UNIVERSITI PUTRA MALAYSIA

ENHANCEMENT OF MOBILE-BASED TEACHING ASSESSMENT USING MOBILITY MEDIATION TO FACILITATE SELF-DETERMINATION THEORY AND TECHNOLOGY ACCEPTANCE MODEL

ABDULLAHI AHMED ABDIRAHMAN

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2018

"I hereby declare that I have read this dissertation and in my opinion this dissertation is sufficient in terms of scope and quality for the award of the degree of Master of Computer Science (Software Engineering)"

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ABDULLAHI AHMED ABDIRAHMAN

A dissertation submitted in partial fulfilment of the requirements for the award of the degree of Master of Computer Science (Software Engineering)

Faculty of Computer Science and Information Technology

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DECLARATION

I Declare That This Dissertation Entitled of "Enhancement of Mobile-Based Teaching Assessment Using Mobility Mediation to Facilitate Self-Determination Theory and Technology Acceptance Model" is the result of my own research except as cited in the references. The dissertation has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature: ....

Name: **ABDULLAHI AHMED ABDIRAHMAN**

Date: December 12, 2017

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DEDICATION

I dedicate this dissertation to my respected and beloved Mother (**FADUMO ALI MOHAMUD**), thank you for the moral and support you've given me throughout my academic life. I also dedicate this work to my brother **MOHAMUD AHMED**, who has encouraged me all the way and his encouragement has made sure that I give it all it takes to finish that which I have started. Thank you. My mother and my brother for you all can never be quantified. May Allah bless you, I thank to Allah for nurturing me spiritually and guiding me throughout this life

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ABSTRACT

The rapid growth of technology has ushered new applications which replace traditional methods. These include e-learning, e-health, etc. Mobile-Based Teaching Assessment (MBTA) has thus emerged as an alternative method for teaching assessment. The adoption of MBTA is driving by user's acceptance to apply teaching assessment through technology. However, the objective of this research is to develop a model which explores the impact of mobility mediation to facilitate the theories of Self-Determination Theory and Technology Acceptance Model in the context of Mobile-Based Teaching Assessment. The study uses Partial Least Squares (PLS). The data were collected among members of the Universiti Putra Malaysia from One-hundred and forty students, lecturers and academic support using convenient sampling method. The results show that Perceived Mobility has a significant positive impact on the intention to use MBTA. The result suggested that 87% of the variation of user's intention to use MBTA is explained by the mobility mediation, while the evidence proved that TAM and SDT had pronounced the adoption of mobile-based teaching assessment (MBTA) in context of the academic arena. These findings highlight the significance of the proposed model.

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LIST OF ACRONYMS

TAM : Technology Acceptance Model

SDT : Self-Determination Theory of Motivation

TES : Teaching Evaluation System

MBTA : Mobile-Based Teaching Assessment

PU : Perceived Usefulness

PEoU : Perceived Ease of Use

ATU : Attitudes Towards Usage

HTML : Hyper Text Mark-up Language

SQL : Standard Query Language

MBT : Mobile-Based Testing

BIU : Behavior Intention to Use

ICT : Information and Communication Technology

PM : Perceived Mobility

PA : Perceived Autonomy

PCOM : Perceived Competence

PREL : Perceived Relatedness

UV : Ubiquity Value

PF : Perceived Feedback

MSE : Mobile Self-Efficacy

PI : Perceived Interactivity

PCOL : Perceived Collaboration

AVE : Average Variance Extracted

HTMT : Heterotrait-Monotrait Ratio

CHAPTER 1

1. INTRODUCTION

The use of mobile devices has become more present in our daily life like culture and education. These devices have accomplished historical access to communication and information. As the report of "Ericsson Mobility Report of 2016" presented that the aggregate number of mobile subscriptions at the end of 2015 was around 7.3 billion, an expansion of 68 million memberships during 2015. Along these lines, Smartphone's represented around 75 percent amid 2014 and eighty percent of mobile phone subscriptions were related with Smartphone's in 2015OBILE (2016). In addition, some higher education institutions are considering to embrace Smartphone's as part of learning aids due to many reasons like, convenience, portability, comprehensive learning experiences, and environmental friendly(Anshari, Almunawar, Shahrill, Wicaksono, & Huda, 2017).

