perceived ease of use had the greatest significant influence on perceived usefulness, followed by behavioural intention and perceived behavioural control. The results from the model-fit-analysis identified a relationship between perceived ease of use and perceived usefulness. Previous research has found a strong link between perceived ease of use and perceived usefulness. Iqbal and Bhatti (2015) and Mutono and Dagada (2016) reported that perceived ease of use had a significant positive influence on perceived

usefulness. The results from the path analysis in this study showed that perceived ease of use had the greatest influence on perceived usefulness, indicating that the perception of the ease of use of mobile learning had an influence on the perception of the usefulness of mobile learning.

Several studies have found that perceived ease of use had a direct, positive, significant influence on behavioural intention (Ali et al., 2018; Hsia, 2016; Hsia et al., 2014; Joo et al., 2016; Iqbal & Bhatti, 2015; Mutono & Dagada, 2016). In this study, it was hypothesised that perceived ease of use positively influences attitude towards mobile learning. This prediction was not confirmed. This finding is interesting as one would expect that if students perceived mobile learning to be easy to use, they would have a positive attitude towards mobile learning. Several studies have also found that perceived ease of use had a positive significant influence on attitude (Cheon et al., 2012; dos Santos & Okazaki, 2016; Raza et al., 2018; Yeap & Soto-Acosta, 2016) but this was not the case in this study. Interestingly, the significant positive influence that perceived ease of use had on perceived behavioural control in this study was not corroborated in the literature. The only variables that have been found to positively influence perceived behavioural control were perceived self-efficacy, learning autonomy, level of interactivity and resource facilitating conditions (Cheon et al., 2012; dos Santos & Okazaki, 2016; Raza et al., 2018; Yeap & Soto-Acosta, 2016).

Perceived behavioural control.

Perceived behavioural control had a significant influence on behavioural intention, confirming the hypothesised relationship as depicted in the model. Similarly, perceived behavioural intention was found to have the most positive significant influence on behavioural intention in a study conducted among higher education students in the United States (Cheon et al., 2012). Several other studies among higher education students also identified that perceived behavioural control had a significant positive influence on

behavioural intention (Chu & Chen, 2016; dos Santos & Okazaki, 2016; Raza et al., 2018; Yeap & Soto-Acosta, 2016). Although not the most significant predictor of behavioural intention to adopt mobile learning in this research, the perception of control over ability to use mobile learning was nevertheless an influencing factor for the adoption of mobile learning in this study.

Attitude towards mobile learning.

Attitude towards mobile learning significantly influenced perceived ease of use, perceived usefulness and perceived behavioural control. Participants' attitudes, however, did not directly influence behavioural intention to adopt mobile learning as hypothesised. Rather, attitude influenced behavioural intention through perceived ease of use, perceived usefulness and perceived behavioural control. This finding is in contrast to previous studies in which attitude towards mobile learning significantly influenced behavioural intention (Cheon et al., 2012; Chu & Chen, 2016 and Raza et al., 2018). Although it was argued in this study that a student who perceives mobile learning to be useful and easy to use will have a positive attitude towards mobile learning, results indicated that an alternative argument is possible, namely that if the student has a positive attitude towards mobile learning, they will perceive mobile learning to be useful and easy to use.

Summary

This chapter presented a discussion of the results from this research study and integrated the findings with the existing literature. The discussion considered the constructs in the TAM model (perceived ease of use and perceived usefulness) and the constructs in the TPB (attitude towards mobile learning, subjective norm and perceived behavioural control). Next, the influence of locus of control and mobile learning self-efficacy on behavioural intention to adopt mobile learning was considered. The second part of the chapter focused on a discussion of the results from the model-fit analysis. Each

of the hypothesised relationships proposed in the model were discussed. The next chapter specifies the general conclusions from this research study.

Chapter 6: Conclusion

This chapter provides the conclusions generated from the findings of this study. A summary of the research aims, and processes is provided, followed by the conclusions that summarise the main findings related to the central research question, each sub-research question and hypothesis. The next section discusses the implications of the research findings for higher education institutions. This is followed by a description of the contributions this research has made to the research field of mobile learning. The next section offers an overview of the limitations of this study. This is followed by proposals for possible areas of future research. A few final thoughts about this study then conclude the dissertation.

