



UNIVERSITI PUTRA MALAYSIA

**FACTORS INFLUENCING UTILISATION OF
UBIQUITOUS TECHNOLOGY AMONG UNDERGRADUATES IN MALAYSIAN
TECHNICAL UNIVERSITIES**

MULIATI BT. HJ. SEDEK

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By
MULIATI BT. HJ. SEDEK

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirement for the Degree of Doctor Philosophy

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of
the requirement for the degree of Doctor of Philosophy

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MULIATI BINTI SEDEK

June 2014

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Faculty: **Educational Studies**

Ubiquitous technology such as laptops, smartphones and tablets have been widely used by many undergraduates in institutions of higher learning. However, not much is known of their utilisation level and the factors that influence its utilisation. Therefore, the main objectives of this study are to determine: i) the level of ubiquitous technology utilisation; ii) the level of competency in using ubiquitous technology, iii) whether the selected factors (technology competency, performance expectancy, effort expectancy, facilitating conditions, social status and behavioural intention) significantly influence ubiquitous technology utilisation; iv) whether behavioural intention acts as a mediator; v) whether gender acts as a moderator and finally vi) to develop a model that can predict the utilisation of ubiquitous technology among the undergraduates.

This study was based on a quantitative descriptive research using a set of questionnaire. The population of the study comprised of third-year undergraduates ($N=4,247$) from Malaysian Technical Universities (MTUN). Based on the Raosoft software, the minimum sample size for this study was 353 respondents. However, a total of 493 questionnaires were distributed among the undergraduates. The respondents were selected based on the proportional stratified and random sampling technique.

The research instrument was adapted from previous studies and validated by a panel of experts from the field of Educational Technology. The research instrument was divided into three sections, namely, i) demographic data, ii) ubiquitous technology utilisation and iii) factors related to the use of ubiquitous technology. The reliability of the instrument ranged from 0.83 to 0.98. The data was analysed descriptively (frequency, mean and standard deviation) using the IBM SPSS Statistics (SPSS) version 20 and inferentially using the Analysis of Moment Structures (AMOS) version 20.

The results of this study indicated that both the utilisation of ubiquitous technology and technology competency among the undergraduates were at a moderate level. The undergraduates' perceived performance expectancy, effort expectancy, behavioural intention, facilitating conditions and social status factors level were found to be high. The performance expectancy ($\beta=.485$, $p= .000$) was found to be the most salient factor influencing the utilisation of ubiquitous technology, followed by technology competency ($\beta=.306$, $p=.000$), facilitating conditions ($\beta=.216$, $p=.000$) and behavioural intention ($\beta=.156$, $p=.000$). Finally, the influences of social status ($\beta=.494$, $p=.000$) and effort expectancy ($\beta=.267$, $p=.000$) towards the utilisation of ubiquitous technology were found to be mediated by behavioural intention.

Gender factor was identified to influence effort expectancy significantly and was more significant amongst female undergraduates. The results attained from the analysis also produced a model that predicts the utilisation of ubiquitous technology among the undergraduates. The model was confirmed to account for 63% of the variance (adjusted R^2) in ubiquitous technology utilisation.

Several implications were also drawn from the results of the study. This study did not only test the Unified Theory of Acceptance and Use of Technology (UTAUT) model itself, but has been expanded by adding one variable; the technology competency from Theory of Acceptance Model (TAM). By encompassing UTAUT, one mediator and moderator, as well as technology competency; the proposed predictive model is a definitive model that synthesizes what is known and provides a foundation to guide future research in a related field of study.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**FAKTOR YANG MEMPENGARUHI PENGGUNAAN TEKNOLOGI
UBIQUITOUS DALAM KALANGAN PELAJAR DI UNIVERSITI-
UNIVERSITI TEKNIKAL DI MALAYSIA**

Oleh

MULIATI BINTI SEDEK

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Teknologi *ubiquitous* seperti komputer riba, telefon pintar dan *tablet* telah digunakan secara meluas oleh mahasiswa di institusi pengajian tinggi. Namun, tidak banyak yang diketahui tentang tahap penggunaan dan faktor-faktor yang mempengaruhi penggunaannya. Oleh itu, tujuan utama kajian ini adalah untuk menentukan: i) tahap penggunaan teknologi *ubiquitous*; ii) tahap teknologi kompetensi dalam menggunakan teknologi *ubiquitous*, iii) sama ada teknologi kompetensi, jangkaan prestasi, jangkaan usaha, keadaan memudahkan, status sosial dan niat tingkah laku mampu mempengaruhi penggunaan teknologi *ubiquitous*; iv) sama ada niat tingkah laku memainkan peranan sebagai pembolehubah pengantara, v) sama ada jantina memainkan peranan sebagai moderator, dan akhir sekali vi) membangunkan model yang boleh meramalankan penggunaan teknologi *ubiquitous* dalam kalangan mahasiswa.

