ABSTRACT

In the past decade there has been an increase in research related to the use of mobile-technologies in different fields of study such as mobile commerce, mobile learning and mobile banking. The acquisition of diverse skills and knowledge through the use of mobile devices such as smartphones and tablets over the internet is known as mobile learning. The study focused on understanding mobile-learning adoption in North Cyprus.

Three research models were adopted into the study and a questionnaire was distributed to 614 students at three universities. Findings have shown that there was no significant correlation between the constructs on the TAM1 model except for attitude towards mobile learning and behavioural intention. Furthermore, there was a significant correlation between all constructs of the DOI model except for Relative Advantage which had no significant correlation towards attitude. In addition, for the UTAUT model, there was no significant positive correlation between all constructs except the following (Performance Expectancy and Social Influence) which had a significant correlation towards Behavioural Intention. The moderating effects of UTAUT model were not considered in this study.

The study is important to reveal the present state of mobile learning and corresponding prospects and challenges regarding its adoption. This work is believed to be beneficial to educational institutions, policy makers, students and other researchers who may be interested in technology adoption.

Keywords: DOI; higher education; mobile learning; North Cyprus; TAM1; UTAUT

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A THESIS SUBMITTED TO THE GRADUATE SCHOOL OF APPLIED SCIENCES OF NEAR EAST UNIVERSITY

By

IBTSAM MOHAMED BALOUT

In Partial Fulfillment of the Requirements for the Degree of Master of Science in Computer Information Systems

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name:

Signature:

Date:

To my family…

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First and foremost, I would like to take this opportunity to thank my supervisor Assist. Prof. Dr. Seren Başaran for constantly supporting and encouraging me during the time I was writing my thesis. It was not an easy journey, the late nights and long hours in the library were not easy but her constant help made it bearable.

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ABSTRACT

In the past decade there has been an increase in research related to the use of mobile-technologies in different fields of study such as mobile commerce, mobile learning and mobile banking. The acquisition of diverse skills and knowledge through the use of mobile devices such as smartphones and tablets over the internet is known as mobile learning. The study focused on understanding mobile-learning adoption in North Cyprus.

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ÖZET

Geçtiğimiz 10 yılda; mobil ticaret, mobil öğrenme, mobil bankacılık gibi farklı alanlarda mobil teknolojileri kullanımı ile ilgili yapılan çalışmalar artmıştır. Böyle internet üzerinden akıllı telefonlar ve tabletler gibi mobil cihazların kullanımı ile çeşitli bilgi ve beceri edinimi mobil öğrenme olarak bilinir. Çalışma, Kuzey Kıbrıs'ta mobil öğrenmenin benimsenmesini anlamaya çalişiyor.

Araştırmaya üç araştırma modeli uygulanmış ve üç üniversitedeki 614 öğrenciye bir anket gönderilmiştir. Elde edilen bulgular, TAM1 modelindeki yapılar arasında mobil öğrenme ve davranışsal niyetle ilgili tutum dışında hiçbir önemli ilişki olmadığını göstermiştir. Ayrıca, tutum ile anlamlı korelasyon bulunmayan göreli avantaj dışında DOI modelinin tüm yapıları arasında anlamlı bir korelasyon vardı. Buna ek olarak, UTAUT modeli için Davranış Niyetine karşı önemli bir korelasyona sahip olan aşağıdaki (Performans Beklentisi ve Sosyal Etki) haricinde tüm yapılar arasında anlamlı bir pozitif korelasyon bulunmamaktadır. Bu çalışmada UTAUT modelinin moderatör etkileri dikkate alınmamıştır.

Çalışma, mobil öğrenmenin mevcut durumunu ve buna ilişkin umutları ve zorlukları ortaya koymak açısından önemlidir. Bu çalışmanın, eğitim kurumları, politika yapıcılar, öğrenciler ve teknolojinin benimsenmesi ile ilgilenen diğer araştırmacılar için yararlı olduğuna inanılıyor.

Anahtar Kelimeler: DOI; Yüksek öğretim; Mobil öğrenme; Kuzey Kıbrıs; TAM1; UTAUT

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LIST OF ABBREVIATIONS

CIU:	Cyprus International University
DOI:	Diffusion of Innovations
EMU:	Eastern Mediterranean University
HES:	Higher Education Sector
ICT:	Information and Communication Technologies
ISP:	Internet Service Provider
IT:	Information Technology
M-learning:	Mobile Learning
NEU:	Near East University
SNS:	Social Networking Site
TAM:	Technology Acceptance Model
UTAUT:	Unified Theory of Acceptance and Use of Technology

CHAPTER 1

INTRODUCTION

This section includes a brief background of the area under study, problem statement, the main aim of the study and research hypothesis, limitations of the study and a description of the chapters included in this thesis.

1.1 Background

In the past decade there has been an increase in research related to the use of mobile-technologies in different fields of study such as mobile commerce, mobile learning and mobile banking (Shakeel & Bhatti, 2015). Furthermore, the researchers also stated that advancements in the technological sector have caused a reduction in the cost of mobile devices thereby making them available to the public at an affordable cost. Different studies conducted around the globe have shown that an increase in ownership of smartphones and tablets among university students and the youth at large has been the key motivating factor forcing researchers to explore this area of study and find out how this highly demanded and used technology can be incorporated in the educational sector.

Liu (2014) defined mobile learning as the acquisition of skills and knowledge that takes place using wireless mobile devices such as smartphones and tablets allowing learners to access information anywhere, anytime as long as there is internet connection. M-learning is an advancement of e-learning which provides flexibility and ubiquity through the usage of mobile technologies (Mtebe & Raisamo, 2014).

Rellinger (2014) stated that previous studies have shown that the adoption of m-learning in higher educational settings has been successful among the younger generational compared to the senior students. To support his assertion, the researcher also pointed out that the digital native refers to the generation born after 1980 who grew up using newer technologies as part of their daily lives and these are the students who are most likely willing to adapt to m-learning. However, other researchers such as Carr (2011) are more concerned about the negative effects that such devices may pose when in-cooperated in the educational setting such as causing distractions to students and eventually lowering their academic grade, therefore the researcher strongly supports the

traditional classroom approach. This study will explore the pros and cons of this technology and how students in North Cyprus perceive the technology and find out if they are willing to adapt this technology in their learning system.

The relationship that exists between m-learning and e-learning is illustrated in Figure 1.1 below as explained by (Ahmad & Love, 2013). The researchers explains that both e-learning and m-learning are subsets of what is called flexible learning. In addition the researchers pointed out that although there is an intersection between the 2 variables, e-learning does not include all components of m-learning.

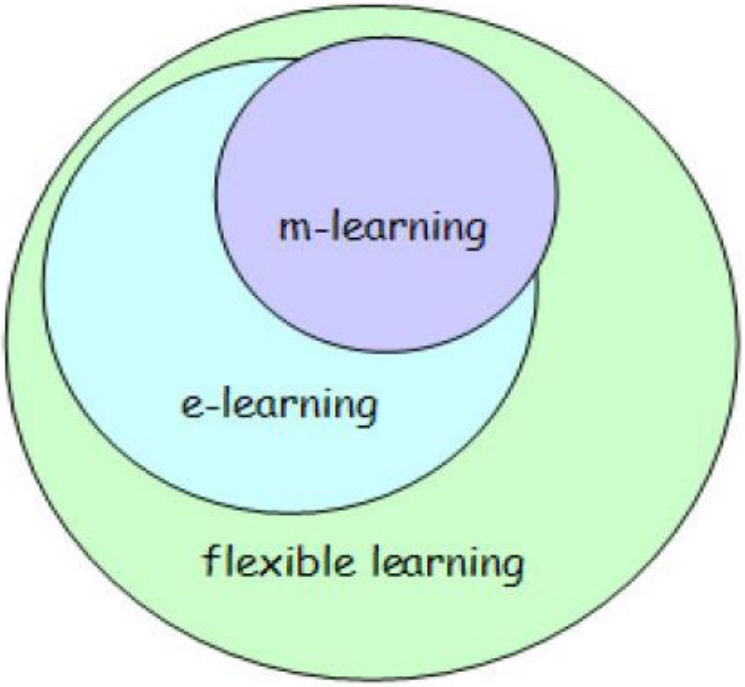

Figure 1.1: The just enough, just in time model for flexible learning (Ahmad & Love, 2013)

1.2 Problem Statement

M-learning has gained momentum over the past years and this has attracted the interest of many researchers since this technology has added value to e-learning. M-learning allows students to access their information from anywhere in the world without geographical restriction so long there is internet connection (Ghazizadeh, 2012). Furthermore, m-learning promotes collaborative

learning and enhances self-confidence. However, a lot of challenges have been reported in the literature that include usability issues, lack of acceptance, cost and internet access problems (Donaldson, 2011; Liu, 2014) and this has been another motivating factor for the researcher to pursue this study to find out if similar challenges are also applicable in North Cyprus. Most of the research done on this subject is limited to the use of one or two models and this has motivated the researcher to conduct this study integrating three models to fully understand the subject. TAM and UTAUT looks at the acceptance aspects of certain technology whereas DOI focuses on technological devices. This is the reason for combining 3 models instead of using one model.

1.3 Aim of Study

This study aimed at combining three research models so as to evaluate each model and compare results found by other researchers who either used one or two models. The integration allows us to have a deeper understanding of m-learning adoption from different angles and models.

Adopting m-learning in the educational sector will have a significant effect in the development of learning and teaching methods. However, successful implementation of this technology is based on users' acceptance. Thus the purpose of this study is on investigating students' acceptance of m-learning in higher educational institutions in North Cyprus. In order to achieve the aim, the following hypothesis were proposed:

- **H1:** Perceived Ease of Use (PEU) has a positive effect on behavioral intention.
- **H2:** Perceived Usefulness (PU) has a positive effect on behavioral intention.
- **H3:** Perceived Ease of Use (PEU) has a positive effect on attitude towards using m-learning.
- **H4:** Perceived Usefulness (PU) has a positive effect on attitude towards using m-learning.
- **H5:** Relative advantage has a positive effect on attitude towards using m-learning.
- **H6:** Compatibility has a positive effect on attitude towards using m-learning.
- **H7:** Complexity has a positive effect on attitude towards using m-learning.
- **H8:** Observability has a positive effect on attitude towards using m-learning.
- **H9:** Trialability has a positive effect on attitude towards using m-learning.

- **H10:** Attitude towards using m-learning will have a positive influence on behavioral intention.
- **H11:** Performance Expectancy has a positive effect on behavioral intention to use m-learning.
- **H12:** Social Influence has a positive effect on behavioral intention to use m-learning.
- **H13:** Effort Expectancy has a positive effect on behavioral intention to use m-learning.
- **H14:** Facilitating Condition has a positive effect on usage behavior.
- **H15:** Behavioral Intention has a positive effect on usage behavior.

1.4 Limitations of the Study

The limitations of this study are explained in detail below:

- ***Time constraint:*** Data collection was limited to 2016-2017 spring academic semester.
- ***Research participants:*** The data collected is restricted to university students. Further data could be administered to faculty members, university administrations to validate the findings. Also it could be extended to other institutions as well.
- This data was collected in a cross-sectional manner. Longitudinal studies might provide more clear vision of the overall picture.
- The study concentrated on collecting data from 3 private universities in North Cyprus which are easily accessible to the researcher namely; Cyprus International University (CIU), Near East University (NEU) and Eastern Mediterranean University (EMU).
- The nature of data collection instrument which is questionnaire that based upon the honest responses of the participants is a limitation
- Sampling: convenience sampling method was employed

1.5 Importance of the Study

Numerous studies have been conducted in different geographical locations to find out user acceptance of mobile learning in the educational sector. Most researchers in the literature have concentrated on using Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology Acceptance Model (TAM) research models independently in order to understand if

users accept m-learning. This study is the first of its kind to in-cooperate three different research models namely UTAUT, TAM and Diffusion of Innovation (DOI) in order to fully investigate students' acceptance of m-learning in higher education. For this reason, findings from this study will be important to the body of knowledge.

Different educational stakeholders will also benefit from this study. Donaldson (2011) explained that Information obtained from this research will be beneficial to administrators, educators and librarians. The benefits are explained below as outlined by the researcher:

- Administrators: IT support staff together with administrators will be able to know what students expect from m-learning platforms and this information is vital in implementing m-learning educational apps. In addition, they will know the expected level of support required and how to effectively deal with resistance to change among students.
- Educators: Students will be able to know the benefits of adapting to this technology, how other institutions are currently using m-learning services and also provides an in-depth knowledge on how to effectively use m-learning services in education.
- Librarians: Academic librarians will be able to know the type of information and resources that students like to access on their mobile devices and this will help them when integrating e-libraries into mobile learning systems.

1.6 Overview of the Thesis

The study is grouped into 6 distinct sections which are described in detail below:

Chapter One: This section includes a brief background of the area under study, problem statement, the main aim of the study and research hypothesis, limitations of the study and a description of the chapters included in this thesis.

Chapter Two: This section presents related research or literature review, a detailed explanation of IT acceptance models used in this study as well as the benefits and barriers of m-learning in higher education.

Chapter Three: This section will discuss quality models for successful adoption of m-learning in higher education. In addition to that, the section will also explore m-learning services that are currently being used in higher education.

Chapter Four: This section explains the research model that was used by the researcher when analyzing data. It also explains research participants, data collection tools as well as reliability tests for the questionnaire.

Chapter Five: This section describes the results obtained from the study

Chapter Six: This section provides a summary of the entire thesis and outlines the conclusion and recommendations for future research.

CHAPTER 2

RELATED RESEARCH

This section presents related research or literature review, a detailed explanation of IT acceptance models used in this study as well as the benefits and barriers of m-learning in higher education.

2.1 M-learning in Higher Education

For any successful implementation to occur there is need to fully understand the benefits and barriers that come along with implementing that technology. The sub-sections below will explain the barriers and benefits for mobile learning adoption in higher educational institutions.

2.2.1 Barriers

Lack of Acceptance: Despite the influx of mobile devices in different countries and its dominance among the teens and adults, mobile learning has still experienced low acceptance levels. This is mainly due to the fact that students are unwilling to use mobile devices such as smartphones and tablets for academic purposes as these devices are mainly seen as best used for socializing and the perception that too much usage of the devices will result in poor performance and low grades (Liu, 2014).

Technology: Numerous studies have shown that rejection of m-learning in many institutions is attributable to the type of mobile devices that some students poses which in turn limit them to fully benefit from m-learning services. Limited storage, small screen, limited internet access, poor bandwidth and slow download speeds are among the most common limitations for m-learning adoption.

Usability: Some studies have shown that small keyboards on smartphones have been noted as barriers to m-learning. However, the usage of virtual keyboards can address this issue. Small screens on most smartphones may cause eye strain when reading large texts and also it makes

viewing cumbersome. Furthermore, most webpages are not designed for view on mobile phones and this may further limit the effective use of m-learning in education.

Cost: Due to digital divide, not all students are able to afford smartphones and have access to the internet. This form of learning may end up targeting a certain social class in the society that can afford the costs that come along with using m-learning. However, other researchers (Donaldson, 2011) claim that mobile phones are less expensive compared to PC's and therefore cost should not be considered as a barrier.

Access: It is crucial to make sure that all students have equal access to m-learning services such as internet access and not simply assume that all students have access. Blind students and other students with virtual disabilities should be taken into consideration and educational institutions must make sure they have special kindle devices to help them in their learning process.

2.2.2 Benefits

Reduction in overall cost: Donaldson (2011) explained that the low cost of mobile devices compared to desktop computers and laptops coupled with shrinking data storage costs will result in cost savings for both the student and the institution at large.