Summary of the Research Aim and Processes

The purpose of this study was to explore the influence of mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning on students' behavioural intention to adopt mobile learning. In addition, the study proposed a model that predicted students' behavioural intention to adopt mobile learning. The TAM and TPB models were combined and extended to include locus of control and mobile learning self-efficacy. Relevant, current literature on mobile and e-learning was reviewed, and trends and issues related to the adoption of mobile learning were analysed. Previous studies concerning the adoption of mobile technology, both internationally and in the South African context, were reviewed. A self-administered online survey questionnaire was designed to collect data for this empirical work. The research was undertaken at a private higher education institution in South Africa. Quantitative data were analysed using descriptive statistics, multivariate analysis of variance, analysis of variance, multiple linear regression analysis and structural equation modelling. Findings emanating from the analysed data were discussed.

Main Conclusions

This section addresses the answers to the central research question, each of the twelve sub-research questions, and the proposed hypotheses.

Central research question.

Multiple regression analysis found that locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning contributed 44.8% towards the variance in behavioural intention to adopt mobile learning, while other factors and unidentified variables contributed 55.2% towards the variance in behavioural intention. Mobile learning self-efficacy did not make a statistically significantly contribution to behavioural intention and was therefore removed from the model. Multiple linear regression analysis indicated that perceived ease of use made the greatest significant contribution to behavioural intention to adopt mobile learning, followed by attitude towards mobile learning, subjective norm, perceived usefulness, perceived behavioural control and locus of control. The findings of this study imply that the psychological readiness of students to adopt mobile learning is driven primarily by the perception of how easy it is to use mobile technology to learn and a positive attitude towards mobile learning as well as the opinion and influence of significant others.

Sub research questions.

Results from the analysis of the twelve sub-research questions revealed that students displayed above moderate to high self-efficacy beliefs about mobile learning, high levels of perceived behavioural control, an internal locus of control, a positive attitude towards mobile learning and a high level of intention to adopt mobile learning. In addition, students perceived mobile learning to be a useful platform for learning and easy to use. The majority of students who participated in this study viewed significant others to have an influence on their behavioural intention to adopt mobile learning. In terms of gender, age, race and household

income, the following results were obtained. Results indicated that gender had a significant influence on perceived usefulness perceived ease of use, attitude towards mobile learning, perceived behavioural control, subjective norm and behavioural intention. Female mean scores were significantly higher than males. Age had a significant influence on perceived usefulness and subjective norm. In terms of perceived usefulness, 35 to 44-year olds had significantly higher mean scores than 18 to 24- and 25 to 34-year olds. In terms of subjective norm, 35 to 44-year olds had a significant higher mean score than 18 to 24-year olds. Race had a significant influence on subjective norm. Africans had the highest mean score, followed by Coloureds, Indians, Asians and Whites. Household income had a significant influence on perceived behavioural control: The mean scores for the categories R10 001 to R15 000 per month and R15 001 to R20 000 per month were both higher than the category of less than R5 000 per month. This indicated that respondents in the higher income categories display greater perceived behavioural control.

Model fit and hypothesis.

Chi square and RMSEA indicated poor model fit, while GFI, AGFI, NFI and CFI all exceeded their respective acceptable levels, indicating goodness of fit. Structural equation modelling identified that perceived ease of use had the most significant influence on behavioural intention, followed by perceived usefulness, subjective norm and perceived behavioural control. Out of the twelve hypotheses proposed in this study only three were not supported, namely Hypothesis 3 (‘Perceived usefulness positively influences attitude towards mobile learning’), Hypothesis 4 (‘Perceived ease of use positively influences attitude towards mobile learning’) and Hypothesis 5 (‘Attitude towards mobile learning positively influences behavioural intention’). Hypothesis 6 (‘Internal locus of control positively influences perceived usefulness’) was only partially supported.

