



Level of ICT Usage and Perceived Attributes among Academicians

Marlita Mat Yusof, Nurhazirah Hashim, Siti Noraini Mohd Tobi

Faculty of Office Management and Technology,
Universiti Teknologi MARA, Puncak Alam, Selangor, Malaysia

marlita@salam.uitm.edu.my

Abstract

This study applies Structural Equation Model for ICT usage in Higher Education (Usluel, Askar & Bass 2008) attempts to identify the level of ICT usage among academicians in UiTM and UNISEL, two higher institutions representing the public and private sector respectively. Subsequently, the relationship between the perceived attributes and the level of ICT usage among academicians is presented. This paper compares the difference and the most influential attributes of the aforementioned between the public and private learning institution. This paper concludes that there is a significant relationship between perceived attributes and the level of ICT usage among UiTM and UNISEL academicians. However, UiTM registers compatibility whilst UNISEL records observability as their most influential perceived attribute that leads to the level of ICT usage. The findings of this research were made through questionnaire distributed to academicians from both institutions and the analysis was carried out to verify the hypotheses.

Keywords: Level of Usage, Information Communication and Technology (ICT), Perceived Attributes, Academician

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1.0 Introduction

As information and communication technology (ICT) becomes more ubiquitous in our society, educational settings are being transformed where educators and students are expected to teach and learn using this new technology (Li et al., 2001; Lee, 2003). Educational institutions around the world are beginning to recognise the potential of ICT in pedagogy (Oblinger & Rush, 1997). Information and Communication Technology (ICT) skills are currently of great interest to governments, businesses and individuals alike. Through the use of automation, ICT has become integrated in the management of knowledge and it is accompanying ICT tools.

E-learning, which is described as the use of ICT to enhance or support learning and teaching in education, has become increasingly important in tertiary education (OECD, 2005). The most crucial part is that ICT is expected to be fully integrated into the academic curriculum in order to ensure all the academicians would give their full commitment towards teaching methods and processes.

Many educational institutions have produced their own strategies which incorporate ICT to realize their mission of being world class universities. These steps are taken to ensure that they stay ahead of others in many ways especially in teaching and research. Sharing these aspirations is Universiti Industri Selangor (UNISEL), an education institution that focuses on industrial excellence in Malaysia. One of the three strategies of UNISEL to be a centre of excellence is to increase the level of academic achievement and professionalism through lifetime education concept which includes the importance of ICT usage among the academicians. In comparison, UiTM has also taken similar approach to inculcate ICT in its teaching and academic affairs. It would not just be interesting but also important from the academical point of view to compare the level of ICT usage among academicians in similar faculty in UNISEL (Faculty of Industrial Information Technology) and UiTM (Office Management and Technology) as each institution corresponds to the private and public higher institution respectively.

2.0 Literature Review

ICT (Information and Communication Technology) can be broadly defined as “technologies that facilitate, by electronic means, the acquisition, storage, processing, transmission, and disseminating of information in all forms including voice, text, data, graphics and video” (Michiels & Van Crowder, 2001; De Alcantara, 2001). This definition primarily focuses on the importance of the connection of information technology, information content and telecommunications in enabling new forms of knowledge production and interactivity. The emergence of new forms of knowledge production and interactivity is inevitable as the technology use is constantly evolving and becoming more important in the workplace and our lives (Karsenti, Brodeur, Deaudelin, Larose & Tardif, 2002; Shapka & Ferrari, 2003; Teo, Lee & Chai, 2008).

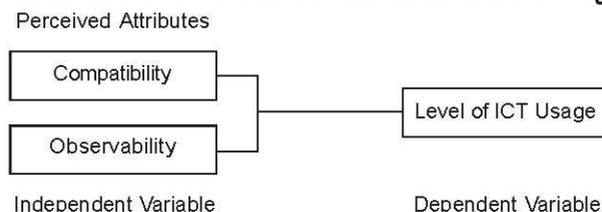
In this study, the concept of ICT “usage” is preferred since it is believed that usage is an indicator of adoption, acceptance as well as diffusion. Innovation according to Rogers (2003) is an “idea, practice, or object that is perceived as new by an individual or other unit of adoption”. It is the receivers’ perceptions of the attributes of innovations, not the attributes as classified by experts or change agents, that affect their rate of adoption. Like beauty, innovations exist only in the eye of the beholder. And it is the beholder’s perceptions that influence the beholder’s behavior (Rogers, 2003).