Synchronized content and persistent connect: Students can easily access course content on their mobile phones and this comes with numerous benefits such as real time file sharing, wireless connectivity and file access from anywhere, anytime, provision of reference tools online for both students and instructors, grading support for instructors and time management tools.

Removal of spatial and temporal limitations: Instructors and students can effectively organize their time due to the removal of geographical barriers implying with m-learning, you can have unlimited access to your documents from anywhere in the world and at any time. The provision of WIFI within educational campuses will enable engagement among peers and instructors to be more effective.

Learning support: M-learning devices can be used effectively to support the learning process outside the classroom. Students are able to access free material on the internet such as e-books and

even use digital libraries and request e-books using their mobile devices. Students can also engage peers in study groups and on blogs and they can share information relating to a specific area of study.

Instant Messaging: Students can easily get in touch with instructors and peers by sending messages to each other. Instructors can instantly message students informing them of any changes in the syllabus or class time changes. Librarians will also make use of the feature, students can easily chat with a librarian when they using messages when they can't find an e-book they are liking for and the librarian can notify the student by a message once the book is available online.

2.2 Previous Research Findings

Chaka and Govender (2017) conducted a study in Nigeria to find out students perceptions on mobile learning. Responses from a sample of 320 students enrolled at three colleges was used to analyse the data using regression analysis. The researchers used the UTAUT model and findings revealed that social influence, performance expectancy, effort expectancy and mobile learning facilitating conditions are positively correlated with behavioural intention. Furthermore results also showed that performance expectancy and effort expectancy directly influence students' intention to use m-learning services.

Ahmad and Love (2013) conducted a study in the United Kingdom (UK) at Brunel University to investigate students' acceptance of mobile learning using the TAM model. A structural equation model was used for data analysis. The sample consisted of 174 students. Findings revealed that the model used by the researchers can predict precisely students' behavioural intention to adapt to m-learning. In addition to that, results also showed that performance expectancy, effort expectancy, service quality, innovativeness and instructors' influence strongly influenced behavioural intention to use m-learning. Students who had a high performance expectancy were seen to accept m-learning faster contrary to those who had a lower level of performance expectancy. Quality of service was also seen to be an important factor in influencing students' intention to use mobile learning. Similar findings were also found by Park et al. (2011).

Another study was conducted by Bere (2014) to find out students acceptance of m-learning in

South Africa. Using dimensions of the UTAUT model, the researcher found out that social influence, effort expectancy and student centralized learning predict behavioural intention. In addition to that, an analysis of the results showed that performance expectancy was high for single students whereas social influence was high among married students.

Alharbi and Drew (2014) combined the Information System (IS) success model together with UTAUT in their study aimed at explaining factors that influence students intention to use m-learning. Their research was done at Griffith University in Australia. Results showed thatperformance expectancy, social influence and effort expectancy positively correlated behavioral intention.

Donaldson (2011) to investigate students' acceptance of m-learning in at North Florida community college, the research participants selected for interviews were 20 students. Factors that were found to significantly determine behavioral intention were social influence, perceived playfulness, performance expectancy and voluntariness of use. In addition, self-management and effort expectancy were not found to be factors that influence behavioral intention to use m-learning.

A study conducted in East Africa by Mtebe and Raisamo (2014) in order to investigate students' behavioral intention to use mobile learning involved a sample of 823 students from five tertiary institutions using the TAM model. Results were analyzed using regression analysis and findings revealed that facilitating conditions, social influence and effort expectancy had a positive effect on intention to use m-learning services. In addition to their findings the researchers mentioned that the study was limited to 2 main countries Tanzania and Kenya with most participants from Tanzania hence further research is required.

Carvalho et al. (2012) conducted a study in Brazil to find out the factors that influence students' acceptance of mobile learning in a university setup. The participants were 402 university students and structural modelling was used to analyze the responses. Results showed that short-term usefulness was the most important factor in determining behavioral intention to use mobile learning. This suggests that if students perceive benefits of adopting to a new technology they are most likely willing to accept the technology.

Chung et al. (2015) conducted a study in Taiwan to investigate factors that influence m-learning among college students at Taiwanese EFL College using the TAM model together with the DOI model. 84 responses were collected and results show that there was a high positive correlation between compatibility self-efficacy and perceived usefulness respectively. In addition to that, there was a moderate correlation on perceived usefulness. The researchers concluded that compatibility was the best predictor in determining students' intention to use mobile learning.

Seliaman and Turki (2012) conducted a study in Saudi Arabia using the TAM model in order to understand how students use smartphones to access course content as well as searching for information related to their field of study. Results showed that there was a close relationship between perceived usefulness and the course content accessed using their mobile phones. In addition to that, findings also revealed that 55% of students accepted mobile learning and were willing to adapt to this new and highly demanded technology.

A study conducted by Iqbal and Bhatti (2015) to find out factors that influence m-learning adoption among students currently enrolled at private institutions in a developing country which was not mentioned by the researchers constituted of 244 participants using the TAM model. Results showed that perceived ease of use was strongly influenced by 2 variables namely students' skills and psychological readiness. These two factors were seen to have a great effect in influencing students to adopt to mobile learning.

Mobile learning was still at its infancy stage when Nassuora (2013) conducted a study in Saudi Arabia among 80 students to find out if students were willing to adapt to this technology. In his study, the researcher used UTAUT as their research model and findings revealed that effort expectancy and facilitating conditions were rated high despite the fact that most students were not familiar with mobile learning. In addition to that, results also proved that a positive attitude leads to behavioural intention to use m-learning.

Baek et al. (2017) conducted a study to investigate teachers' attitude towards mobile learning in Korea. The researchers wanted to understand from an instructor's perspective based on differences in gender, school level, teaching experience and the course they taught. The researchers used the

Mobile Learning Perception Scale (MLPS) developed by Uzunboylu and Özdamlı. Findings revealed that attitude among Korean teachers was very low with females having higher levels of positivity compared to male teachers. In addition to that secondary school teachers had higher attitude levels compared to teachers in the elementary school. Furthermore teachers who had more experience of 15 years and above had a higher attitude contrary to teachers with few teaching experience. Also it was noted that language teachers had a higher level of attitude towards m-learning adoption contrary to teachers who taught other subjects results using the TAM and UTAUT models were analysed.

CHAPTER 3

FRAMEWORK INTEGRATION

This section will discuss quality models for successful adoption of m-learning in higher education. In addition to that, the section will also explore m-learning services that are currently being used in higher education.

3.1 Quality model for successful m-learning implementation

For any successful implementation of new technology there require a complete set of principles that the development team ought to follow to enhance the quality output of the product which in turn will stimulate users interest leading to acceptance (Sarrab et al., 2016). In his study Sarrab et al. (2016) proposed a quality model that increase the chances of successful mobile learning adoption in educational settings. The model comprises of generic aspects of quality in mobile learning environments such as functionality, flexibility, time response, user interface, security, availability, reliability, performance, connectivity, maintainability, scalability and usability.

In the literature many researchers (Zhang et al., 2014; Vogel et al., 2012) have explained that the quality of m-learning systems is defined in terms of software quality characteristics. Quality is measured in terms of standards internationally recognized such as ISO which define a set of quality standards that a certain system should poses. In their studies, the researchers focused on understanding the characteristics of high-quality mobile learning applications. The researchers found out that many factors influence the quality of m-learning both technical and non-technical as well as cultural values also play a role in multi-national and cross-cultural learning environments.

3.1.1 Technical quality model for m-learning

The model proposed by Sarrab et al. (2016) is based on the DeLone and McLean information system success model which is a model for evaluating organizations success in implementing Information systems. The researchers have modified the model to include other useful quality determining factors and has been split in two sections namely; development of m-learning

applications and evaluating existing m-learning applications. Figure 3.1 below illustrates the model in detail.

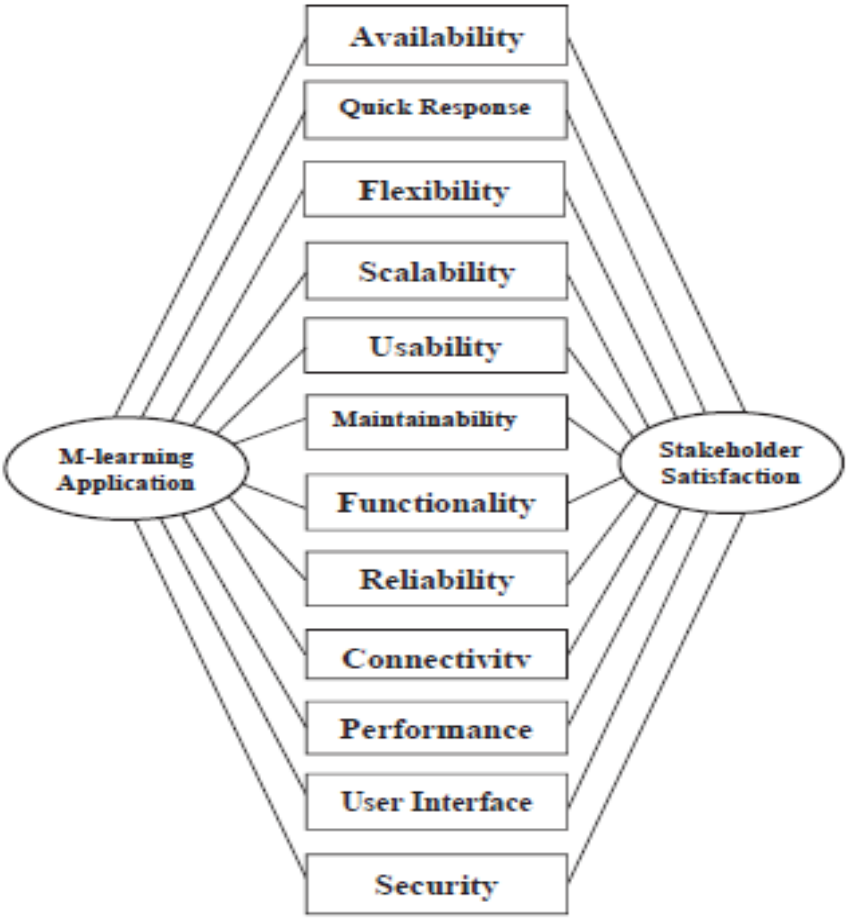

Figure 3.1: Proposed m-learning technical quality model (Sarrab et al., 2016)

To fully understand the constructs of the proposed model. Sarrab et al. (2016) explained the different factors that affect quality of m-learning platforms that will lead to acceptance or rejection as follows:

I. Availability

By adopting to mobile learning, learners can easily access a pool of information anytime. Instructors are able to use different materials such as multimedia, wikis, skype and many others which may be difficult to fully use in a traditional classroom. An increase in mobile technologies is leading institutions to fully consider adopting to m-learning since it provides better and more

effective learning platforms if fully managed. Synchronous and asynchronous communication is also effective in mobile learning platforms allowing instructor and student to communicate effectively without geographical limitation.

II. Quick response

This refers to the time taken by the system to notify the other person of a request placed by the other user. It is critical for any successful m-learning platform to provide quick responses to learners' requests. For m-learning to be more exciting all stakeholders should make use of instant messaging and respond to requests in the shortest possible time. Delays in providing responses can affect the effectiveness of m-learning. Developers should design the system in such a way that it improves interaction between learners and their instructors.

III. Flexibility

Applications developed to facilitate m-learning should be flexible in nature by allowing learning environments to be more personalized and learner-centric. In addition to that, applications should be flexible and easily customized and should support several features such as mp3, pdf, multimedia and other useful learning materials which may be stored and saved in different formats.

IV. Usability

This refers to the distinct characteristics that make an application user friendly which appear on the interface of the application. Mobile learning applications should be used to achieve satisfactory outcomes by paying close attention to functional and non-functional requirements in order to enhance usability. The user interface should not be too complicated such that it's difficult to operate without training, the user interface should be friendly and easy to use. Including a help menu on the interface or a first time tour guide can also aid assistance for new users. Usability is also affected by other factors such as limited memory, poor screen resolution, screen size, and low storage capacity.

V. Scalability

This refers to the system's ability to accommodate the changes done to the system. Changes should be saved and changes should be trackable. The system should be dynamic implying that changes

that come along with technology should be easy to integrate into the system. The system should be designed in such a way that it can manage a large amount of data, allow multiple users to access data at the same time as well as providing connection to different educational stakeholders from different locations.

VI. Maintainability

Mobile learning systems should have the ability to adapt to changes and undergo system modifications easily. The vast changes in the technological sector require materials to be constantly updated, modified and enhanced. Hamdeh and Hamdan, 2010 outlined important features that are needed for one to maintain mobile learning systems such as stability, changeability, analysability, testability and maintainability. The ability of a system to diagnose a fault is analysability. The effort required to modify and eliminate an error is known as changeability. Tolerance that the system exhibits due to unpredictable modifications is known as stability. The validation process of modifications made to the m-learning system is known as testability. Compliance in terms of meeting stated standards is known as maintainability.

VII. Reliability

This refers to the ability of the m-learning system to perform what it was designed to perform in different educational environments. The system must not experience faults such as a system crash, it must have high processing power, and it must be robust and accurate for it to be seen as reliable. The system should be designed in such a way that it can automatically solve issues related to errors of fault tolerance, crash frequency and data recovery. Network should be reliable to prevent degraded performance allowing stakeholders to access information in a timely manner.

VIII. Functionality

This refers to the ability of the m-learning system to meet stated requirements that will enhance the learning process such as suitability, privacy, interoperability, compliance and accuracy. Instructors should be able to control code reuse as well as maintenance of privacy. Suitability refers to the system's ability to meet the needs of the user in terms of providing the required functions

IX. Performance and efficiency

The success of any m-learning environment lies in its effectiveness in meeting the requirements of stakeholders such as quick response time. Performance should be high in terms of CPU power used, connectivity as well as memory usage. The learning process can be enhanced by integrating it with a wide range of technologies that results in an increase in overall system performance.

X. Security

Security for m-learning systems refers to a systematic process of ensuring, integrity, availability and confidentiality by making use of controls such as authentication, authorisation, data protection and validation. Privacy should be ensured as well as confidentiality for data in transit as well as data stored in the system. Security threats are increased since users access the system using their own mobile devices, it is therefore important for mechanisms to be put in place that support learner data management, context copying as well as downloading data from the m-learning management system.

XI. User interface

An attractive user interface will stimulate the interest of users. It is important for m-learning applications to poses the following features namely; attractiveness, ease of use, learnability and user satisfaction. It is vital for developers to take the users into consideration when designing the interface and in-cooperate special user requirements that may be needed for example in-cooperating some brail functions to cater for blind students. Robust systems of high quality will gain a wider acceptance level and consistency on different m-learning platforms should be maintained.

XII. Connectivity

Improved connectivity services in mobile learning environments results in improved collaboration, through real-time access despite geographical location. Several factors should be taken into consideration when selecting infrastructure for networking such as security, range, data access,

place of usage, interference as well as time. The most popular wireless technology that are used in mobile learning environments include WIFI, Bluetooth, GSM and CDMA. Communication networks which can be used in m-learning include ad-hoc networks, wireless local networks, mobile telephony as well as satellites.

XIII. User satisfaction

Feedback from stakeholders is vital for the success of any mobile learning implementation. Feedback obtained from stakeholders will help institutions in assessing progress and negative feedback will enable them to know which areas still need to be worked on. To enhance behavioural intention to use it is also critical to survey users and know what exactly they expect the system to do and by so doing user satisfaction is enhanced when conditions are met.