Implications for Higher Education in South Africa

A review of the responses to the survey questions relating to mobile learning self-efficacy posed to respondents in this study indicated that students would be able use mobile learning if they had enough time to complete the learning activities on the mobile device. They also indicated that they would use mobile learning if someone showed them how to complete the learning activities on their mobile device. In addition, students indicated that they possessed sufficient confidence in their abilities to adopt mobile learning, but they felt that they did not have sufficient knowledge to use mobile learning. In relation to perceived ease of use, students noted that they perceived it to be easy for them to become skilful at using mobile learning and that they perceived that they have the ability to successfully complete the learning activities on their mobile device. Institutions and educators must be cognisant of these points when designing learning content that students need to access with the use of their mobile device. The first important point to note is that at the start of a programme sufficient allowance should be made for orientation to mobile learning. Institutions could, for example, provide students with help videos that explain how to use mobile learning and the LMS of the institution. Discussion forums can be utilised during the orientation where students can meet and interact with their classmates and lecturers, thus enabling them to interact with others and, at the same time, learning how to navigate forums using their mobile devices. When developing course content for mobile learning, enough time must be factored in at the start of the programme or module such that students can gradually familiarise themselves with the learning activities they need to complete with the use of their mobile device. The time duration of each learning activity must therefore be carefully planned to allow for novice users to gain confidence in completing the required learning activities. Educators must also not assume that students know how to complete a particular learning activity with their mobile device, and therefore clear instructions must be included

with each activity. Educators should make use of videos and other multi-media technologies to illustrate how students need to complete a task.

The students in this study also stressed the importance of the usefulness of mobile learning when studying, specifically with regard to potentially positively impacting their academic performance. Mobile learning must therefore add value to a student's studies. Institutions and educators must therefore ensure that students have access to quality material and resources that can improve students' academic performance. The layout and flow of learning activities must allow for deep learning to take place through reflection, self-assessment, discussions, critical thinking, problem solving and collaboration with peers. In other words, the LMS must not become a repository of resources, but an interactive platform that allows for learning to take place.

Results indicated that, generally, students had positive attitudes towards mobile learning. In order to further foster positive attitudes towards mobile learning students should easily be able to access resources related to their studies and assessments, course material must be accessible anytime and anywhere and mobile technology must provide students with easy access to feedback and notifications from their lecturers and tutors. Institutions could potentially provide students with links to resource centres, such as online libraries in the LMS, which will allow students access to additional readings for studying and assessment preparation. Institutions must also consider the implementation of a mobile application for their LMS. For example, with Blackboard and Moodle, institutions are able to configure a mobile application that allows students to work online and offline. A mobile application that can be used by students to study offline will widen access to quality higher education for the previously disadvantaged groups and communities in South Africa. Educators should also use the various communication tools available in the LMS to provide students with easy access to feedback and notifications.

One of the primary benefits of mobile learning for higher education, relates to the reduction in computer infrastructure systems maintenance costs, allowing for resources to be allocated to the development and maintenance of mobile learning infrastructure. This benefit is important for both public and private institutions.

Contributions

The contributions made by this study relate specifically to the psychological factors that influence students' behavioural intention to adopt mobile learning within the context of higher education in South Africa:

- The findings of this study indicated that the psychological constructs included in the model, namely mobile learning self-efficacy, locus of control, subjective norm, perceived usefulness, perceived ease of use, perceived behavioural control and attitude towards mobile learning indeed had an influence on students' behavioural intention to adopt mobile learning. The model explained a significant amount of variance in behavioural intention to adopt mobile learning and can be used by other researchers in the field of mobile learning to explore student readiness.
- 80.56% of the participants in this study had a household income of less than R10 000 per month. These students who earned less than R10 000 per month displayed intention to adopt mobile learning, so it seems mobile learning is, financially speaking, a viable option for students, even for those who earn below average incomes.

Limitations of this Study

A limitation of this study relates to the use of self-report questionnaires to collect data. When participants are aware that they are being studied, it may influence their responses (Foxcroft & Roodt, 2015). There may also be response bias where respondents may have responded either

very positively or very negatively to mobile learning. In addition, the questionnaires were administered online, making it impossible to clarify questions/items that may not have been clearly understood by the participants.