Mobile-based Teaching Assessment is a complementary or alternative to paper or Web-based assessment delivery mode. Its successful implementation depends on user's acceptance. While previous research provides evidence on acceptance of mobile learning, computer-based assessment and Mobile-based Assessment, but there is a need on focusing explicitly on the acceptance of Mobile-based Teaching Assessment. This study investigates the significance of Perceived Mobility on the study that have been integrated the theories of Self-Determination Theory (SDT) of Motivation and the Technology Acceptance Model (TAM) (S. A. Nikou & Economides, 2017).

On the other hand, Web-bassed Teaching Evaluation System (TES) presented issues of low reponse rates, burden and time consuming during the filling web-forms, whereas the feedback of the students are important to the enhancement of teaching quality. Though, higher education management is to have effective Teaching Evaluation System (TES) in order to ensure the best possible quality education provided to students (Kuzmanovic, Savic, Popovic, & Martic, 2013).

At present, many colleges and universities are using Web-based teaching evaluation as main evaluation mechanism in teaching management (Gu & Zheng, 2016) to eliminate the drawbacks of paper based evaluation (Al-Khatib, 2014; El Rahman, 2015; Muyanja, Musasizi, Tibatemwa, & Muwanga, 2012). However, technology pressure has large effects on global trend towards increasing number of users connected to the network via mobile devices, since these devices have various properties like easy to access, flexibility and continually improving, which allows us to believe that there are many new possibilities for users to benefit from, and one of these is the educational area. Mobile devices are also useful tools that are easily portable and accesible to everywhere, this could be perfect for any student during the learning process (Navarro, Molina, Redondo, & Juárez-Ramírez, 2016).

Moreover, Mobile-based Teaching Assessment (MBTA) is the evaluation taken by using mobile devices. The application development of mobile devices in education provides numerous benefits: it facilitates personalized learning and assessment, supports situated and context-aware learning, supports different assessment practices (classroom polling, formative and summative assessment, peer-assessment, authentic assessment, competence-based) enhances seamless learning, bridges formal and informal learning

and assessment, and improves communication and collaboration among members of the learning communities(S. Nikou & Economides, 2013).Therefore, mobile devices can perform the assessment and may become a complementary to paper or computer-based testing (Johnson, Adams Becker, S., M., & Freeman, 2016). The existing literature explored the usage of Mobile Based Assessment, includeing clicker and mobile device in the classroom polling(Stowell, 2015). Therefore, many studies exist that explore acceptance of maobile learning (Y. Liu, Han, & Li, 2010; S. Y. Park, Nam, & Cha, 2012). There is a gap in the literature about the acceptance of Mobile-based Teaching Assessment. Furthermore, the Mobile Based Assessment is expected to supersede over Web-based Assessment due to technology.

The rapid growth of smart phones had made mobile learning into a new way of learning and teaching, causing the majority of scholars to research. Mobile learning has broad application prospects(Zheng, Cheng, & Peng, 2015). However, the vast majority of domestic teaching evaluation systems are designed for traditional PC and do not support the use of mobile terminals. Obviously it seems to ignore students' convenience to use the system at anytime and anywhere. Nevertheless, there is a need to use the mobile devices in teaching evaluation for enhancing response rate as showing the survey conducted 2010 for reviewing the student evaluation of teaching which presented issues mentioned above (Tulloch et al., 2015). Thus, this study suggests mobility model which extends the model of(S. A. Nikou & Economides, 2017) based on Self-Determination Theory and Technology Acceptance Model in the context of Mobile-Based Teaching

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Assessment. Therefore, the study is a step forward towards the understanding of the factors driving Mobile-Based Teaching Assessment.