3.2 M-learning Services for Use in Higher Education

Ghazizadeh (2012) explained the different services that are available to smartphone and tablet users that can effectively be in-cooperated into m-learning. The different services are explained below:

- **Apple Facetime and Skype**

These services can be used for communicating in video mode. Students can effectively use facetime and skype to discuss class projects and assignments with their peers in video mode despite the location they are in. Very effective were gestures are important and also were its difficult to meet and discuss face to time. For facetime, the response rate is very high as incoming calls ring on every apple device you have and the user can select the one closer to them at that time. Although this technology can easily be in-cooperated into the educational system the only limitation it pose is that it is only available to apple users however skype can be downloaded on any smartphone device both android and IOS. Figure 3.2 below illustrates a screenshot of apple facetime feature.

Figure 3.2: Apple facetime service (Ghazizadeh, 2012)

- **Integrating social network sites into m-learning systems**

In their study, Plessis and Smith (2014) came up with a list of features that can be integrated into mobile learning platforms and can result in an increase in the acceptance level of m-learning adoption. The researchers explained that most students mainly use smartphones and tablets for social networks to communicate with family and friends. In order to increase the adoption level it is crucial for institutions to embed social network services into mobile learning platforms which can be effectively used in education. Table 3.1 below describes features that can be embedded in mobile learning platforms.

Table 3.1: Integrating social network sites into m-learning platforms to increase adoption levels (Plessis &Smith, 2014)

Social network Features	How the features can be embedded and used in m-learning platforms
Wall	Students can post useful educational content on their walls so that their peers can also benefit from the information. Videos, clips, pdf files and other useful website links can also be shared on the wall as students interact with both fellow students and their instructors.
Discussion	Social media sites can be a useful platform where students meet virtually and discuss course topics, questions can be answered and it encourages participation. Discussion threads act as a powerful source of reference during exam preparation.
Photo	Learners are able to post photos of topics under discussion as well as their personal life photos so that students get to know each other outside the learning environment.
Quiz	Social network sites such as Facebook can be integrated into the m-learning platform and lecturers can share quizzes with students and they can interact in a virtual educational setting.
Private message	This feature can be utilized in m-learning environments were confidential and private discussions are done such as when instructors message exam results to each student or when the instructor wants to know some information causing low performance on the student, private messages can be a vital tool. Apart from that when a message or course notes are directed to a particular individual students and instructors can make use of this feature.

Table 3.1: Integrating social network sites into m-learning platforms to increase adoption levels continued

Social network Features	How the features can be embedded and used in m-learning platforms
Video	M-learning services can make use of social media by putting links and thumbnails of useful information thereby re-directing students to the source page. YouTube videos can be embedded on a mobile learning page and students can access the same information in a different format, in this case mp4 format.
Comment	Just like in Microsoft word, comments are important and provide more detailed explanation on the topic under discussion. Students can share information, their thoughts and debate on the comment section about a certain educational topic.
Tag	Instructors can tag their students on important posts that they find useful. Students likewise can also tag their fellow classmates on important subjects and discuss in detail.
Event Calendar	Mobile learning can make use of calendar alerts available in social networking sites, this will allow most students to be alerted and reminded as days draw nigh. Instructors can schedule events such as conference dates and exam dates and social network sites remind students as the days draw closer.
News Feed	Students can customize their newsfeed so that they see information that is relevant to their area of study.

3.3 Individual IT Acceptance Theory

In a bid to fully understand users' acceptance of technology, different researchers have come up with models and theories that assist researchers to fully understand factors that affect adoption of new technology. This study will combine three research models namely, TAM, UTAUT and DOI which are explained in detail below:

3.3.1 Technology Acceptance Model (TAM1)

Davis (1989) came up with the Technology Acceptance Model in a bid to understand the reasons that cause people to accept or reject a new technology. His model gained momentum among researchers and has been one of the widely used model when assessing users' acceptance of technology.

Perceived Usefulness (PU) and Perceived Ease of Use (PEU) are the main constructs underlying the model (Donaldson, 2011). Perceived Usefulness (PU) is defined as the extent or degree that one predicts a particular technology will be of benefit and enhance his or her job. On the other hand, Perceived Ease of Use (PEU) refers to the extent that one believes a particular technology will be free of effort/ hustle free (Davis, 1989).

The original TAM model was based on the determinants of perceived ease of use as well as the determinants of perceived usefulness that enabled organizations to design organizational interventions that would increase user acceptance and usage of new systems. For this reason, Venkatesh and Davis conducted a study published in 2000 to extend TAM that examined how the perceived usefulness and usage intention constructs change with continued information system (IS) usage hence the emergence of TAM1 as usage dimension was added.

In order to fully understand all the components of the Technology Acceptance Model and how the independent and dependent variables interact, Figure 3.3 below illustrates the relationship.

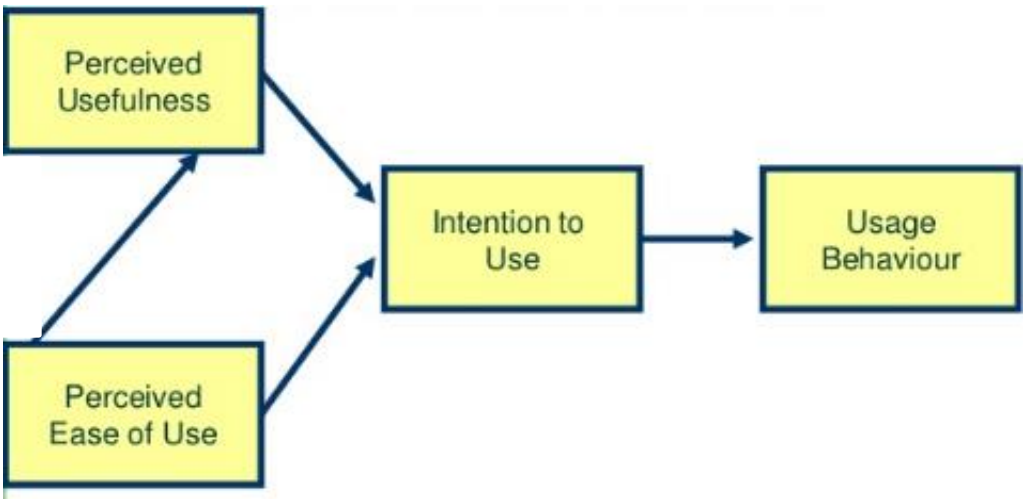

Figure 3.3: Technology acceptance model (Davis, 1989)

3.3.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT model also seek to explain the factors that influence users in adopting a new technology. The dependent variables are behavioral intention and usage behavior whereas the independent variables are performance expectancy, effort expectancy, social influence, facilitating conditions, gender, age, experience, and voluntariness of use (Donaldson, 2011). Individuals use and intention to use are directly influenced by performance expectancy, effort expectancy, social influence, and facilitating conditions. On the other hand, gender, age, experience, and, voluntariness of use also influence intention to use and usage behaviour.

To fully understand the model, the constructs are explained in detail below:

- ***Performance Expectancy:*** With regards to mobile learning this means that users in our case students will find m-learning beneficial because it will allow them to access information quickly at any place, any time with any mobile device (Donaldson, 2011).

- ***Social Influence:*** The degree or extend that one perceives that his/her inner circle believe that he/she must use the technology and is therefore influenced to use it by those around him/her (Donaldson, 2011).

- ***Effort Expectancy:*** The extent to which a system or certain technology is considered to be easy to use and requires minimum effort. This construct is closely related to the perceived ease of use which fall in the Technology acceptance model (Liu, 2014).

- ***Facilitating Conditions:*** This refers to resources or materials that are deemed necessary and essential for one to use a certain technology (Liu, 2014).

- ***Behavioral Intention (BI):*** The influence that stimulates one's intention to do something as a result of one's attitude towards performing that behavior together with beliefs about what others expect him/her to do.

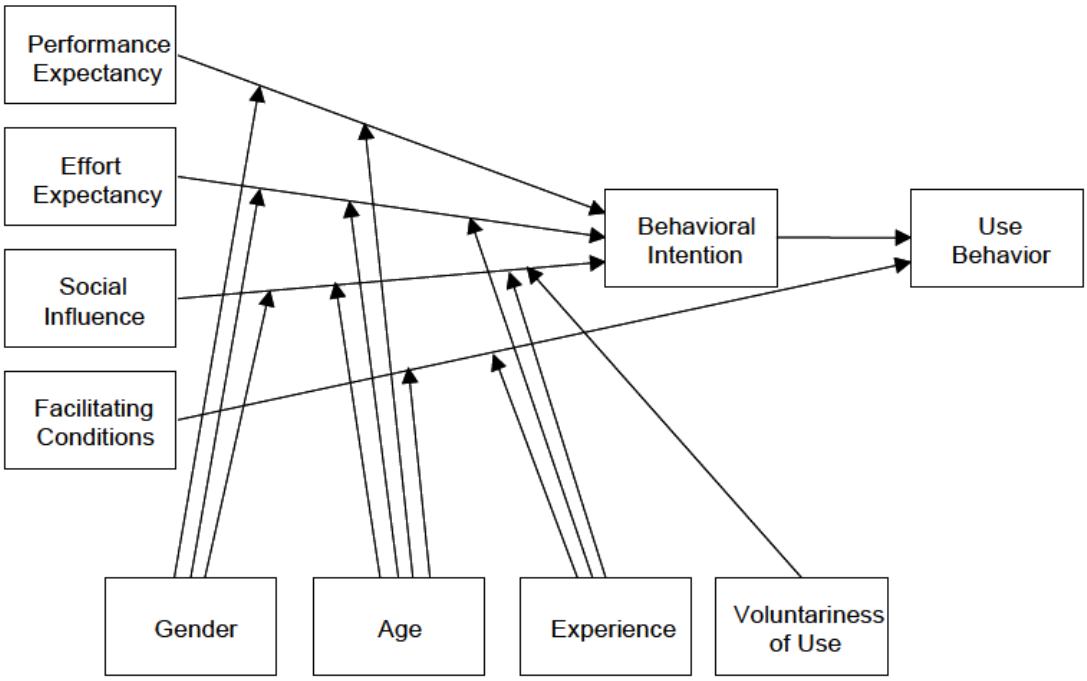

Figure 3.4: The unified theory of acceptance and use of technology (UTAUT) model (Liu, 2014)

3.3.3 Diffusion of Innovation Theory

In his study, Ghazizadeh (2012) explained that the main aim of the diffusion of innovation theory is to investigate why and how technology is accepted differently among different social groups. Rogers (2003) defines diffusion as the way in which people in a certain society communicate about a technology over a period of time. In addition to that, the researcher mentioned four key elements that are crucial in diffusion research which are as follows: innovation, time, communication and the social system. The five important stages in the Theory of Diffusion of Innovation (DOI) as explained by Ghazizadeh (2012) are explained below:

- ***Knowledge:*** This is the stage when the user is not fully aware of the technology but, however he/she is getting familiar with the innovation.
- ***Persuasion:*** At this stage the user has gained more knowledge about the technology and is starting to show more interest and continues to seek more information about the innovation.
- ***Decision:*** This is the most critical stage whereby the user makes a solid decision of either accepting or rejecting a technology based on the information they know about the innovation at that particular point in time.
- ***Implementation:*** At this stage the user adopts the technology and is so eager to find if the technology is really useful.
- ***Confirmation:*** The user critically makes a decision whether to continue using the innovation or reject the innovation. This is another crucial stage in accepting innovation.

Several factors have been identified by researchers that influence users' decision in accepting innovation when basing with the theory of Diffusion of Innovation. Ghazizadeh (2012) explains the main factors below:

- ***Relative Advantage:*** This refers to the perceived benefit that the user will enjoy by using the newer version of the innovation compared to the older version.
- ***Compatibility:*** The extent to which the innovation is compatible with the users' needs.
- ***Complexity:*** The degree of simplicity that is required in using a new innovation. When users perceive the new technology to be easy to use they are most likely willing to adapt to the new technology.
- ***Observability:*** The extent to which the results of using a certain innovation is visible and can be seen by others.
- ***Trialability:*** This refers to the trial period that users are given to test a system and decide if they are willing to adopt the innovation. This is a very critical stage because if the innovation is too complex and difficult to use many users will reject the innovation.

Rogers (2003) categorized individuals who are willing to adopt to new technology into 5 distinct phases as illustrated in Figure 3.5 below. Explanations of each phase are given below:

- ***Innovators:*** This refers to the first group of individuals who are quick to adopt to innovation.

- ***Early adopters:*** The second group who adopt a new innovation. This group is characterized by high income earners, educated people and mainly comprised of youth.
- ***Early majority:*** This group is characterized by people with an average status in the society and this group normally take time before adapting to new innovation.
- ***Late majority:*** These adopt to the innovation when the majority of the people in the society have adapted to the new technology.
- ***Laggards:*** This group is normally characterized with people who are mainly concerned with tradition and this resemble the last group who adopt innovation when the peak level has already elapsed and the innovation is almost phasing out.

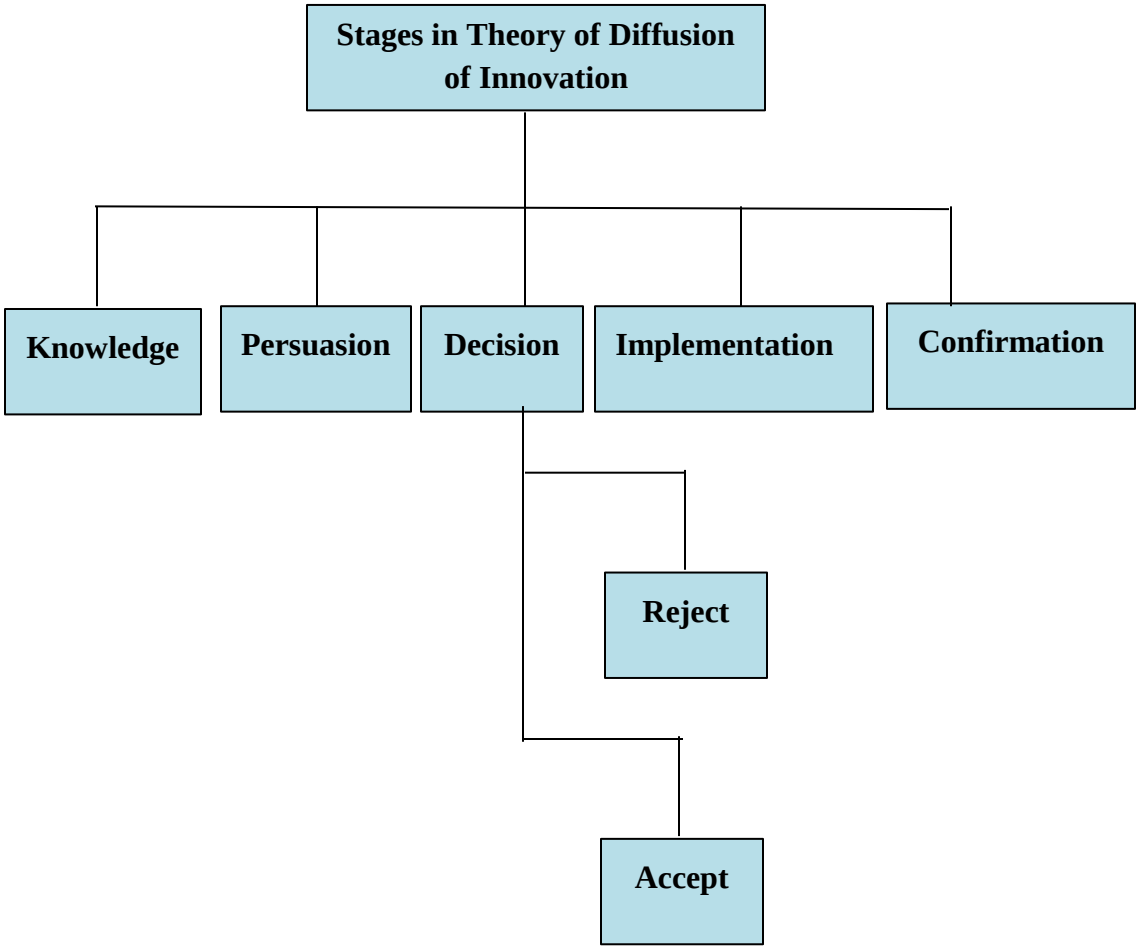

Figure 3.5: Showing the five stages in the decision innovation process (Rogers, 2003)

CHAPTER 4

RESEARCH METHODOLOGY

This section explains the research model that was used by the researcher when analyzing data. It also explains research participants, data collection tools as well as reliability tests for the questionnaire.