The use of the convenience sampling technique employed in this research means that results have to be interpreted tentatively and causal inferences based on these techniques cannot be made.

The response rate in this study was very low, 5.01%. 2203 students responded to the request to complete the survey. However, it was found that 1106 participants opted out of the survey after completing the demographic information, leaving only 1097 responses from which outliers were removed, leaving only 1070 responses. This response rate is extremely low because 89.68% of the students elected not to complete the survey. It is therefore, unlikely that the responses reflect an adequate representation of the population. The possibility of response bias as potential limitation in this study is also worth noting. The low response rates could indicate that there was a response bias in that only students who were interested in mobile learning were inclined to participate in the survey.

Furthermore, in this study mobile learning was treated very generally without considering mobile learning readiness in relation to different modules or learning programmes.

Finally, when measuring a psychological construct such as mobile learning self-efficacy, various factors may impact on the participants' responses. These factors include the participants' level of self-knowledge and their ability to reflect on their own capabilities. In addition, attitudes consist of beliefs, knowledge, motivation and emotions. These are all influenced by many internal and external factors, such as the environment that the

participants find themselves in, the type of day they have had and their psychological and physical wellness at the time of completing the questionnaire.

Future Research Directions

This research study has generated findings that could benefit further exploration and research in the field of mobile learning readiness in the South African context. Given that this research focused exclusively on students enrolled for short learning programmes and higher certificates, further research is needed to investigate undergraduate and postgraduate students' behavioural intention to adopt mobile learning. In this study, the psychological constructs included in the model explained 44.8% of behavioural intention to adopt mobile learning. Additional research is needed to identify the unexplained factors that may influence behavioural intention in a South African context. Furthermore, there is a dearth of qualitative research regarding intention to adopt mobile learning. Future research using qualitative methods could shed more light on student readiness to adopt mobile learning.

Final Thoughts

Management of higher education institutions should focus their efforts on the creation of user-friendly and mobile-friendly Learning Management Systems. Educators should focus their attention on the type of learning activities they expect students to complete. These activities should be relatively easy to complete on a mobile device, but also be useful and aid in improving student academic performance. Initiatives should also be implemented to strengthen students' mobile learning self-efficacy and positively influence their attitude towards mobile learning. Therefore, the focus needs to remain on educating students about the benefits of mobile learning, how to use mobile learning and the evaluation of user experience in order to facilitate the adoption of mobile learning.

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Appendix A: Research Instrument

Table 34 Research Instrument

Demographic information		
AGE	In which category is your age?	AGE1: 18-24 years AGE2: 25-34 years AGE3: 35-44 years AGE4: 45 years and older
GEN	Please specify your gender.	GEN1: Male GEN2: Female
RACE	Please specify your race.	RACE1: African RACE2: Asian RACE3: Coloured RACE4: Indian RACE5: White
IN	Please specify your household income.	IN1: Less than R5000 per month IN2: R5001 to R10000 per month IN3: R10001 to R15000 per month IN4: R15001 to R20000 per month IN5: R20001 to R25000 per month IN6: R25001 to R30000 per month IN7 More than R30000 per month
Mobile learning self-efficacy		
MSE1	I could use mobile learning even if there was no one around to tell me what to do	**Not at all Confident** **1** 2 3 4 **Moderately Confident** **5** 6 7 8 9 **Totally Confident** **10**
MSE2	I could use mobile learning if I had never used a mobile device like it before	**Not at all Confident** **Moderately Confident** **Totally Confident**

		1 2 3 4 **5** 6 7 8 9 **10**
MSE3	I could use mobile learning if I had only the mobile device manual for reference	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
MSE4	I could use mobile learning if I had seen someone else using it before trying it myself	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
MSE5	I could use mobile learning if I could call someone for help if I got stuck	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
MSE6	I could use mobile learning if someone else has helped me get started	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
MSE7	I could use mobile learning if I had a lot of time to complete the task for which the mobile device was provided	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
MSE8	I could use mobile learning if I had just the built-in help facility for assistance	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
MSE9	I could use mobile learning if someone showed me how to do it first	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
MSE10	I could use mobile learning if I has used similar mobile devices before this one to do the same task	**Not at all Confident** **Moderately Confident** **Totally Confident** **1** 2 3 4 **5** 6 7 8 9 **10**
Perceived usefulness		
PU1	I believe that learning using mobile learning would enhance my academic performance	Strongly Disagree 1 Disagree 2 Not Sure 3 Agree 4 Strongly Agree 5