The study examines the impact of perceived mobility on the extension for the model of Mobile-Based Assessment – Motivational and Technology Acceptance in the context of Mobile-Based Teaching Assessment (MBTA) in order to improve the service of teaching assessment.

1.1   PROBLEM STATEMENTS

Current Web-based teaching assessment are the standard method for course evaluation although the service of this method have been criticized to more time filling the forms of the evaluation(Stowell, Addison, & Smith, 2012), lower response rate(Al-Khatib, 2014; Crews & Curtis, 2011; El Rahman, 2015),and requiring easy, secure and anonymised device access (Creswell, 2011; Stowell et al., 2012). Hence there is a need for alternative method that is simple to resolve these obstacles in such environment that involve flexible, and easy –to-use teaching assessment.

The technology change has an impact of the web application and the past few years mobiles have remarkable rise in the world(Zakas, 2013). The utilization of the mobile has became more popular in learning environments since some of lecturers have adopted to do evaluation inside the class, Therefore, an evaluation was made for comparing the use of mobile devices and Web based for testing assessment, In fact the experiments have shown that students were highly motivated and enjoyed using mobile application for testing (Romero, Ventura, & De Bra, 2009).

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In addition, previous studies showed us that, there is a lack of Mobile-Based Teaching Assessment in the domain of mobile application for higher education institutions. Indeed, there are studies that already discussed the acceptance of the mobile learning (Y. Liu et al., 2010; S. Y. Park et al., 2012). And the acceptance of the Mobile-based Assessment (S. A. Nikou & Economides, 2015). Furthermore, the study of S. A. Nikou and Economides (2017) has companied the theory of Self-Determination of Motivation and Technology Acceptance Model by developing a model of Mobile-Based Assessment-Motivational and Acceptance Model. While the study S. A. Nikou and Economides (2015) revealed the impact of Mobility factor on the Technology Acceptance Model. However, the current study is the extension of the model of Mobile-Based Assessment-Motivational Technology Acceptance with extending Mobility factor due to the essential features that affect the quality of using mobile devices and makes it possible to extend their service into the assessment activities. The study is based on Self-Determination Theory (SDT) of Motivation and the Technology Acceptance Model (TAM) for the purpose of analyzing effects of the mobility on the model in the context of Mobile-Based Teaching Assessment (MBTA).

Following from these studies, our understanding of the use of Mobile devices in learning environment not only in teaching, but also in more applicable in teaching assessment therefore, it is the time of applying mobile application in the domain of the teaching assessment.

1.2   RESEARCH QUESTIONS

Regarding to the current challenges of Web-based teaching assessment and the growth of mobile technology which has received remarkable effect on learning environment, plus the impact of the mobility on Technology Acceptance Model, we suggest another alternative method for improving the service of teaching assessment by proposing a model of Mobile-Based Teaching which extends the model of (S. A. Nikou & Economides, 2017) by adding Mobility factor. For accomplishing the study, the research must replay the following questions:

1. What are the limitations of the current Web-based teaching assessment services?

2. How does the mobility factor affect the Mobile-Based Assessment-Motivational and Acceptance Model to enhance the services of teaching assessment?

3. To what extent does the mobility factor enhance the adoption of Mobile-Based Teaching Assessment (MBTA)?

1.3   RESEARCH OBJECTIVE

Mobile devices have become the essential part of our daily life. The growth of technology particularly mobile devices have a significantly involve in the domain of education. So that, the mobile application development systems are booming and their services are increasing in the domain of the education. Further, the existence of the mobile-based learning and assessment encourages toward applying the mobile based assessment on the other domains like teaching assessment. Therefore, our main objective of the study is to propose a model of Mobile-Based Teaching Assessment by deriving

from the model of Mobile-Based Assessment –Motivational and Acceptance Model (S. A. Nikou & Economides, 2017) with extending Mobility factor, and also to investigate the significance effect of the mobility factor on that model in the context of Mobile-Based Teaching Assessment (MBTA) for enhancing the service of teaching assessment in higher education institutions.