2.1 Theory of Diffusion of Innovation

Basically, the theory of Diffusion of Innovation (DoI) was the anchor model in this study in measuring the level of ICT usage among academicians of UiTM and UNISEL. The DoI theory was introduced by Everett Rogers in 1962 and explains the ICT usage for higher education which consists of ICT facilities (ICTF) and five attributes; relative advantage, compatibility, ease of use, observability and trialability (Usluel, Askar & Bas, 2008).

However, due to some limitations and constraints of this research and to best suit to the study, a new model adapted from original DoI model has been developed in which the Dependent Variable is The Level of ICT Usage and Independent Variable is Perceived Attributes which comprise of Compatibility and Observability.

Theoretical Framework: Perceived Attributes and the Level of ICT Usage



Source: Adapted from Diffusion of Innovation (DoI) model; Usluel, Askar and Bas (2008)

2.2 Dependent Variable (Level of ICT Usage)

Adoption and voluntary use of information technology by managerial, professional, and operating level personnel as users is deemed a necessary condition for its success, and resistance to computer systems by managers and professionals is a widespread problem (Attewell & Rule, 1984; Davis, 1993 and Igbaria, 1993). Davis (1993) argues that lack of user acceptance has long been an impediment to the success of information systems, which, if avoided, would improve performance on the job as the goal of most organizationally based information systems.

End users are often unwilling to use available computer systems that, if used, would generate significant gain (Davis, 1993; Igbaria, 1993 and Nickerson, 1981). Research shows that “although teachers in schools show great interest and motivation to learn about

the potential of ICT, in practice, use of ICT is relatively low and it is focused on a narrow range of applications” (Sime & Priestly, 2005).

Rogers (1962) argues that perceived attributes of an innovation are one important explanation of the rate of adoption of an innovation. Adoption leading to usage is often the pivotal factor and a central focus of MIS implementation research in determining the success or failure of an IT product (Davis, 1993; Igbaria, 1993 and Thompson, 1991).

2.3 Independent Variable (Perceived Attributes)

The theory of perceived attributes is based on the notion that individuals will adopt an innovation if they perceive that it has the following attributes. First, the innovation must have some relative advantage over an existing innovation or the status quo. Second, the innovation must be compatible with the existing values, past experience, and practices of the potential adopter. Third, the innovation cannot be too complex or perceived as difficult to understand. Fourth, the innovation must have trialability; that is, it can be tested for a limited time without adoption. Fifth, the innovation must offer observable results (Rogers, 1995).

2.4 Compatibility

Compatibility has been found to be one of the major predictors and is positively related to an innovations rate of adoption (Kendall et al., 2001, Limthongchai & Speece, 2002 and Dholakia, Dholakia & Kshetri, 2003).

“Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters”. This might include compatibility with socio-cultural values and beliefs, with previously introduced ideas, or with client needs for innovation (Rogers, 1995).

This attribute has characteristics in common with “relative advantage” and with a “complexity”. An innovation that is compatible with previous procedures entails less learning (including of new socio-technical routines) and thus less complexity. Such innovations are more immediately perceived to have an advantage (Haythornwaite, 1998). Compatibility brings less uncertainty to the potential adopter and suits better to the person’s life situation.

2.5 Observability

Observability in an innovation is important factor in early adoption of innovation (Rogers, 1995). Observability is the degree to which the results of an innovation are visible to others. In terms of observability, the results of some ideas are easily observed and communicated to others, whereas some innovations are difficult to observe or to describe to others. Rogers (1995) argues that “the perceived observability of an innovation is positively related to its rate of adoption”. Rogers gives an example of the software component of computers to explain the observability of an innovation. He argued that the software component of a technological innovation is not so apparent to observation, so innovations in which the software aspect is dominant possess less observability, and usually have a relatively slower

rate of adoption.