Kajian ini berbentuk penyelidikan kajian deskriptif kuantitatif yang menggunakan satu set soal selidik. Populasi kajian terdiri daripada pelajar tahun ketiga ($N=4,247$) dari universiti-universiti Teknikal Malaysia (MTUN). Berdasarkan perisian Raosoft itu, sampel saiz minima untuk kajian ini adalah 353 responden. Walau bagaimanapun, sebanyak 493 soal selidik telah diedarkan dalam kalangan mahasiswa. Responden telah dipilih berdasarkan teknik persampelan berstrata dan rawak berkadar.

Instrumen kajian yang digunakan telah diadaptasi daripada kajian-kajian sebelum ini dan disahkan oleh satu panel pakar dari bidang Teknologi Pendidikan. Instrumen kajian terbahagi kepada tiga bahagian, iaitu i) pembolehubah demografi, ii) penggunaan teknologi *ubiquitous*, dan iii) faktor yang berkaitan dengan penggunaan teknologi *ubiquitous*. Nilai kebolehpercayaan instrumen adalah di antara 0.83 dan 0.98. Data dianalisis secara deskriptif (kekerapan, min dan sisihan piawai) dan inferensi menggunakan perisian IBM SPSS Statistics (SPSS) versi 20 dan Analysis of Moment Structures (AMOS) versi 20.

Dapatan kajian menunjukkan penggunaan teknologi *ubiquitous* dan kompetensi teknologi *ubiquitous* dalam mahasiswa didapati berada pada tahap sederhana. Tahap persepsi pelajar terhadap jangkaan prestasi, jangkaan usaha, , keadaan memudahkan dan status sosial dan niat tingkah laku didapati adalah tinggi. Jangka prestasi ($\beta=.485$, $p=.000$) dikenalpasti sebagai faktor utama mempengaruhi penggunaan teknologi *ubiquitous*, diikuti dengan kecekapan teknologi ($\beta=.306$, $p=.000$), keadaan memudahkan ($\beta = .216$, $p=.000$) dan niat tingkah laku ($\beta=.156$, $p=.000$). Akhir sekali, pengaruh status sosial ($\beta=.494$, $p=.000$) dan jangkaan usaha ($\beta=.267$, $p=.000$) terhadap penggunaan teknologi *ubiquitous* didapati dimoderasi oleh pembolehubah pengantara iaitu niat tingkah laku.

Faktor jantina telah dikenal pasti mempengaruhi faktor jangkaan usaha, dan didapati lebih signifikan dalam kalangan mahasiswa perempuan. Keputusan yang dicapai daripada analisis ini juga menghasilkan model yang meramalkan penggunaan teknologi *ubiquitous* dalam kalangan mahasiswa. Model ini disahkan mampu menjelaskan 63% daripada varians (selarasan dari R^2) dalam penggunaan teknologi *ubiquitous*.

Beberapa implikasi telah terhasil daripada kajian ini. Kajian ini bukan sahaja mampu menguji *Unified Theory of Acceptance and Use of Technology* (UTAUT), tetapi telah diperluaskan dengan menambah satu pembolehubah iaitu teknologi kompetensi yang diadaptasi dari *Theory of Acceptance Model* (TAM). Gabungan dari UTAUT, pembolehubah pengantaraan dan moderator serta kompetensi teknologi, mampu menjadikan model ramalan ini sebagai satu asas baharu dalam membantu penyelidikan dalam bidang yang sama pada masa hadapan.

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“The journey towards my goals in life is not a solo effort. I need to have Allah and people around me who believe in and support me. I believe that if I want to start the journey, stay on course and complete it successfully”.

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Last but not least, for my late mum, Hajah Maimunah Daud, I dedicate this thesis to you! I love you and miss you. May we meet in Jannah.

I certify that a Thesis Examination Committee has met on 25th June 2014 to conduct the final examination of Muliati bt. Hj. Sedek on her thesis entitled " Factors Influencing Utilisation of Ubiquitous Technology Among Undergraduates In Malaysian Technical Universities." in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U. (A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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