MALAYSIAN STUDENTS USE OF UBIQUITOUS TECHNOLOGY (MY-UTECH): MODEL ON THE USE OF UBIQUITOUS TECHNOLOGY AMONG STUDENTS IN MALAYSIAN HIGHER LEARNING INSTITUTIONS.

Muliati Sedek[a*], Rosnaini Mahmud[b], Habibah Ab. Jalil[b] and Shaffe Mohd Daud[b]
[a]Universiti Teknikal Malaysia Melaka,
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, MALAYSIA
[b]Universiti Putra Malaysia, 43400 Serdang
Selangor Darul Ehsan, MALAYSIA
*E-mail: muliati@utem.edu.my

ABSTRACT: *Ubiquitous technologies or known as U-Tech such as laptops, smartphones and tablets have been widely used by many students in the institution of higher learning. This study was based on a quantitative research in which the Structural Equation Modelling was employed. In this paper, using data from four universities with three points of measurement, a new model, called the Malaysian Students Use of Ubiquitous Technology (My-UTech), was formulated, with five influencing factors, as well as one mediator and moderator of key relationships. All the five factors were found to be significant in influencing the use of u-tech. Thus, 63% of the variance in the usage of u-tech among students was described by all five factors in this model. This model thus provides a useful tool in assessing the likelihood of success for new technology introductions and helps to understand the factors of targeted users in using new technology such as u-tech.*

Keywords: Structural Equation Modelling; Ubiquitous Technology Usage; Engineering Students, Malaysian Higher Learning Institutions

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1.0 INTRODUCTION

1.1 Ubiquitous Technology (U-Tech)

In this 21st century and followed with the fast paced development of technology, students thrived more on mobility, where they expect to take their technology everywhere they go, and immediate gratification, where they aim to get feedback straight away [1]. These needs have led to the introduction of u-tech in education. Today, the most popular u-tech that have been used by many including students are laptops [2, 3], smartphones [4] and tablet computers or tablets [5, 6]. In the context of this study, the focused ubiquitous technologies were laptops, smartphones and tablets, as these three technologies were identified to be mostly used among students in Malaysia.

U-tech is a multipurpose and refined mobile communication which can be used to make call, browse the Internet to find information or check e-mail, find location using a Global Positioning System (GPS), and take pictures and record video [7]. These features make life of students easier, as there is surerity that they get everything they need in one technology [8]. U-tech is viewed as a versatile device, combining the mobility and connectivity of many elements such as powerful processors which enable users to organize a number of computing tasks simultaneously [9]. U-tech is lightweight and portable, therefore users can take the technology anywhere they like [10] and interactive due to the colourful interface, speed, response as well as it immediate feedback [11].

2.0 FACTORS INFLUENCING UBIQUITOUS TECHNOLOGY USAGE

The determined factors include only technology competency, performance expectancy, effort expectancy, behavioural intention, facilitating conditions and social status. Technology competency is the ability of being able to handle a wide range of computer applications for various purposes which can be achieved through the process of learning, acquisition of knowledge and development of skills in using technology [12]. Performance expectancy refers to the degree to which learners believe that using the technology will help them to achieve gains in learning [13]. Research in the Malaysian context showed that the usage of educational computer games (ECG) using laptops were regarded as the useful and promising tool due to its fun and engagement features [14]. Effort expectancy is a perception which a person believes that using a technology is free of physical and mental attempt [15]. Next is social status, which known as the degree to which an individual perceives the importance of others believe he or she should use the technology [16]. Facilitating conditions refers to as the degree to which an individual believes that an organizational and technical infrastructure exists to support the usage of the u-tech as a learning tool [17]. Behavioural intention was identified as a mediating factor that influences all the factors to technology usage.