1.4   SIGNIFICANCE OF THE RESEARCH

Controlling and enhancing the quality of the education are the vital role of higher education institutions management. Thus, it is crucial to the institutions to have advanced methodology which facilitates the evaluation of the services of the institutions particularly the extent of the teaching standard. So, Mobile-based Assessment is increasingly used in different educational settings. Mobile devices have the potential to facilitate the process of delivering learning and assessment material "anywhere" and "in any anytime", maximizing the benefits for students, teachers and administrators (S. A. Nikou & Economides, 2014b). Since the Mobile-based assessment has already applied and the mobility factor has the effect on the technology acceptance model as mentioned.

Therefore, this research serves to suggest Mobile-Based Teaching Assessment Model with Mobility constructor to enhance the teaching assessment service since the pervious study indicates that Users, who perceive the value of mobility, appreciate the ubiquity of mobile learning and have a strong perception of its usefulness toward mobile services(J.-H. Huang, Lin, & Chuang, 2007; E. Park & Joon Kim, 2013).

1.5 MOTIVATION OF THE STUDY

Teaching assessment is the one of keys that measures the performance appraisal for the lecturers and it is where the management knows the level of the teaching quality. Consequently, the ignorance of the students to fill the forms in the Web-based teaching assessment for the sake of busyness which resulted to the low feedback rate issue, plus the pressure of the technology changes in the environment have inspired toward the system into Mobile based application approach which makes the student more convenient than the previous method. Since the people especially students uses smart mobile devices than computers growths significantly, clients are getting familiar to having both web and computing access by small mobile devices (Islam, Islam, & Mazumder, 2010).

Acceptance and usage of new technologies have been studied extensively. One major model in the field of IT acceptance is the Technology Acceptance Model (TAM). TAM uses Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Attitudes Towards Usage (ATU) to explain and predict system adoption. Perceived Usefulness is defined as the degree to which a person believes that using a particular system will enhance his/her job performance and Perceived Ease of Use is defined as the degree to which a person believes that using the system would be free of effort(Davis, 1989). In addition S. A. Nikou and Economides (2015) has extended Technology Acceptance Model with the variables of Perceived Mobility and Satisfaction.

Perceived Mobility is the distinguished advantage of mobile learning over traditional forms of education. Mobile learners can access learning resources "anytime" and "anyplace" without any temporal and spatial limitations. Moreover, the inspiration of the user's to use mobile device is the theory of Self-Determination has engage a set of psychological needs must be satisfied in order to enhance intrinsic motivation. These needs are autonomy, competence and relatedness. Autonomy refers to the desire to self-initiate and self-regulate own behavior. Relatedness refers to the desire to feel connected to others. Competence refers to the desire to feel effective in attaining valued outcomes(Ryan & Deci, 2000b). Based on that theories, mobile technologies can facilitate learning "anytime and anyplace", offering a continuous learning experience that is personal, situated and contextual (Traxler, 2007). All educational processes, including assessment, can be facilitated even revitalized through mobile technologies. Different assessment practices can be implemented with the use of mobile devices: adaptive, dynamic, location-aware, context aware, collaborative, self- and peer-assessment even mobile game-based assessment(S. A. Nikou & Economides, 2014b).

While many studies have discussed the relations between Self-Determination Theory of Motivation and Technology Acceptance Model in the context of mobile based assessment in various studies (S. A. Nikou & Economides, 2014a, 2014b, 2017), there is still a gap in the literature about the acceptance of Mobile-Based Assessment. Therefore, this study intends to develop Mobile-Based Teaching Assessment Model, In order to investigate the impact of Mobility factor on the Mobile-Based Teaching Assessment Model.

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