PU2	I believe that using mobile learning would increase my academic productivity	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PU3	I believe that using mobile learning would enhance my learning effectiveness	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PU4	I believe that using mobile learning would enhance my learning efficiency	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PU5	I believe that mobile learning would be useful for my studies	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
Perceived ease of use						
PEU1	I think learning to use mobile learning is very simple	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PEU2	It would be easy for me to become skilful at using mobile learning	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PEU3	I think using mobile learning is easy	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PEU4	It is easy to use mobile learning to accomplish my studying tasks	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PEU5	My interaction with mobile learning would be clear and understandable	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
Attitude towards mobile learning						
AT1	Mobile technology is a useful tool for my studies	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

		1	2	3	4	5
AT2	Mobile technology can offer opportunities for communication and teamwork	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
AT3	Mobile technology can help me find resources related to my studies	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
AT4	Mobile technology can bring many opportunities to the learning process	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
AT5	Mobile technology can help me to access the course material, anytime, anywhere	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
AT6	Mobile technology can be an easy way to get feedback and notifications from my instructors	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
AT7	Mobile Apps can help me to manage my studies	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
AT8	Mobile technology can help me to do my coursework	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
AT9	Mobile technology can help me to develop my learning skills	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
Locus of control						
LC1	People’s misfortunes result from the mistakes they make	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5

LC2	In the long run, people get the respect they deserve in this world	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC3	Capable people who fail to become leaders have not taken advantage of their opportunities	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC4	Becoming a success is a matter of hard work; luck has little or nothing to do with it	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC5	What happens to me is my own doing	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC6	When I make plans, I am almost certain that I can make them work	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC7	In my case, getting what I want has little or nothing to do with luck	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC8	Getting people to do the right thing depends upon ability; luck has little or nothing to do with it	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC9	There is really no such thing as “luck”	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC10	Most misfortunes are the result of lack of ability, ignorance, laziness or all three	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
LC11	It is impossible for me to believe that change or luck plays an important role in my life	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
Perceived behavioural control						

PBC1	I have a sufficient extent of knowledge to use mobile learning	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PBC2	I have a sufficient extent of control to make a decision to adopt mobile learning	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PBC3	I have a sufficient extent of self-confidence to make a decision to adopt mobile learning	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PBC4	I have a sufficient extent of ability to use mobile learning	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
PBC5	I would be able to use mobile learning well for learning process	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
Subjective norm						
SN1	People who influence my behaviour would think that I should use mobile learning	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
SN2	People who are important to me would think that I should use mobile learning	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
Behavioural intention						
BI1	I will use mobile learning for my courses in the future	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5
BI2	I intend to use mobile learning as often as possible	Strongly Disagree 1	Disagree 2	Not Sure 3	Agree 4	Strongly Agree 5

Appendix B: Ethics Clearance

UNISA university of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

30 April 2019

NHREC Registration # :
Rec-240816-052
CREC Reference # : 2019-CHS-Depart-3259-219-1

Dear Adele Bellingan

Decision:
Ethics Approval from 30 April 2019 to 01 May 2023

Researcher(s): Adele Bellingan

Supervisor(s): SN Hagen

hagensn@unisa.ac.za

Mobile Learning: Readiness of distance education students in South Africa

Qualification Applied: Masters in Psychology

Thank you for the application for research ethics clearance by the Unisa Department of Psychology College of Human Science Ethics Committee. Ethics approval is granted for three years.

The ***low risk application*** *was* ***reviewed and*** **expedited** by Department of Psychology College of Human Sciences Research Ethics Committee, on the **(30 April 2019)** in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the Department of Psychology Ethics Review Committee.