4.1 Research Model

The main focus of this research is to investigate students' acceptance of m-learning in higher educational institutions. To fully examine the relationship that exists between the independent and dependent variables of the study, the model depicted in Figure 4.1 was proposed and used in this study.

The research model has been integrated to include essential attributes from three technology models namely; Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) and Diffusion of Innovation theory (DOI) in order to fully understand whether students are willing to adapt to this new technology. The moderating effects of UTAUT model were not considered in this study. Most of the research done on this subject is limited to the use of one or two models and this has motivated the researcher to conduct this study integrating three models to fully understand the subject

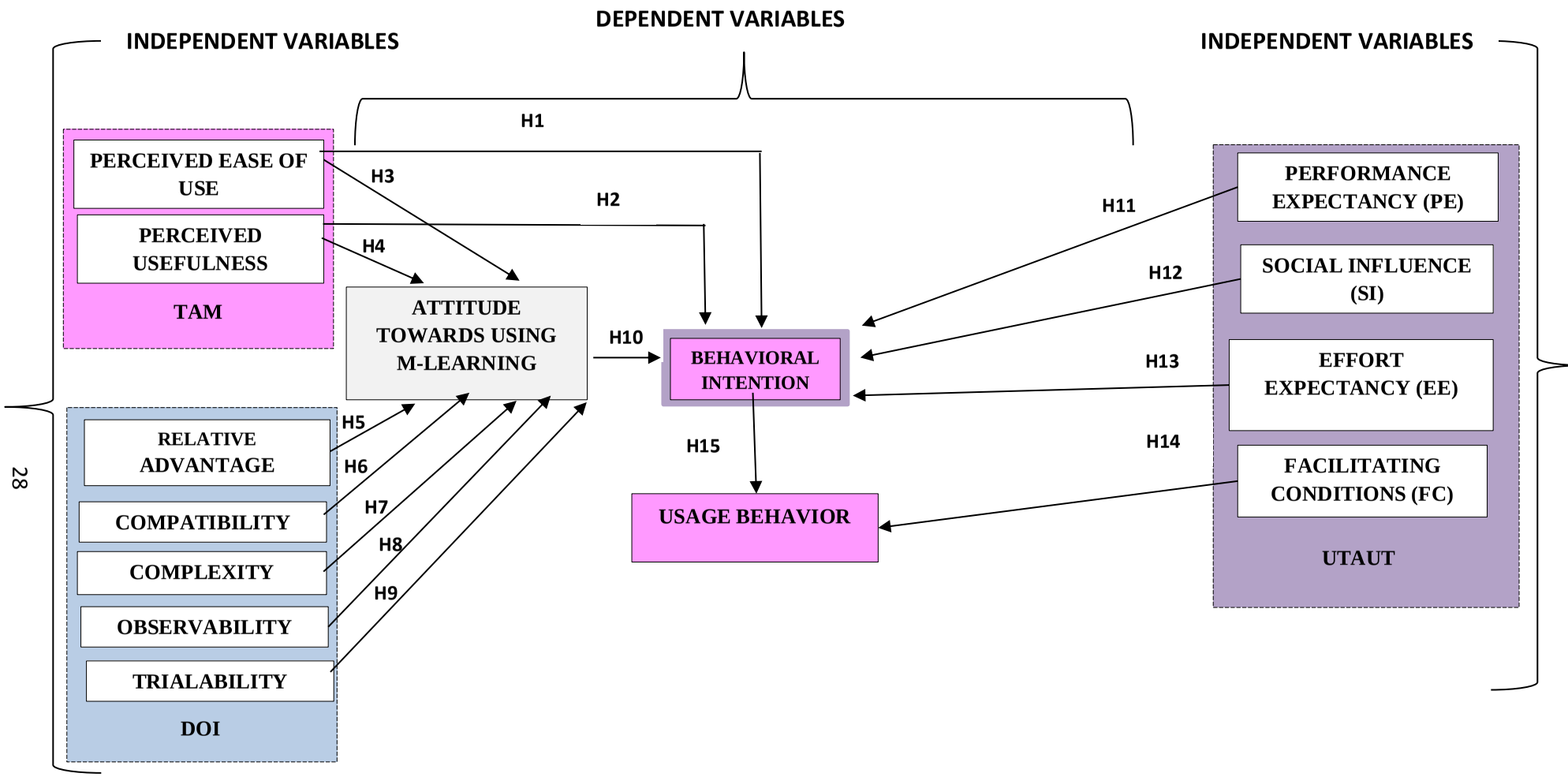

Figure 4.1: Research model of the study

4.2 Research Participants

The researcher focused her study on students from different faculties currently enrolled at three universities in North Cyprus. Universities chosen are the ones which were close to the researcher since the researcher was not mobile. In addition to that, the sample size used was calculated by looking at the complexity of the model and the number of attributes. The universities chosen are as follows:

- Near East University (239)
- Cyprus International University (178)
- Eastern Mediterranean University (197)

In addition to that, the department were distinctively divided into two, STEM and other. STEM representing students studying degrees related to Technology, Science, Engineering and Mathematics. The reason why STEM was chosen was because the researcher was interested in finding out if there was any difference in knowledge and acceptance rates between IT and science students versus other non-scientific students who are not exposed to technology a lot.

4.2.1 Demographic data of research participants

Table 4.2 below describes the demographic data of participants. There were 312 male participants (50.81%) and 302 female participants (49.19%). The age group which had the highest number of participants was the 23-27 years which had 267 participants followed by the 17-22 age group which had 235 participants and the last group had 112 participants and this was the 28 years and above age group. Most participants were undergraduate students as seen by the highest number of participants which were 350, followed by master students which were 201 and the least number of participants were 63 PhD students. 57.7% of the students are currently enrolled in STEM departments and 42.3% other non-scientific departments. Furthermore, participants were asked to tell us more about their mobile learning experience and results showed that 57% of the students have been using mobile learning for less than 6 months, 32.7% of participants have been using mobile learning for more than 6 months and 10.3% have not used mobile learning before.

Table 4.1: Demographic data of research participants

Demographic Variable		Number	Percentage (%)
Gender	Male	312	50.81
	Female	302	49.19
	Total	614	100
Age group	17-22	235	38.27
	23-27	267	43.49
	28+	112	18.24
	Total	614	100
Level of Study	Undergraduate	350	57
	Masters	201	32.74
	PhD	63	10.26
	Total	614	100
Department	STEM	354	57.7
	Other	260	42.3
	Total	614	100
Experience	Less than 6 months	350	57
	More than 6 months	201	32.7
	No experience	63	10.3

4.3 Data Collection Tool

The data collection tool that was used for this study was a paper based questionnaire which was distributed to students currently enrolled at 3 universities in North Cyprus. The questionnaire has 2 sections; first part included demographic information and the last part included dimensions related to 3 models (TAM, UTAUT and DOI) which has 14 dimensions namely; Perceived Usefulness, Perceived Ease of Use, Social Influence, Facilitating Conditions, Compatibility, Trialability, User Behavior, Relative Advantage, Observability, Complexity, Behavioral Intention, Attitude towards using m-learning, Effort Expectancy and Performance Expectancy (see Appendix 1).

4.3.1 Reliability

In order to assess the reliability of results obtained by the questionnaire a reliability test was conducted using SPSS. The Cronbach alpha reliabilities of each dimension was calculated and results ranked from the highest to the lowest are as follows; DOI had 0.785, UTAUT 0.647 and TAM1 had 0.623. The total Cronbach Alpha for the whole questionnaire with 48 questions was 0.811. According to a study conducted by George and Mallery (2003), the researchers described the results of Cronbach alpha in that, if it is .90 and above it is excellent, .80 and above is good, between 7 and 8 is acceptable, between .60 and .70 is questionable, between 5 and 6 is poor and below 5 is unacceptable. Cronbach Alpha reliability of DOI, TAM and UTAUT dimensions is within acceptable ranges for data analysis. The questionnaire was adopted from different sources which are referenced in Table 4.3 below.

Table 4.2: Questionnaire constructs and reliability test

Constructs:	Number of Items	Cronbach Alpha:
TAM DIMENSION	6	0.623
DOI DIMENSION	24	0.785
UTAUT DIMENSION	18	0.647
TOTAL	48	0.811

Table 4.3: Questionnaire sources

Constructs	Reference of Statement(s)
PERCEIVED EASE OF USE	
• Learning through a mobile device saves time	(Chung et al., 2015)
• Learning through a mobile device is more convenient for me	(Chung et al., 2015)
• I believe it is easy for me to remember how to perform tasks using a smartphone/ tablet	Rellinger (2014)

Table 4.3: Questionnaire sources continued

Constructs	Reference of Statement(s)
PERCEIVED USEFULNESS	
• Learning through mobile phones is not restricted by time and place	(Chung et al., 2015)
• Learning through mobile phones can help me gain quick access the information I need	(Chung et al., 2015)
• My learning process becomes more effective through the use of m-learning.	(Chung et al., 2015)
USAGE BEHAVIOR	
• I often access the internet using a handheld mobile device.	Donaldson (2011)
• Lecturers have been of help in enabling me to use mobile learning.	Donaldson (2011)
• I am willing to use mobile learning in my studies	(Chaka & Govender, 2017)
RELATIVE ADVANTAGE	
• The overall quality of my school work is improved by using smartphones and/or a tablet	Rellinger (2014)
• I can access my lecturer easily by using a smartphone and/or a tablet	Rellinger (2014)
• There are more benefits of using a smartphone/tablet than disadvantages	Rellinger (2014)
COMPATIBILITY	
• My learning style is supported by the usage of smartphones and/or tablets	Rellinger (2014)
• I have confidence when using my smartphone and/or tablet	Rellinger (2014)
• I am not worried by the possibility of being seen as a non-expect when it comes to using smartphones	Rellinger (2014)

Table 4.3: Questionnaire sources continued

Constructs	Reference of Statement(s)
COMPLEXITY	
• I find it easy to learn how to use a smartphone/tablet	Rellinger (2014)
• I find it easy to handle my schoolwork with smartphones/tablets	Rellinger (2014)
• I find the challenges that come with learning how to use a new smartphone exciting	Rellinger (2014)
OBSERVABILITY	
• Most of my classmates use smartphones/tablets	Rellinger (2014)
• I have seen smartphones/tablets being used in learning	Rellinger (2014)
• The results of using tablets/smartphones are so obvious and visible	Rellinger (2014)
TRIALABILITY	
• I am always the first one to try a new technology amongst my friends	(Ahmad & Love, 2013)
• I am willing to receive assignments and classwork through my mobile phone.	(Chaka & Govender, 2017)
• I was able to try using mobile learning with one of my courses before I make a decision to use mobile learning for all my courses.	Rellinger (2014)
ATTITUDE TOWARDS USING M-LEARNING	
• I believe mobile technology is a useful tool for my study.	(Mostafa et al., 2016)
• I can easily manage my study by using mobile Apps.	(Mostafa et al., 2016)
• Mobile technology help me in exchanging lecture notes with my friends	(Mostafa et al., 2016)

Table 4.3: Questionnaire sources continued

Constructs	Reference of Statement(s)
BEHAVIORAL INTENTION	
• I plan on using m-learning services for my studies	(Ahmad & Love, 2013)
• I predict I will use m-learning services in the future	(Mtebe & Raisamo, 2014)
• I will recommend m-learning services to others	(Chung et al., 2015)
PERFORMANCE EXPECTANCY	
• I believe m-learning is useful for my studies	(Ahmad & Love, 2013)
• Using mobile learning allows me to access more information about my courses	(Mtebe & Raisamo, 2014)
• Mobile devices can assist me in receiving school work from my lecturers and submitting assignments	(Chaka & Govender, 2017)
SOCIAL INFLUENCE	
• I think I will use mobile technology since my friends use it.	(Chaka & Govender, 2017)
• My friends who are currently using m-learning applications find them helpful and this encourages me to use it too.	(Chaka & Govender, 2017)
• I believe lecturers and staff members will be helpful in motivating me to use mobile learning	(Mtebe & Raisamo, 2014)

Table 4.3: Questionnaire sources continued

Constructs	Reference of Statement(s)
FACILITATING CONDITIONS	
• My decision to use m-learning will depend on the mobile device I will have at that time	(Chaka & Govender, 2017)
• I will only accept m-learning if the service provider is willing to provide quality service	(Chaka & Govender, 2017)
• I have resources that are necessary for me to use m-learning	(Mtebe & Raisamo, 2014)
EFFORT EXPECTANCY	
• I find m-learning easy to use	(Ahmad & Love, 2013)
• I believe it would be so easy for me to become skilful at using m-learning services	(Mtebe & Raisamo, 2014)
• Operating mobile learning services is going to be easy for me	(Mtebe & Raisamo, 2014)
VOLUNTARINESS OF USE	
• Even though it may be helpful to use mobile learning, it is not compulsory for my classes.	Donaldson (2011)
• My lecturers do not require me to use m-learning.	Donaldson (2011)
• My usage of m-learning is voluntary	Donaldson (2011)
EXPERIENCE	
• I need to gain some experience first before deciding to use mobile learning.	(Ahmad & Love, 2013)
• Experience is key when deciding to use mobile learning.	(Ahmad & Love, 2013)
• My lecturers think it is important to learn how to use mobile technology first before adapting to mobile learning.	(Mtebe & Raisamo, 2014)

4.4 Data Analysis

A total of 700 questionnaires were distributed to students at the 3 above mentioned universities. Of the 700 questionnaires distributed, 33 were not completed in full and were disregarded from further analysis, 53 were not returned back to the researcher by participants and the remaining 614 were fully completed and the data collected was fully analyzed in Chapter 5 of this study. The data collected from the questionnaire was analyzed using a statistical software known as SPSS and the following analysis methods were used:

- Descriptive Statistics
- Pearson Correlation

4.5 Procedure

The topic was assigned to the researcher by her supervisor regarding the integration of three well-known models of TAM, UTAUT and DOI from the literature. The research began by reviewing the literature to fully understand the subject being discussed. When the subject was thoroughly exhausted and fully understood, a proposal was submitted to the school department. The research proposal was approved by the supervisor and an ethical letter from the research department was issued and handed to the researcher. A questionnaire was adopted from these models and reliability tests were calculated for each model integrated and the results showed that the questionnaire results satisfy acceptable internal consistency. Next, the researcher distributed questionnaires at the universities aforementioned at public areas like on-campus restaurants, cafeterias and the library where students of different faculties meet and interact. After 2 months of collecting data, the questionnaires were compiled and data collected was entered in SPSS for data analysis. Data collected was analysed and thesis report was written. The final thesis was submitted to the supervisor for final checks. Corrections were done and a Jury date was organized and the results discussed. Final corrections were also done after the Jury adding valuable information obtained from the panel. The final thesis was submitted to the school. Table 4.4 below shows the research schedule and Fig 4.2 shows the Gantt chart.