3. 0 STATEMENT OF PROBLEM

Studies in identifying the factors that contribute towards technology usage among students in Malaysia were conducted by many researchers [18, 13, 19, 20]. Findings showed that the technology usage were mostly being influenced by perceived ease of use, usefulness, motivation and environment. Although a lot of studies have been conducted in the recent years on the usage of technology for learning in Malaysia, little is known about the factors that contribute towards the usage of u-tech as not many comprehensive studies have been done related to it. A review of related literature also demonstrates that factors

such as technology competency, performance expectancy, effort expectancy, behavioural intention, facilitating conditions and social status influence technology uptake the usage. Thus, the focus of this study was to examine and confirm either the determined factors contribute towards the u-tech usage among Malaysian students.

4.0 OBJECTIVES OF THE STUDY

The specific objective of this study was to:

i) develop a model on the factors influencing the use of u-tech among students in Malaysian higher learning institutions.

5. 0 METHODOLOGY

The type of research that was carried out in this study was a survey research and the accessible population were included the selected students from four universities. For sampling purpose, the proportional stratified sampling was used. The questionnaire was divided into four sections. Section A, collected the student's demographic information, Section B was on technology usage, Section C was on the technology competency and Section D was on factors that influence the technology usage. A total of 493 questionnaires were distributed and 420 responses were returned. Prior to data analysis, the questionnaires were carefully screened by checking for missing data. 20 responses were found to contain errors and incomplete values, therefore, the 400 responses were used as the actual data for this study. From the reliability test conducted, the range of the instruments' reliability was between 0.819 and 0.901. Overall the reliability of the instrument was good.

5.1 Structural Equation Modeling (SEM)

SEM is an extension of various multivariate methods encompasses a Confirmatory Factor Analysis (CFA), measurement model and structural model [21]. There are three characteristics that distinguish SEM from the other analyses. The first characteristic is the ability to estimate the multiple and interrelated dependence influences simultaneously [21]. The second feature of SEM is its ability to include items into the analysis. By including the items in the analysis, researcher will be able to define the individual constructs and test for convergent validity and construct reliability simultaneously. The last characteristic of SEM is its potential to define a model [22].

5.2 Data Preparation in Structural Equation Modelling

5.2.1 Confirmatory Factor Analysis (CFA)

The CFA was meant to define the individual constructs and was employed for three major purposes, namely to test for; 1) model fit, 2) convergent validity and 3) construct reliability [22, 23]. For the test for model fit, the researcher was looking at two criteria; the fit indices and the individual factor loadings of each item in a construct. Researcher decided to refer to these set of criteria for fit indices and their recommended value.

Fit Indices	Recommended value
CMIN/DF	< 5.0
Relative x^2	< 5.0
CFI	> .90
RMSEA	< .80
Factor loadings	> .5
	Positive
	< 1.0

5.2.2 Measurement Model Test

The analysis of measurement model was also conducted and prior to this analysis, test for normality and for outliers were conducted. The analysis of measurement model strived to test for model fit and discriminant validity. For model fit, researcher was looking at two criteria; the fit indices and the individual factor loadings of each item in a construct. The researcher decided to refer to these set of criteria for fit indices that been used as same as in the CFA step.

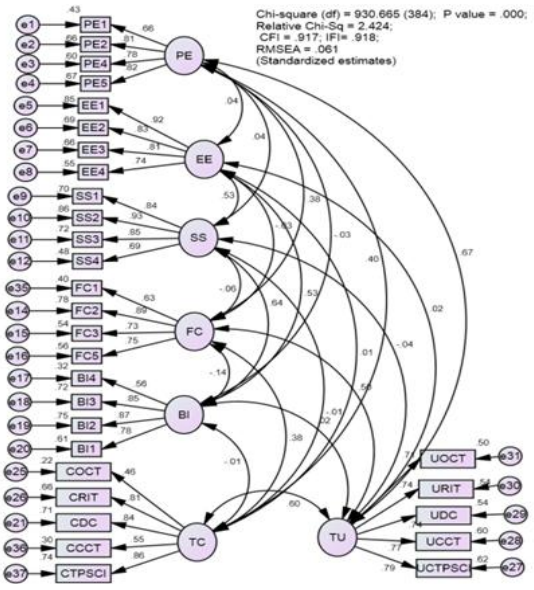
5.2.2.1 Test for model fit

The complete measurement model for this study with its seven constructs and it fits well according to the criteria set. The input covariance matrix was generated from 35 indicators measured in the measurement model and it contains 465 sample moments. There were 60 regression weights, 21 covariances, 37 variances and a total of 81 distinct parameters to be estimated. Hence, this measurement model had 384 (465-81) degrees of freedom and the chi-square goodness-of-fit statistic, X^2 (N=388, df=384) = 930.665, p .000 which was <.05.