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3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date **(01 May 2023).** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2019-CHS-Depart- 3259-219-1** *should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature : 

Prof I. Ferns
Ethics Chair: Psychology
Email: fernsi@unisa.ac.za
Tel: (012) 429 8210

Signature : 

Dr Suryakanthie Chetty
Ethics Chair : CREC
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Appendix C: Consent Letter

16 May 2016

The Chief Executive Officer
IQ Academy

RE: Research proposal: *Investigating the self-efficacy of distance education students and their attitude towards mobile learning at a Private Higher Education Institution in South Africa*

I am currently registered for a Master degree in Psychology at Unisa. The programme consists of a research proposal module and a dissertation. It is a requirement that I first register and comply with the requirements for the research proposal (2018) before continuing with the dissertation part of the programme, the latter which I hope to start in 2019.

I have opted to utilise the context of a Private Distance Education Institution for the above purpose. In particular, I wish to conduct the research among students registered with IQ Academy. As Programme Manager on one of the programmes I am well positioned to execute much of what is needed for me to conduct the investigation.

This letter serves as a request for permission by the Institution to allow me to conduct the proposed study. The following institutional resources will be utilised for this study:

1. **Research Participants** - Short course and Higher Certificate students registered for the 2019 academic year.
2. **Research Instrument -** The research instrument will take the form of an online survey, consisting of three questionnaires.
    a) Demographic questionnaire
    b) Mobile learning self-efficacy questionnaire
    c) Attitude towards mobile learning questionnaire

    The online survey will be administered using the institutions SurveyMonkey tool. Data collected will remain the property of the institution and I undertake to only use the data for purposes of the proposed research project.

On completion of the dissertation, the results and findings from the research project will be made available to the Institution.

For privacy reasons, no reference will be made to the actual name or location of the institution, IQ Academy.

Yours sincerely

Adele Bellingan
Student Number: 3259-219-1
Employee Number: RP4195

Institutional Approval		
IQ Academy Academic Head: Danie Vlok	**Approval Date:** 25 May 2018	**Signed at East London:**
IQ Academy CEO and College Principle: Ernst Kriek	**Approval Date:** 25 May 2018	**Signed at East London:**

Appendix D: Email Invitation for Student Questionnaire

Ethical Clearance Approval: 30 April 2019

NHREC Registration #: Rec-240816-052

CREC Reference #: 2019-CHS-Depart-3259-219-1

Dear valued participant,

You are invited to participate in an online survey conducted by Adele Bellingan under the supervision of Sean Hagen a lecturer in the Department of Psychology, towards a MA in Psychology at the University of South Africa.

The survey you have received has been designed to study the readiness of South African distance education students to engage in mobile learning. You were selected to participate in this survey as your input will contribute positively towards the success of this study and the findings thereof. By completing this survey, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings.

You are, however, under no obligation to complete the survey and you can withdraw from the study prior to submitting the survey. The survey is developed to be anonymous, meaning that we will have no way of connecting the information that you provide to you personally. Consequently, you will not be able to withdraw from the study once you have clicked the send button based on the anonymous nature of the survey. If you choose to participate in this survey it will take approximately 15 – 20 minutes of your time. We do not foresee that you will experience any negative consequences by completing the survey. The researcher(s) undertake to keep any information provided herein confidential, not to let it out of our possession and to report on the findings from the perspective of the participating group and not from the perspective of an individual.

The records will be kept for five years for audit purposes thereafter it will be permanently destroyed. Hard copies will be shredded, and electronic versions will be permanently deleted from the hard drive of the computer. You will not be reimbursed or receive any incentives for your participation in the survey.

The primary researcher, Adele Bellingan, can be contacted during office hours at 0765338274. The supervisor, Sean Hagen can be contacted during office hours at 0124298236. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the Research Ethics Review Committee of the Department of Psychology Unisa, Professor P Kruger, on 0124296235.

Your willingness to participate and the valuable time that you are willing to commit to complete the research questionnaire is much appreciated.

With sincere gratitude for your participation.

Regards

Adele Bellingan