Table 4.4: Thesis research schedule

PROCEDURE	DURATION (WEEKS)
Literature review	8
Writing thesis proposal	5
Proposal submission and waiting for feedback	2
Questionnaire design	1
Sample data collection and questionnaire dimension checks	2
Data collection and analysis	11
Compiling last chapters of thesis	2
Thesis review and submission of thesis to supervisor	3
Corrections and amending thesis	2
Jury and final corrections	2
Total	38 Weeks

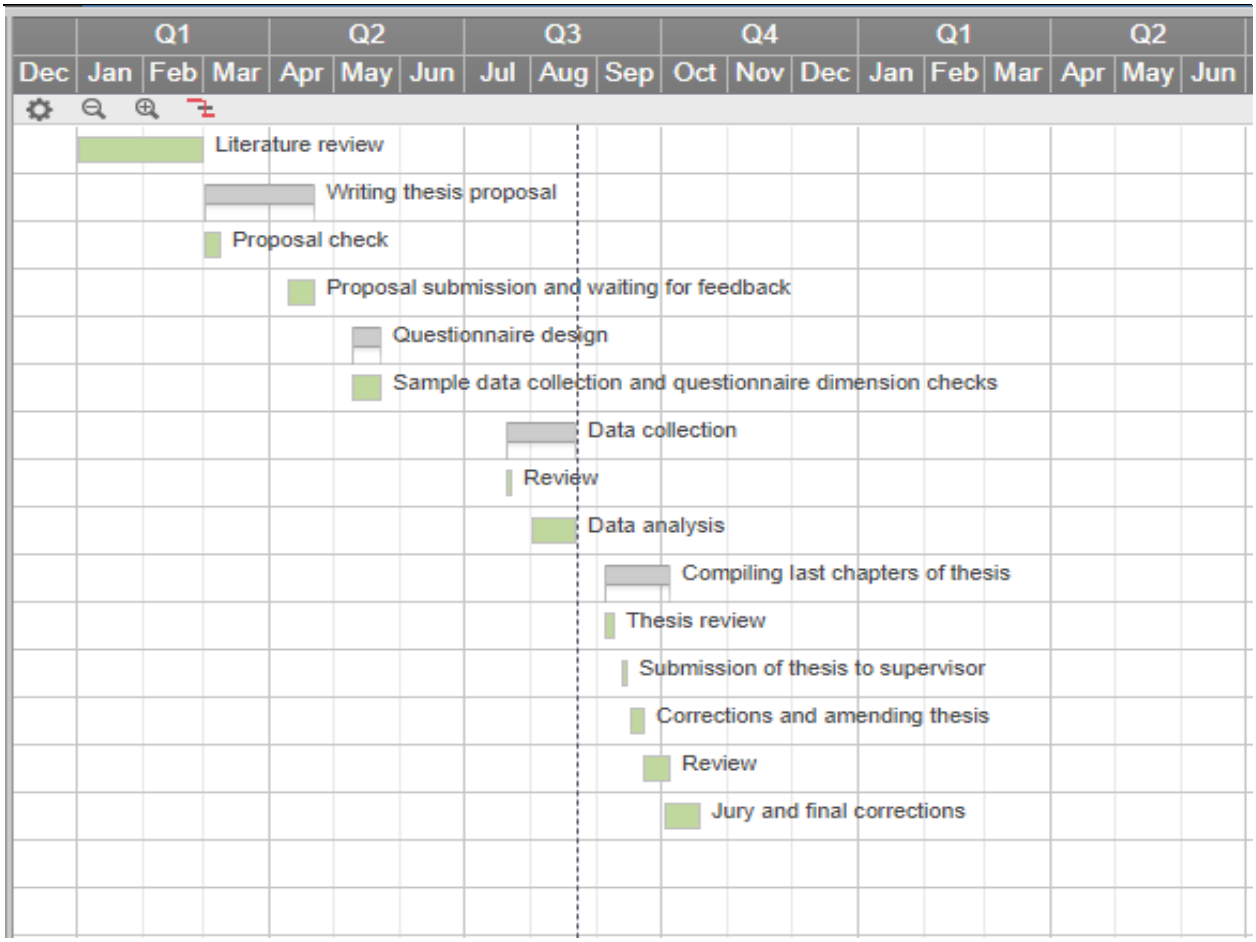

Figure 4.2: Gantt chart for the research

CHAPTER 5

RESULTS AND DISCUSSIONS

This chapter is a compilation of the analyzed data. Results are discussed and compared with previous findings in the literature to find similarities and differences. An analysis of the research questions are conducted and the outcome is discussed in detail.

5.1 The Relationship between Perceived Ease of Use (PEU) and Behavioral Intention (BI)

H1: Perceived Ease of Use (PEU) has a positive effect on behavioral intention.

To find out the relationship that exists between the two variables (Perceived Ease of Use and Behavioural Intention), a Pearson correlation coefficient was computed and showed that there was no significant correlation between the aforementioned two variables with r=.021, n= 614 and p= .599. Similar findings were found by Bere (2014) who conducted a research on using technology in learning in the countryside of Angola. His findings showed that there was no significant correlation between and Perceived Ease of Use and behavioural intention when it came to technology acceptance amongst college students in Bakina village, however the researcher pointed out that differences in results could be attributed to different settings as his research focussed on remote areas of Angola with a high level of illiteracy rates and most students had not used computers before. In addition, similar findings were also found by Carr (2011) who also used the TAM1 model and enriched it with other variables, including satisfaction and personal characteristics, to investigate the relationship between PEU and BI, findings showed that there was no significant relationship between the two variables. The researcher noted that, these results could have been attributed to the fact that most students saw computers are complex devices and were not willing to use them.

5.2 The Relationship between Perceived Usefulness (PU) and Behavioral Intention (BI)

H2: Perceived Usefulness (PU) has a positive effect on behavioral intention.

To find out the relationship that exists between the two variables (Perceived Usefulness and Behavioural Intention), results showed that there was a positive correlation between the

aforementioned two variables with r=.021, n= 614 and p= .606. Results also showed a weak, positive correlation between the two variables. This means that when Perceived Usefulness (PU) increases, Behavioural Intention (BI) also increases. Since p> .05 we therefore reject the hypothesis and conclude that there is no statistically significant correlation between the two variables. Venkatesh and Morris (2000) used TAM1 amongst 342 employees in a workplace and compared the results between males and females. Results showed that there was significant correlation between PU and BI among all employees. However, a further analysis between females and males actually showed that women were having lower perceived usefulness because they were having higher levels of computer anxiety as compared to their male counterparts which could explain differences when further analysed based on gender differences. In addition, other researchers (Hamdeh & Hamdan, 2010; Liu, 2013) found out that there was no significant correlation between Perceived Usefulness and Behavioural Intention among students in remote areas as they were not exposed to computers and did not perceive their benefits, The researchers noted that differences in results could be attributed to differences in settings.

5.3 The Relationship between Perceived Ease of Use (PEU) and Attitude Towards using M-learning

H3: Perceived Ease of Use (PEU) has a positive effect on attitude towards using m-learning.

To find out the relationship that exists between the two variables (Perceived Ease of Use and Attitude), results showed that there was a positive correlation between the aforementioned two variables with r=.015, n= 614 and p= .708. Furthermore, there was a weak, positive correlation between the two variables. This means that when Perceived Ease of Use (PEU) increases, Attitude also increases. Since p> .05 we therefore reject the hypothesis and conclude that there is no statistically significant correlation between the two variables. Similar findings were also found by Rogers (2003) who did his study in India and found out that Perceived Ease of Use does affect attitude when using mobile learning in secondary schools. The researcher articulated his findings to the fact that when students think that mobile learning will make their studies easier they are willing to adapt to the change. In addition, Akbar (2013) also found similar results, however in a different setting. The researcher found out that PEU does affect attitude to use technology in a work environment.

5.4 The Relationship between Perceived Usefulness (PU) and Attitude Towards using M-learning

H4: Perceived Usefulness (PU) has a positive effect on attitude towards using m-learning.

To find out the relationship that exists between the two variables (Perceived Usefulness and Attitude), results showed that there was a negative correlation between the aforementioned two variables with r= -.012, n= 614 and p= .768. Furthermore, results showed a weak, negative correlation between the two variables. This means that when Perceived Usefulness (PU) increases, Attitude decreases. Since p> .05 we therefore reject the hypothesis and conclude that there is no statistically significant correlation between the two variables. Similar findings were found by many researchers in the literature (Nassuora, 2013; Rogers, 2003; Ghazizadeh, 2011) who concluded that Perceived Usefulness has a positive effect on attitude when it comes to mobile learning. What is interesting about these researchers is that, they all did their studies among graduating senior students and results showed that PU indeed has a positive effect on attitude. This could be attributed to the fact that older students have been exposed to many technologies during their study life and have developed their metacognitive skills in such that if they view a new technology as useful, they are likely to adapt compared to younger students who are getting exposure for the first time and are most likely to be reluctant to change.

5.5 The Relationship between Relative Advantage and Attitude Towards using M-learning

H5: Relative advantage has a positive effect on attitude towards using m-learning.

To find out the relationship that exists between the two variables (Relative Advantage and Attitude results showed that there was a negative correlation between the aforementioned two variables with r= -.024, n= 614 and p= .553. Furthermore, results also showed a weak, negative correlation between the two variables forming a downhill linear relationship. This means that when Relative Advantage increases, Attitude decreases. Since p> .05 we therefore reject the hypothesis and conclude that there is no statistically significant correlation between the two variables. Khechine et al. (2014) also found out that there was no significant correlation between Relative Advantage and attitude towards using mobile learning. This suggests that in the sight of students, mobile

learning technologies do not appear as superior compared to existing learning systems and by so doing students are not keen on using mobile learning technologies. However, different results were also found by Mostafa et al. (2016) who conducted a study in Malaysia and found out that relative advantage has a positive effect on attitude among employees. These differences in results could be attributed to differences in settings/ environments which researchers conducted their studies.

5.6 The Relationship between Compatibility and Attitude Towards M-learning

H6: Compatibility has a positive effect on attitude towards using m-learning.

To find out the relationship that exists between the two variables (Compatibility and Attitude), a Pearson correlation coefficient was computed and findings are shown on Table 5.1 below. From the results, we can clearly see that there was a positive correlation between the aforementioned two variables with r= .131, n= 614 and p= .001. Furthermore, a scatterplot in Figure 5.1 also shows a positive correlation between the two variables. This means that when Compatibility increases, Attitude increases. Since p< .05 we therefore accept the hypothesis and conclude that there is a statistically significant correlation between the two variables. Akbar (2014) found similar results and concluded that if students perceive that mobile learning technology is compatible with other devices they currently use such as smartphones they are willing to adapt to change. However, contrary findings were also found by Plessis and Smith (2014) in Algeria who did a similar study and concluded that there was no significant correlation between compatibility and attitude towards using m-learning for distance learning students at the Faculty of law at 3 universities in Algeria. Other factors not mentioned by the researcher could have contributed to differences in results.

Table 5.1: showing the pearson correlation between compatibility and attitude

		Compatibility	Attitude
Compatibility	Pearson Correlation	1	.131**
	Sig. (2-tailed)		.001
	N	614	614
Attitude	Pearson Correlation	.131**	1
	Sig. (2-tailed)	.001	
	N	614	614

**. Correlation is significant at the 0.01 level (2-tailed).

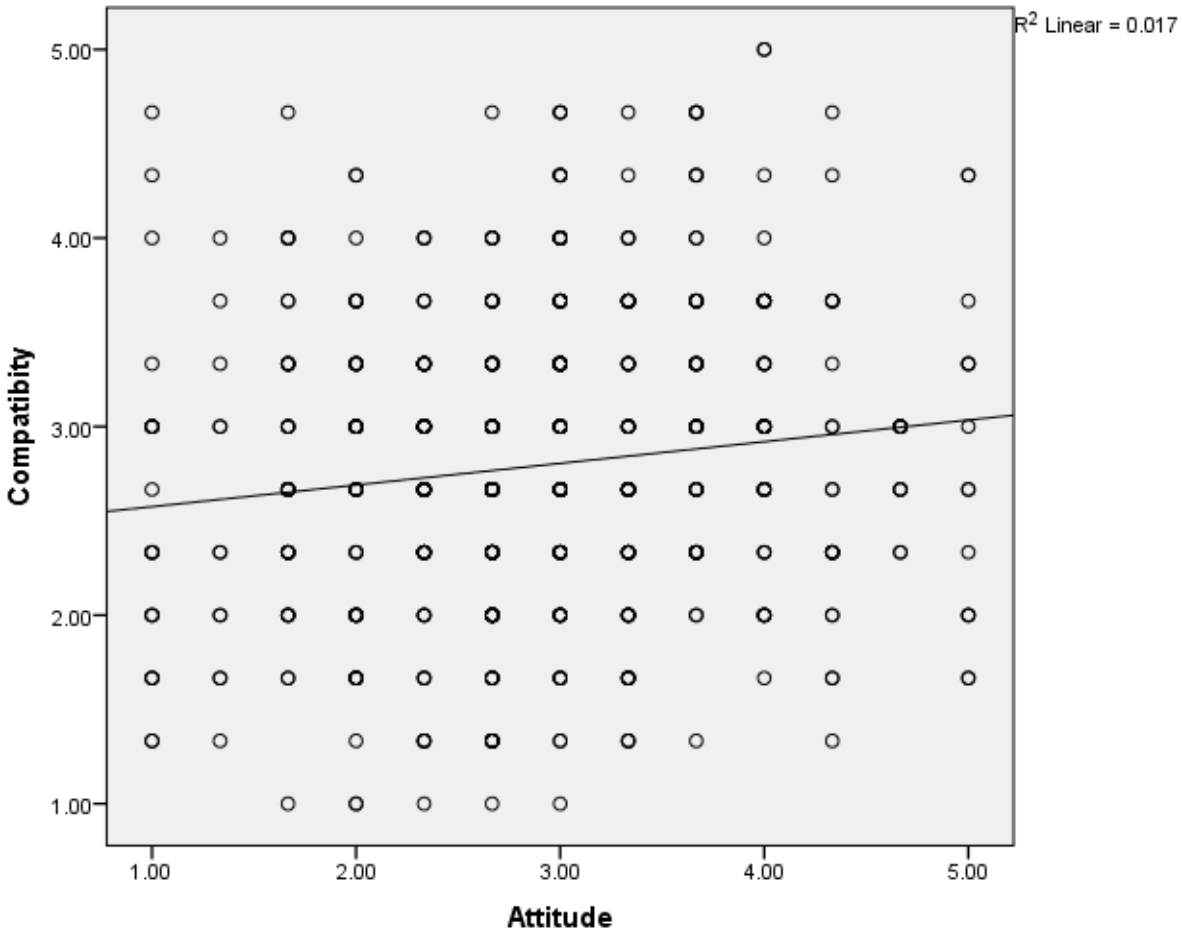

Figure 5.1: Scatter diagram showing the relationship between compatibility and attitude

5.7 The Relationship between Complexity and Attitude Towards using M-learning

H7: Complexity has a positive effect on attitude towards using m-learning.