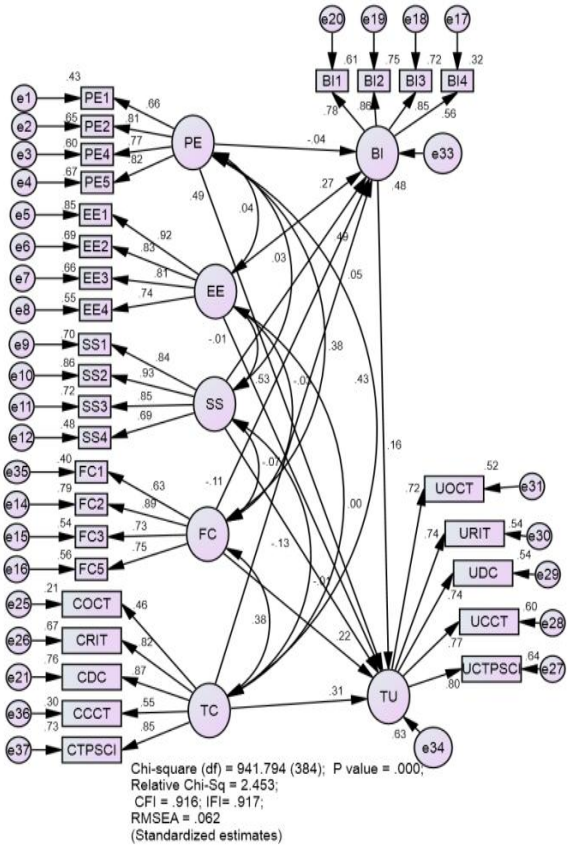
6.1 The Model

The structural path for the model was considered significant by determined its (C.R >± 1.96, β and p <.05) for each and every structural path. From the analysis, the identified significant structural path for TC to BI was identified as insignificant (β=.051, p=.337). Meanwhile, the structural path for PE to BI (β=-.037, p=.505) and FC to BI (β=-.110, p=.060) were identified as insignificant too. However, the structural paths for EE to BI was significant (β=.267, p=.000). Meanwhile, the structural paths for TC to TU (β=.306, p=.000), BI to TU (β=.156, p=.013), PE to TU (β=.485, p=.000) and FC to TU (β=.216, p=.000) were all significant, but, the structural path for EE to TU (β=-.014, p=.796) was not significant. From the analysis, the structural path for SS to TU (β=-.126, p=.038) and SS to BI (β=.494, p=.000) were both significant. Subsequent validation of the model found it to account for an impressive 48% of the variance in BI and about 63% in u-tech usage among students. Therefore, from these results, it can be explicated that this predictive model was able to explain 63% of the u-tech usage.

6.0FINDING



The Measurement Model



The Model

7.0 CONCLUSION

Generally, with this new model and results gained, has provided a full understanding on u-tech usage among students' and its relation between the students' technology competency and perceptions on performance expectancy, effort expectancy, behavioural intention, facilitating conditions and social status. Therefore, the outcome of this study may absolutely contribute in bridging the gap that existed in searching for the model that predicts the use of u-tech among students in Malaysia. The findings of this study have provided practical implications in the reformulation of the existing an e-Learning Policy in providing a quality and better framework of e-Learning in accordance with the 1Malaysia concept and the New Economic Model. With the new policies reformulated later, it is hoped that it would provide a better quality in education at all levels and provide an equal and fair access to all.

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