To find out the relationship that exists between the two variables (Complexity and Attitude), a Pearson correlation coefficient was computed and findings are shown on Table 5.2 below. From the results, we can clearly see that there was a positive correlation between the aforementioned two variables with r= .532, n= 614 and p= .000. Furthermore, a scatterplot in Figure 5.2 also shows a strong, positive correlation between the two variables. This means that when Complexity increases, Attitude increases. Since p< .05 we therefore accept the hypothesis and conclude that there is a statistically significant correlation between the two variables. Similar results were found by Baek et al. (2017) who concluded that complexity has a positive effect on attitude, however it

is important to note that this study focussed mainly on e-learning as opposed to m-learning. Furthermore, Bere (2014) also found similar results and concluded that students prefer to have tried the system and checked if it is easy to use before making a decision to use mobile learning technologies.

Table 5.2: Showing the pearson correlation between complexity and attitude

		Complexity	Attitude
Complexity	Pearson Correlation	1	.532**
	Sig. (2-tailed)		.000
	N	614	614
Attitude	Pearson Correlation	.532**	1
	Sig. (2-tailed)	.000	
	N	614	614

**. Correlation is significant at the 0.01 level (2-tailed).

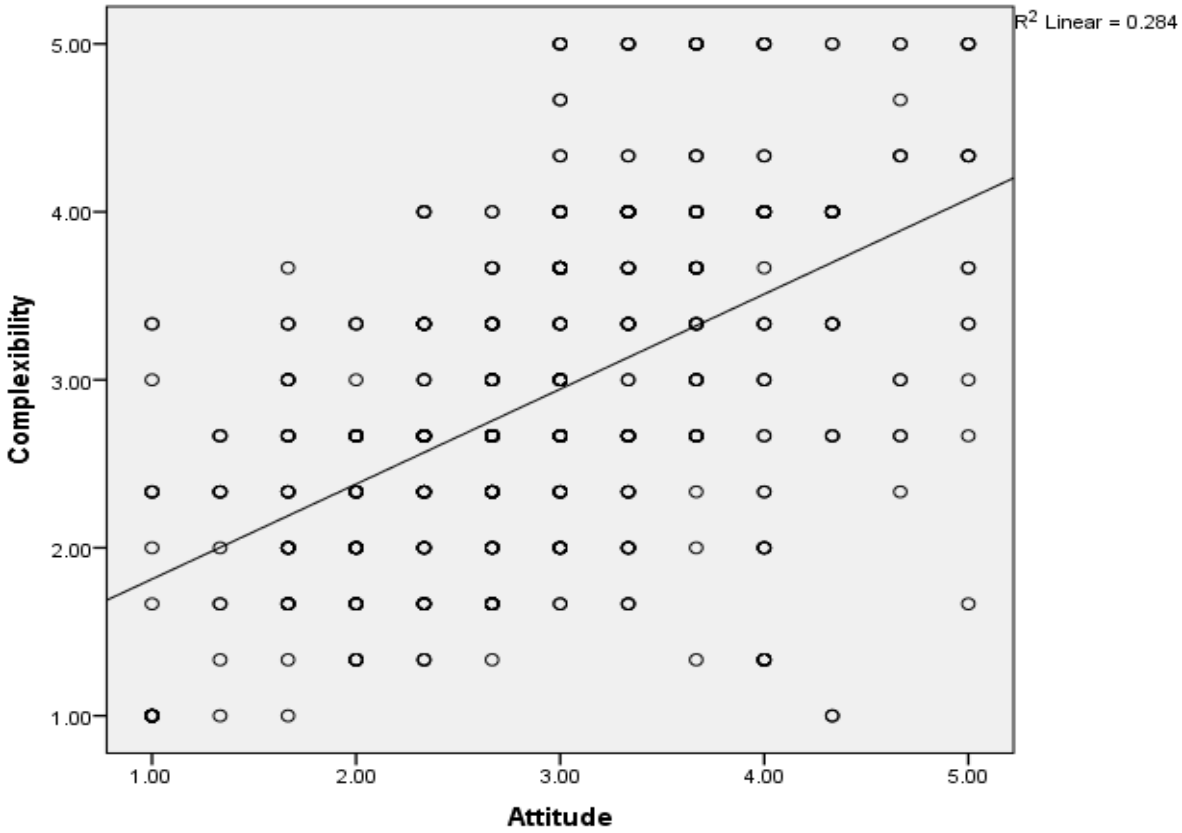

Figure 5.2: Scatter diagram showing the relationship between complexity and attitude

5.8 The Relationship between Observability and Attitude Towards M-learning

H8: Observability has a positive effect on attitude towards using m-learning.

To find out the relationship that exists between the two variables (Observability and Attitude), a Pearson correlation coefficient was computed and findings are shown on Table 5.3 below. From the results, we can clearly see that there was a positive correlation between the aforementioned two variables with r= .582, n= 614 and p= .000. Furthermore, a scatterplot in Figure 5.3 also shows a strong, positive correlation between the two variables forming a strong uphill linear relationship. This means that when Observability increases, Attitude increases. Since p< .05 we therefore accept the hypothesis and conclude that there is a statistically significant correlation between the two variables. Similar findings were also found by Alharbi and Drew (2014) who concluded that observability does have a positive influence on attitude. The researcher explained his findings that the more you see a lot of people using a type of technology, it does influence your attitude towards using the same technology.

Table 5.3: Showing the pearson correlation between observability and attitude

		Observability	Attitude
Observability	Pearson Correlation	1	.582**
	Sig. (2-tailed)		.000
	N	614	614
Attitude	Pearson Correlation	.582**	1
	Sig. (2-tailed)	.000	
	N	614	614

**. Correlation is significant at the 0.01 level (2-tailed).

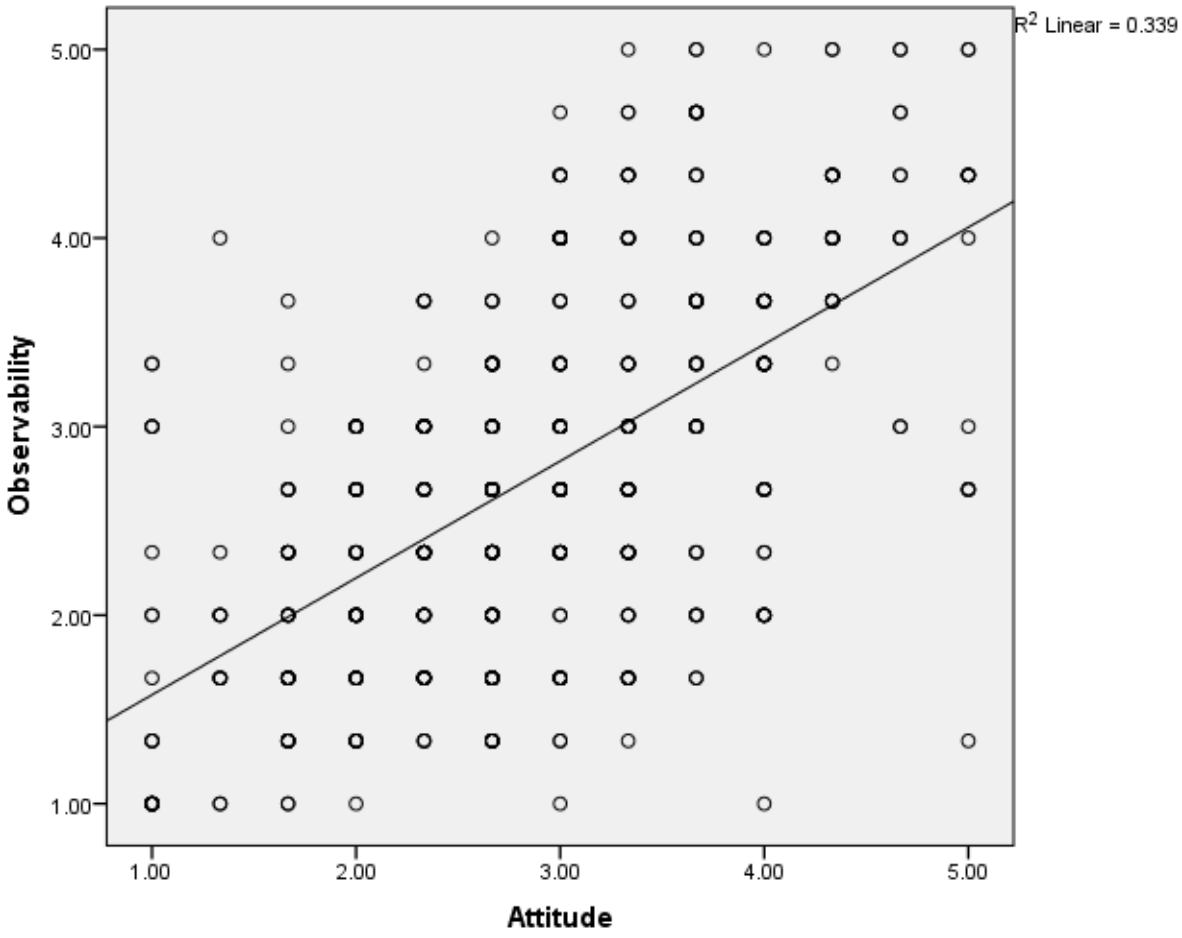

Figure 5.3: scatter diagram showing the relationship between perceived ease of use and behavioral intention

5.9 The Relationship between Trialability and Attitude Towards using M-learning

H9: Trialability has a positive effect on attitude towards using m-learning.

To find out the relationship that exists between the two variables (Trialability and Attitude), a Pearson correlation coefficient was computed and findings are shown on Table 5.4 below. From the results, we can clearly see that there was a positive correlation between the aforementioned two variables with r= .628, n= 614 and p= .000. Furthermore, a scatterplot in Figure 5.4 also shows a strong, positive correlation between the two variables forming a strong uphill linear relationship. This means that when Trialability increases, Attitude increases. Since p< .05 we therefore accept the hypothesis and conclude that there is a statistically significant correlation between the two

variables. A similar study conducted by Vogel et al. (2012) had the same results, the researchers also concluded that Trialability does have a positive effect on m-learning. To support their findings the researchers explained that if students are given a chance to try the technology before and familiarize with it, acceptance level will be high. In addition, Carr (2014) also pointed out that imposing a technology on students before they try it out can have a negative effect on response levels. People tend to feel honoured when they first have the chance to try out a system and decide whether they want to use it or not.

Table 5.4: showing the pearson correlation between trialability and attitude

		Trialability	Attitude
Trialability	Pearson Correlation	1	.628**
	Sig. (2-tailed)		.000
	N	614	614
Attitude	Pearson Correlation	.628**	1
	Sig. (2-tailed)	.000	
	N	614	614

**. Correlation is significant at the 0.01 level (2-tailed).

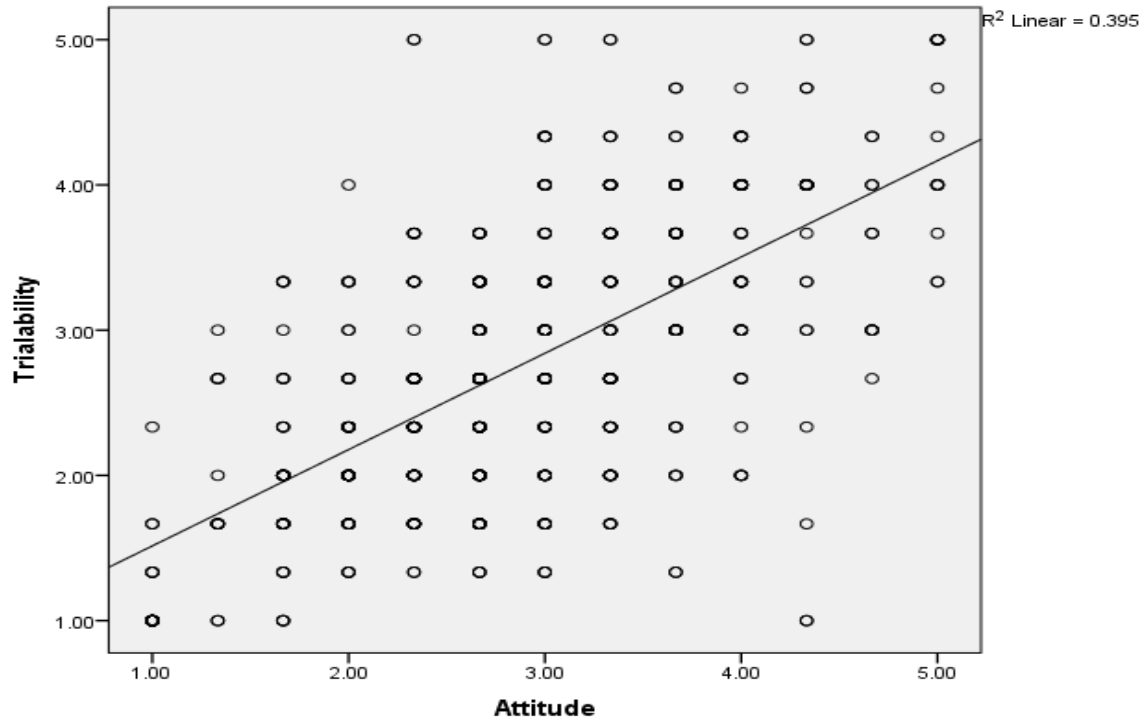

Figure 5.4: Scatter diagram showing the relationship between trialability and attitude

5.10 The Relationship between A/ttitude Towards using M-learning and Behavioral Intention

H10: Attitude towards using m-learning will have a positive influence on behavioral intention.

To find out the relationship that exists between the two variables (Attitude and Behavioural Intention), a Pearson correlation coefficient was computed and findings are shown on Table 5.5 below. From the results, we can clearly see that there was a positive correlation between the aforementioned two variables with r= .433, n= 614 and p= .000. Furthermore, a scatterplot in Figure 5.5 also shows a weak, positive correlation between the two variables forming an uphill linear relationship. This means that when Attitude increases, Behavioural Intention also increases. Since p< .05 we therefore accept the hypothesis and conclude that there is a statistically significant correlation between the two variables. Similar findings were found by Akbar (2013) who concluded that attitude towards mobile learning had a significant influence on Intention to use mobile learning technologies for both male and female students. This suggests that attitude towards technology use plays a key role in students' acceptance of mobile learning. If students have a positive attitude towards technology they are most likely to adapt to changes and accept mobile learning. On the other hand, contrary results were found by Shakeel and Bhatti (2015) in their study in New Zealand, they found out that there was no positive effect between attitude and behavioural intention, however no reasons were mentioned by the researcher for this difference.

Table 5.5: showing the pearson correlation between attitude and behavioral intention

		Attitude	Behavioural Intention (BI)
Attitude	Pearson Correlation	1	
	Sig. (2-tailed)		.000
	N	614	614
Behavioural Intention (BI)	Pearson Correlation	.433**	1
	Sig. (2-tailed)	.000	
	N	614	614

**. Correlation is significant at the 0.01 level (2-tailed).

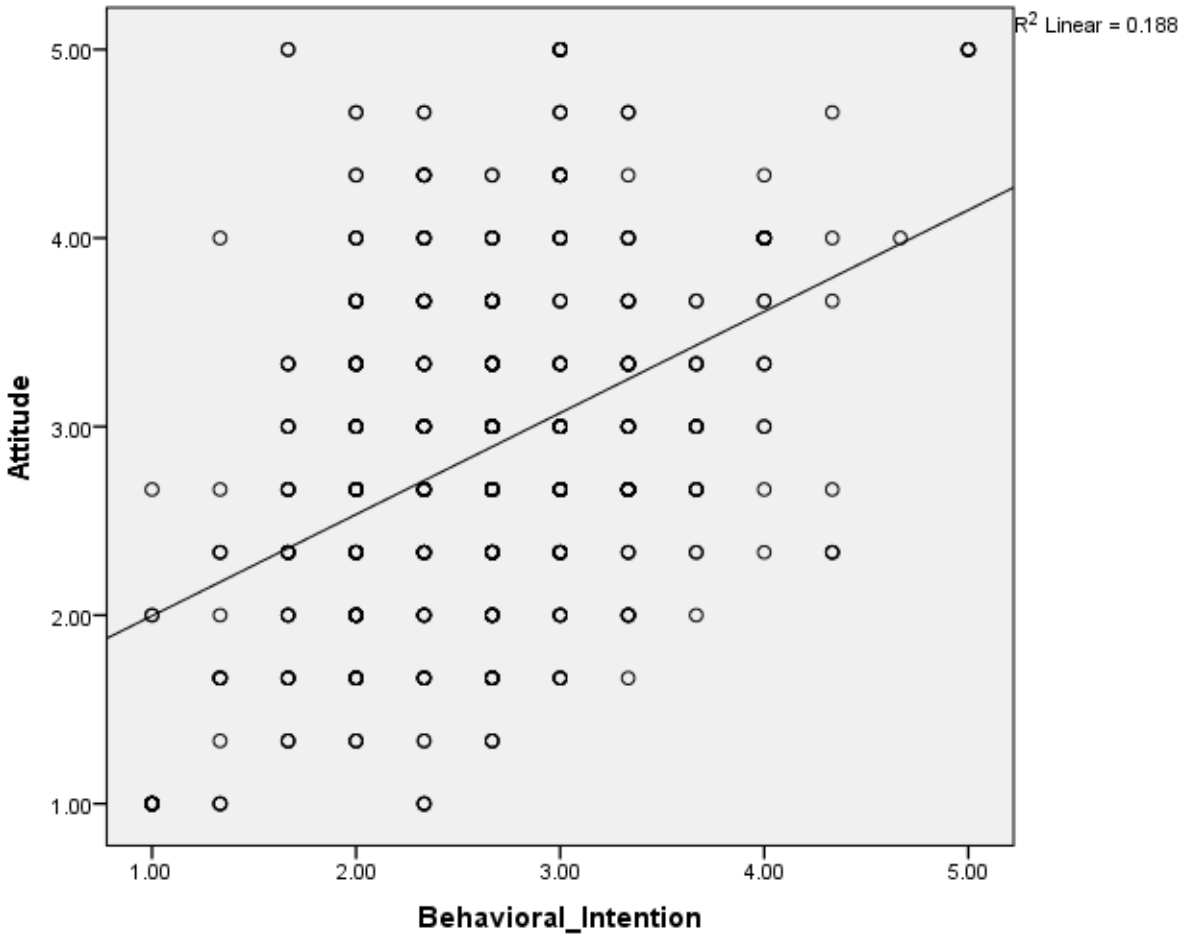

Figure 5.5: Scatter diagram showing the relationship between attitude and BI

5.11 The Relationship between Performance Expectancy (PE) and Behavioral Intention

H11: Performance Expectancy has a positive effect on behavioral intention to use m-learning.

To find out the relationship that exists between the two variables (Performance Expectancy and Behavioural Intention), a Pearson correlation coefficient was computed and findings are shown on Table 5.6 below. From the results, we can clearly see that there was a positive correlation between the aforementioned two variables with r= .299, n= 614 and p= .000. Furthermore, a scatterplot in Figure 5.6 also shows a weak, positive correlation between the two variables forming an uphill linear relationship. This means that when Performance Expectancy increases, Behavioural Intention also increases. Since p< .05 we therefore accept the hypothesis and conclude that there is a statistically significant correlation between the two variables. Similar findings were also found

by Park et al (2011) who found out that there was indeed a strong positive correlation between performance expectancy and behavioural intention. When students perceive that the new system will function as expected and make their work load lighter they are likely to adapt to mobile learning.

Table 5.6: showing the pearson correlation between performance expectancy and BI

		Performance Expectancy (PE)	Behavioural Intention (BI)
Performance Expectancy (PE)	Pearson Correlation	1	.299**
	Sig. (2-tailed)		.000
	N	614	614
Behavioural Intention (BI)	Pearson Correlation	.299**	1
	Sig. (2-tailed)	.000	
	N	614	614

**. Correlation is significant at the 0.01 level (2-tailed).

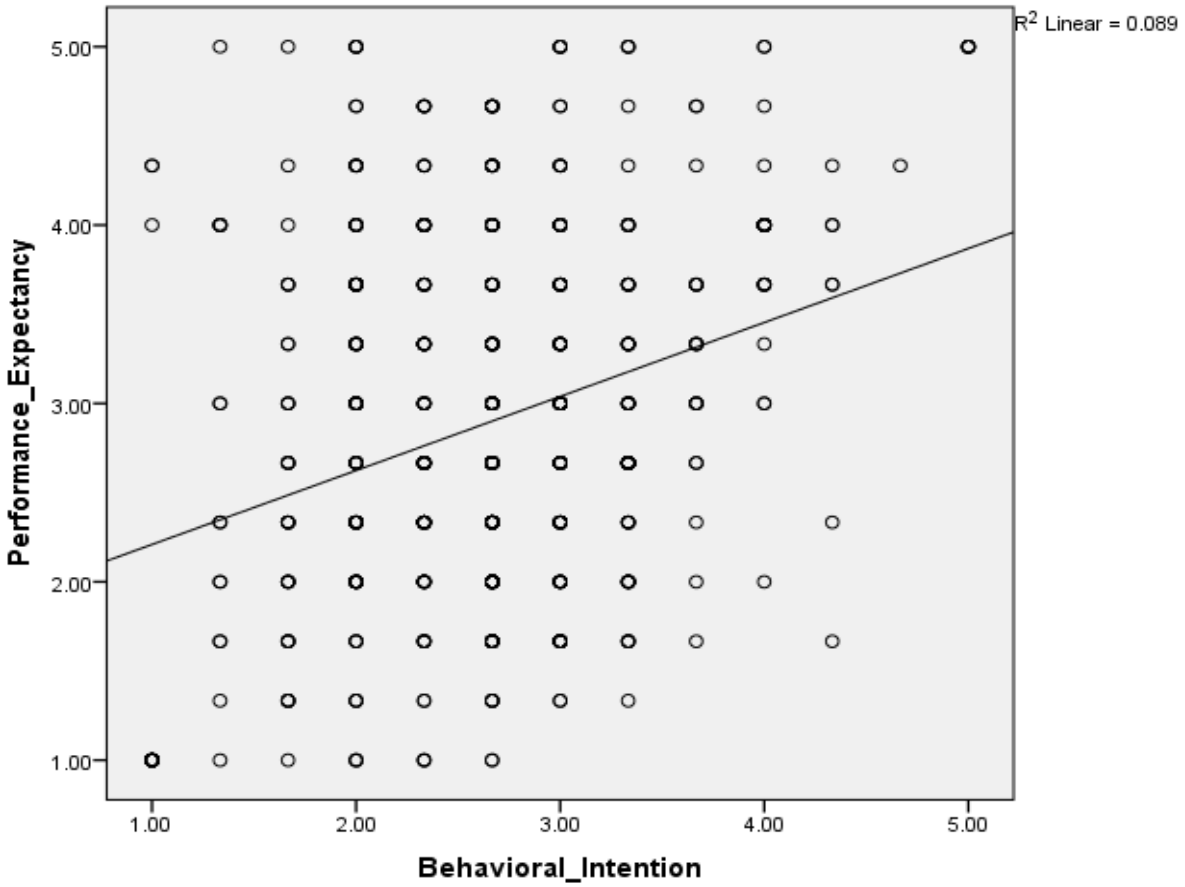

Figure 5.6: scatter diagram showing the relationship between performance expectancy and behavioral intention

5.12 The Relationship between Social Influence (SI) and Behavioral Intention (BI)

H12: Social Influence has a positive effect on behavioral intention to use m-learning.

To find out the relationship that exists between the two variables (Social Influence and Behavioural Intention), a Pearson correlation coefficient was computed and findings are shown on Table 5.7 below. From the results, we can clearly see that there was a positive correlation between the aforementioned two variables with r= .206, n= 614 and p= .000. Furthermore, a scatterplot in Figure 5.7 also shows a weak, positive correlation between the two variables. This means that when Social Influence increases, Behavioural Intention also increases. Since p< .05 we therefore accept the hypothesis and conclude that there is a statistically significant correlation between the two variables. Similar findings were found by many researchers (Liu, 2014; Alharbi & Drew, 2014) who concluded that social influence does have a positive correlation on behavioural

intention. To support their findings, the researchers mentioned that the more you mingle around with people the more your traits and behaviour become the same. In the context of mobile learning, when a student's peers are using mobile learning technology they quickly adapt and are willing to try it out.

Table 5.7: showing the pearson correlation between social influence and behavioral intention

		Social Influence (SI)	Behavioural Intention (BI)
Social Influence (SI)	Pearson Correlation	1	.206**
	Sig. (2-tailed)		.000
	N	614	614
Behavioural Intention (BI)	Pearson Correlation	.206**	1
	Sig. (2-tailed)	.000	
	N	614	614

**. Correlation is significant at the 0.01 level (2-tailed).

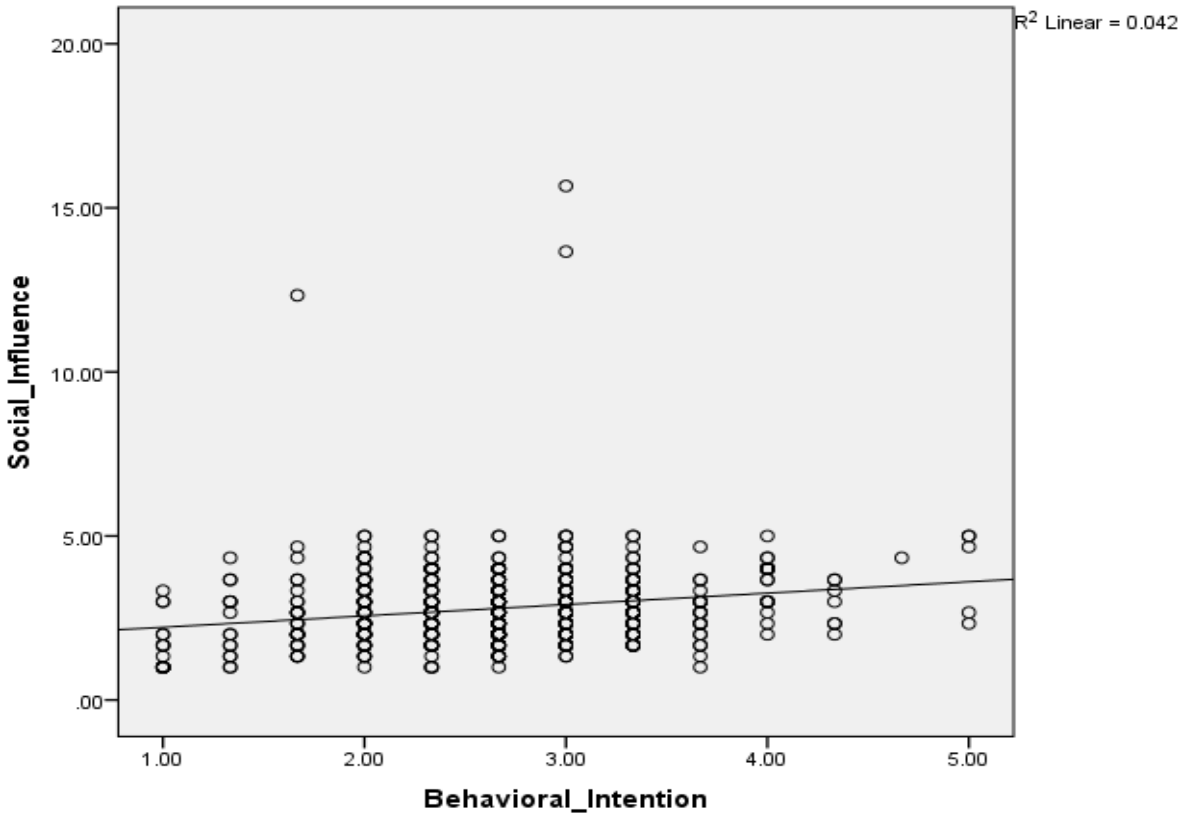

Figure 5.7: Scatter diagram showing the relationship between Social Influence and behavioral intention

5.13 The Relationship between Effort Expectancy (EE) and Behavioral Intention (BI)

H13: Effort Expectancy has a positive effect on behavioral intention to use m-learning.

- To find out the relationship that exists between the two variables (Effort Expectancy and Behavioural Intention), results showed that there was a weak positive correlation between the aforementioned two variables with r= .065, n= 614 and p= .108. Furthermore, there was a weak, positive correlation between the two variables forming a moderate uphill linear relationship. This means that when Effort Expectancy increases, Behavioural Intention also increases. Since p> .05 we therefore reject the hypothesis and conclude that there is no statistically significant correlation between the two variables. However, similar results were found by Mtebe and Raisamo (2014) who found out that Effort Expectancy has no positive correlation with Behavioural Intention. This suggest that even if the system has a certain degree of ease students are reluctant to change. Other factors such as resistance to change play an important role.

5.14 The Relationship between Facilitating Conditions (FC) and Usage Behavior (UB)

H14: Facilitating Condition has a positive effect on behavioral intention to use m-learning.

To find out the relationship that exists between the two variables (Facilitating Conditions and Usage Behaviour results showed that there was a weak positive correlation between the aforementioned two variables with r= .013, n= 614 and p= .743. Furthermore there was a weak, positive correlation between the two variables. This means that when Facilitating Conditions increases, Usage Behaviour also increases. Since p> .05 we therefore reject the hypothesis and conclude that there is no statistically significant correlation between the two variables. Ahmad and Love (2013) also found out similar results in their study in Taiwan on m-learning adoption and concluded that there was no positive correlation between Facilitating Conditions and Usage Behaviour. These results could be attributed to the fact that despite other factors that may support mobile learning that does not have any effect on changing the behaviour of a student towards their view on mobile learning.

5.15 The Relationship between Behavioral Intention (BI) and Usage Behavior (UB)

H15: Behavioral Intention has a positive effect on usage behavior.

To find out the relationship that exists between the two variables (Behavioural Intention and Usage Behaviour), results showed that there was a weak positive correlation between the aforementioned two variables with r= .006, n= 614 and p= .873. Furthermore, results showed a positive correlation between the two variables. This means that when Behavioural Intention increases, Usage Behaviour also increases. Since p> .05 we therefore reject the hypothesis and conclude that there is no statistically significant correlation between the two variables. Similar findings in the literature were found by many researchers, (Bere, 2014; Ghazizadeh, 2012; Mostafa et al., 2016) who also concluded that Behavioural Intention has a positive effect on usage behaviour for m-learning. In addition, Akbar (2013) also found similar results and concluded that Behavioral intention had a significant positive influence on usage across all points of measurement, however the researcher emphasized that differences in the cultural or organizational could contribute to other differences.

5.16 Summary of Findings

In order to fully understand students' acceptance of mobile learning in higher education. A summary of findings is tabulated in Table 5.8 below:

Table 5.8: Summary of findings

Hypothesis	IV	DV	Moderators	Supported	Correlation coefficient (+/- Positive/Negative)	R value
H1	PEU	BI		No	Weak +	0.021
H2	PU	BI		No	Weak +	0.021
H3	PEU	ATT		No	Weak +	0.015
H4	PU	ATT		No	Weak -	0.012
H5	RA	ATT		No	Weak -	0.024
H6	COMP	ATT		Yes	Weak +	0.131
H7	COMPLEX	ATT		Yes	Moderate +	0.532
H8	OBSER	ATT		Yes	Moderate +	0.582
H9	TRIA	ATT		Yes	Moderate +	0.628
H10	ATT	BI		Yes	Moderate +	0.433
H11	PE	BI		Yes	Weak +	0.299
H12	SI	BI		Yes	Weak +	0.206
H13	EE	BI		No	Weak +	0.065
H14	FC	UB		No	Weak +	0.013
H15	BI	UB		No	Weak +	0.006

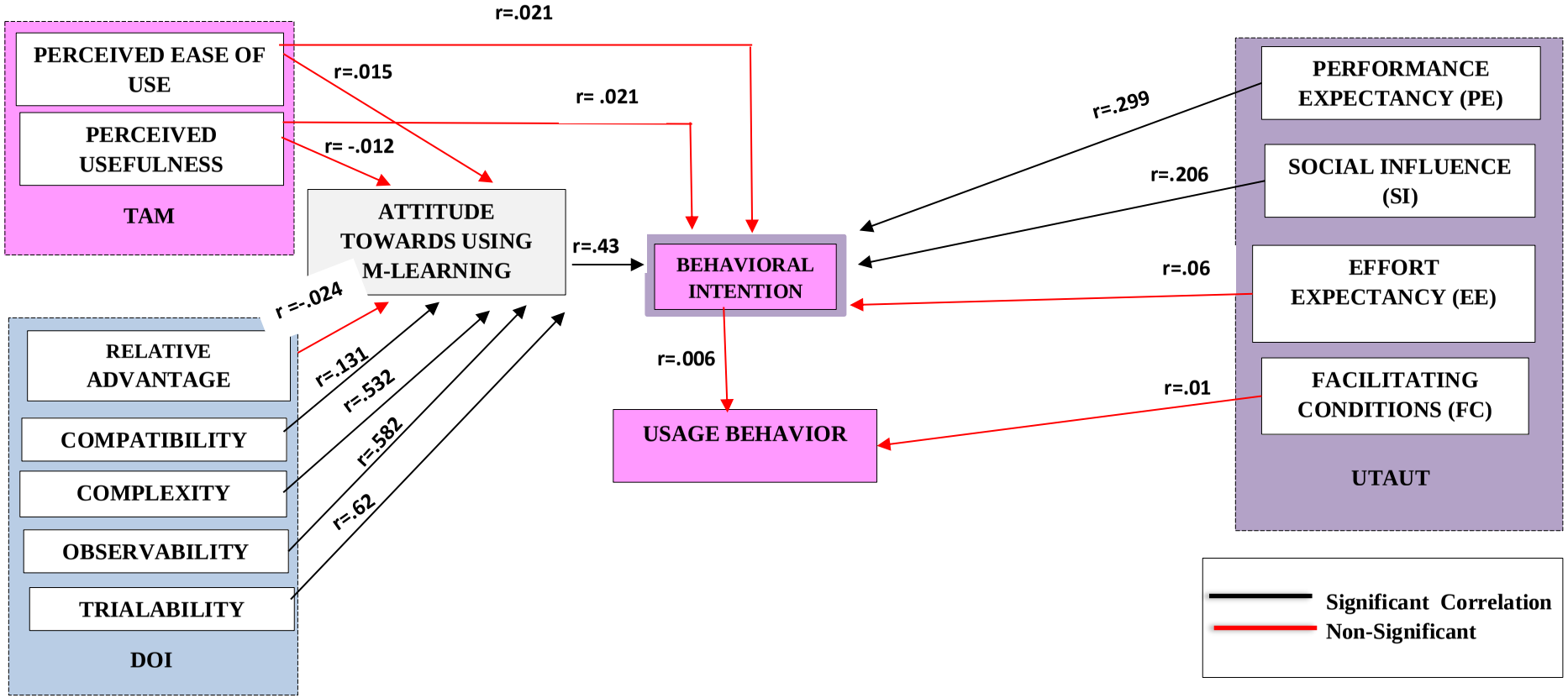

Figure 5.8: Summary of findings and correlations

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

To conclude the study, in this section, the researcher gives an overview of what the study was all about, the findings and proposes some recommendations for further study.

6.1 Conclusion

In this study, the researcher investigated the acceptance of mobile learning technologies among university students at three institutions in North Cyprus. The present study had both practical and theoretical implications. The theoretical side was evidenced by original results obtained from the use of three technology models namely UTAUT, TAM1 and DOI tested in a school environment. Results from these models provide an insight of technology acceptance in a school environment as explained below:

- With reference to the TAM1 model, results have shown that Perceived Ease of Use and Perceived Usefulness do not affect one's intention to use mobile learning, however results showed that attitude towards mobile learning had a significant influence on Intention to use mobile learning technologies for all students. This suggests that attitude towards technology use plays a key role in students' acceptance of mobile learning. If students have a positive attitude towards technology they are most likely to adapt to changes and accept mobile learning.

- Results obtained from the DOI model showed that there was a significant correlation between all dimensions of the model and attitude towards mobile learning with complexity, observability and Trialability with moderate correlations. This suggests that students prefer to have tried the system, observed how it functions and check if it's easy to use before making a decision to use mobile learning technologies. However, results also showed that there was no significant correlation between Relative Advantage and attitude towards using mobile learning. This suggests that in the sight of students, mobile learning technologies

do not appear as superior compared to existing learning systems and by so doing students are not keen on using mobile learning technologies.

- Findings from the UTAUT model showed that Performance Expectancy and Social Influence play an important role in ones decision to use mobile learning technologies. When students feel the system will be better and their peers already use it they are willing to adapt and use mobile learning technologies. However, on the other side results also showed that Effort Expectancy and facilitating conditions do not have any significant correlation with Behavioral Intention and Usage Behavior respectively. This suggest that even if the system has a certain degree of ease students are reluctant to change. It is also important to note that the moderating effects of UTAUT model were not considered in this study

On the practical side, this study allowed the researcher to gain more insight on factors that will encourage students to use mobile learning which are explained below:

- From the findings and observations made during conducting the study, students are willing and ready to use mobile learning, however, lack of knowledge on the benefits of using mobile learning still exists among a few students. However, this can easily be resolved by including training programs the universities to help students learn more about the benefits of mobile learning.

- The researcher also observed that there is an increase in the number of mobile devices among university students. Approximately based on the observation, 95% of University students had mobile phones which suggest that mobile-learning has a good potential and is most likely to be accepted.

6.2 Recommendations

The researcher did not fully exhaust the subject under study as a result of the limitations discussed in chapter 1. In order to fully understand the subject and enrich the literature database on mobile learning, it is important for the following recommendations to be taken into account for future research:

- Further research is recommended targeting a large sample size. One of the limitations of this study was that, the research only focused at a few universities in North Cyprus. Further research is recommended over a wider geographical coverage.

- Awareness programs should be implemented at universities where students are taught on the advantages of using mobile technology for their studies. This could be through organizing seminars or workshops. In addition, computer lessons should be mandatory for all degrees as these form the basis for mobile learning.

- Efforts should be made at the institutional level to embrace technology. Educational institutions should see technology as a lifetime investment that simplify tasks. When the institution embraces technology and value its importance, students' are likely to adopt to mobile learning.

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APPENDIX 1

INVESTIGATING UNIVERSITY STUDENTS ACCEPTANCE OF M-LEARNING UNIVERSITIES

Investigating University Students' acceptance of m-learning in North Cyprus universities questionnaire

This questionnaire is designed in order to understand students' acceptance of mobile learning in higher education. Responses are anonymous and participation in this survey is voluntary.
All information collected will be used for academic purposes only. Carefully read the questions and choose the most applicable response.
You are required to answer all questions.
Your participation is greatly appreciated.

Contact: Ibtsam Mohamed Balout (iibtisam7872@gmail.com)
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Definition of m-learning: This refers to the acquisition of skills and knowledge that takes place using wireless mobile devices such as smartphones and tables allowing learners to access information anywhere, anytime as long as there is internet connection (Liu, 2014).

Section I: Demographic information of participant

1. **Gender:**

   ○ Male ○ Female

2. **In what age group are you?**

   ○ 17-22 ○ 23-27 ○ 28 and above

3. **Level of Study**

   ○ Undergraduate ○ Master Student ○ PhD student

4. Department Type :

◯ STEM (Science, Technology, Engineering, Mathematics) ◯ Other

5. How long have you been using mobile learning:

◯ Less than 6 months ◯ More than 6 months ◯ I have never used m-learning

Section II: Perceived Ease of Use	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Learning through a mobile device saves time					
2. Learning through a mobile device is more convenient for me					
3. I believe it is easy for me to remember how to perform tasks using a smartphone/ tablet					
Section III: Perceived Usefulness	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
4. Learning through mobile phones is not restricted by time and place					
5. Learning through mobile phones can help me gain quick access the information I need					
6. My learning process becomes more effective through the use of m-learning.					
Section IV: Usage Behavior	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
7. I often access the internet using a handheld mobile device.					
8. Lecturers have been of help in enabling me to use mobile learning.					
9. I am willing to use mobile learning in my studies					
Section V: Relative Advantage Basing on my experience with tablets and smartphones, I think that…	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
10. The overall quality of my school work is improved by using smartphones and/or a tablet					
11. I can access my lecturer easily by using a smartphone and/or a tablet					
12. There are more benefits of using a smartphone/tablet than disadvantages					

Section VI: Compatibility Basing on my experience with tablets and smartphones, I think that…	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
13. My learning style is supported by the usage of smartphones and/or tablets					
14. I have confidence when using my smartphone and/or tablet					
15. I am not worried by the possibility of being seen as a non-expect when it comes to using smartphones					
Section VII: Complexity Basing on my experience with tablets and smartphones, I think that…	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
16. I find it easy to learn how to use a smartphone/tablet					
17. I find it easy to handle my schoolwork with smartphones/tablets					
18. I find the challenges that come with learning how to use a new smartphone exciting					
Section VIII: Observability Basing on my observations, I think…	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
19. Most of my classmates use smartphones /tablets					
20. I have seen smartphones/tablets being used in learning					
21. The results of using tablets/smartphones are so obvious and visible					
Section IX: Trialability	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
22. I am always the first one to try a new technology amongst my friends					
23. I am willing to receive assignments and classwork through my mobile phone.					
24. I was able to try using mobile learning with one of my courses before I make a decision to use mobile learning for all my courses.					

Section X : Attitude towards using m-learning	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
25. I believe mobile technology is a useful tool for my study.					
26. I can easily manage my study by using mobile Apps.					
27. Mobile technology help me in exchanging lecture notes with my friends					
Section XI: Behavioral Intention	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
28. I plan on using m-learning services for my studies					
29. I predict I will use m-learning services in the future					
30. I will recommend m-learning services to others					
Section XII: Performance Expectancy	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
31. I believe m-learning is useful for my studies					
32. Using mobile learning allows me to access more information about my courses					
33. Mobile devices can assist me in receiving school work from my lecturers and submitting assignments					
Section XIII: Social Influence	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
34. I think I will use mobile technology since my friends use it.					
35. My friends who are currently using m-learning applications find them helpful and this encourages me to use it too.					
36. I believe lecturers and staff members will be helpful in motivating me to use mobile learning					

Section XIV: Facilitating Conditions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
37. My decision to use m-learning will depend on the mobile device I will have at that time					
38. I will only accept m-learning if the service provider is willing to provide quality service					
39. I have resources that are necessary for me to use m-learning					
Section XV: Effort Expectancy	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
40. I find m-learning easy to use					
41. I believe it would be so easy for me to become skilful at using m-learning services					
42. Operating mobile learning services is going to be easy for me					
Section XVI: Voluntariness of use	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
43. Even though it may be helpful to use mobile learning, it is not compulsory for my classes.					
44. My lecturers do not require me to use m-learning.					
45. My usage of m-learning is voluntary					
Section XVII: Experience	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
46. I need to gain some experience first before deciding to use mobile learning.					
47. Experience is key when deciding to use mobile learning.					
48. My lecturers think it is important to learn how to use mobile technology first before adapting to mobile learning.					

Thank you for your participation

APPENDIX 2

ETHICAL APPROVAL LETTER

YAKIN DOĞU ÜNİVERSİTESİ

BİLİMSEL ARAŞTIRMALAR ETİK KURULU

12.05.2017

Dear Ibtisam Mohamed Balout,

Your application titled "**Investigating Students Acceptance of Mobile Learning in North Cyprus Universities: Contributions of Utaut, Tam and Doi Theory Models"** with the application number YDÜ/FB/2017/2 has been evaluated by the Scientific Research Ethics Committee and granted approval. You can start your research on the condition that you will abide by the information provided in your application form.

Assist. Prof. Dr. Direnç Kanol

Rapporteur of the Scientific Research Ethics Committee

Direnc Kanol

Note: If you need to provide an official letter to an institution with the signature of the Head of NEU Scientific Research Ethics Committee, please apply to the secretariat of the ethics committee by showing this document.

APPENDIX 3

SIMILARITY REPORT

Submit File

Edit assignment settings | Email non-submitters

	AUTHOR	TITLE	SIMILARITY	FILE	PAPER ID	DATE
☐	Ibtsam Balout	Abstract	14%		896471395	15-Dec-2017
☐	Ibtsam Balout	Chapter1	19%		896471397	15-Dec-2017
☐	Ibtsam Balout	Chapter2	7%		896471400	15-Dec-2017
☐	Ibtsam Balout	Chapter3	9%		896471401	15-Dec-2017
☐	Ibtsam Balout	Chapter4	7%		896471408	15-Dec-2017
☐	Ibtsam Balout	Chapter5	21%		896471409	15-Dec-2017
☐	Ibtsam Balout	Chapter6	1%		896471411	15-Dec-2017
☐	Ibtsam Balout	MS thesis	20%		896471413	15-Dec-2017

ÖZET

Geçtiğimiz 10 yılda; mobil ticaret, mobil öğrenme, mobil bankacılık gibi farklı alanlarda mobil teknolojileri kullanımı ile ilgili yapılan çalışmalar artmıştır. Böyle internet üzerinden akıllı telefonlar ve tabletler gibi mobil cihazların kullanımı ile çeşitli bilgi ve beceri edinimi mobil öğrenme olarak bilinir. Çalışma, Kuzey Kıbrıs'ta mobil öğrenmenin benimsenmesini anlamaya çalışiyor.

Araştırmaya üç araştırma modeli uygulanmış ve üç üniversitedeki 614 öğrenciye bir anket gönderilmiştir. Elde edilen bulgular, TAM1 modelindeki yapılar arasında mobil öğrenme ve davranışsal niyetle ilgili tutum dışında hiçbir önemli ilişki olmadığını göstermiştir. Ayrıca, tutum ile anlamlı korelasyon bulunmayan göreli avantaj dışında DOI modelinin tüm yapıları arasında anlamlı bir korelasyon vardı. Buna ek olarak, UTAUT modeli için Davranış Niyetine karşı önemli bir korelasyona sahip olan aşağıdaki (Performans Beklentisi ve Sosyal Etki) haricinde tüm yapılar arasında anlamlı bir pozitif korelasyon bulunmamaktadır. Bu çalışmada UTAUT modelinin moderatör etkileri dikkate alınmamıştır.

Çalışma, mobil öğrenmenin mevcut durumunu ve buna ilişkin umutları ve zorlukları ortaya koymak açısından önemlidir. Bu çalışmanın, eğitim kurumları, politika yapıcılar, öğrenciler ve teknolojinin benimsenmesi ile ilgilenen diğer araştırmacılar için yararlı olduğuna inanılıyor.

Anahtar Kelimeler: DOI; Yüksek öğretim; Mobil öğrenme; Kuzey Kıbrıs; TAM1; UTAUT