3.0 Methodology

This study was a descriptive correlational research. Correlational research was conducted to identify the important factors that are associated with the variables of interest and to answer questions about the relationship among the variables or events (Salkind & Sekaran, 2006). In this study, the level of ICT usage among the UiTM and UNISEL academicians is determined and then the relationship between perceived attributes and the level of ICT usage among the UiTM and UNISEL academicians was investigated. Furthermore, this study was also to compare the difference of perceived attributes and the level of ICT usage between UiTM and UNISEL academicians. Finally, the highest influenced perceived attributes towards the level of ICT usage among UiTM and UNISEL academicians were identified.

3.1 Sampling Frame

The sampling frame used for this study was the list of academicians from the Faculty of Office Management and Technology (FOMT), UiTM Puncak Alam and the Faculty of Industrial Information Technology (FIIT), UNISEL Batang Berjuntai. A table produced by Krejcie and Morgan (1970) was used as a guideline to determine the random sample size from determined population. Based on the table, the suitable sample size determined for FOMT and FIIT was $n = 52$ and $n = 60$ respectively.

3.2 Sampling Technique

The Probability Sampling chosen was Simple Random sampling. According to Salkind (2008), simple random will be chosen as it allows equal and independent chance of respondents being selected to be part of the sample and there are no possibilities of bias. In addition, probability of sampling tends to yield good estimation of the population's characteristics and the sample results tend to be more representative of the population (Zamalia, 2008).

3.3 Research Instrument

The main instrument for this study was survey questionnaire. The advantage of using this method for data collection is that it provides opportunity to introduce the research topic and motivates the respondents to offer their frank answers (Sekaran, 2003).

This structured questionnaire comprises of three sections namely A, B and C. Section A contained questions pertaining to the demographic profiles of respondents, while the elements of the questionnaire covered the research objectives and research questions specified in the study. Section B was designed to measure Perceived Attributes which were 'Compatibility' and 'Observability'. Finally, Section C was to measure the Level of ICT

Usage.

4.0 Results and Discussions

Pearson Product Moment Correlation and Independent Sample T-test were used to test the relationship that might exist between perceived attributes and the level of ICT usage among UiTM and UNISEL academicians.

Pearson Product Moment Correlation

This analysis was performed to reveal the relationship that might exist between two variables that were perceived attributes (Compatibility and Observability) and the level of ICT usage among UiTM and UNISEL academicians. Pearson test was only performed if the independent and dependent variables were continuous. For this study, Pearson was performed for each of the perceived attribute in order to identify any significant relationship with the level of ICT usage for both UiTM and UNISEL academicians.

Table 1: Pearson for domains in perceived attributes and the level of ICT usage among UiTM academicians

	Perceived Attributes	Sig.
Compatibility	0.48	0.00*
Observability	0.35	0.00*

Grouping Variable: Level of ICT Usage

*p < 0.05

Pearson test was performed between perceived attributes and the level of ICT usage among UiTM academicians. It was hypothesized that a positive relationship existed between these two variables among UiTM academicians. Results of the correlation suggest that the level of ICT usage among UiTM academicians was greatly influenced by every of the perceived attribute: Compatibility ($r = 0.48$, $p < .05$), and Observability ($r = 0.35$, $p < .05$). Levene's test was conducted to show the equality of variances for each of the perceived attributes: Compatibility, Ease of Use and Observability among UiTM and UNISEL academicians. The results revealed that the variances for both variables were unequal.

Levene's test for equality of variances in this table shows that the variances for UiTM and UNISEL academicians were equal for the level of ICT usage ($p = 0.34$). An independent samples t-test was conducted to evaluate the hypothesis that UiTM and UNISEL academicians differ significantly in their level of ICT usage. The result in Table 2 indicates that there was a significant relationship existed between level of ICT usage and UiTM and UNISEL academicians suggesting that the level of ICT usage between UiTM

academicians was statistically significantly different from that of UNISEL academicians ($t = -4.77$, $df = 110$, $p = 0.00$). A more specific difference between UiTM and UNISEL's data is explained further in the above table highlighting that UNISEL academicians recorded higher level of ICT usage than of UiTM academicians (Mean = 4.37, SD = 0.37).

Table 2: Comparing means for level of ICT usage across academicians

Academicians	FOMT	FIIT
Mean	4.00	4.47
Std Deviation	0.41	0.37

The Mann-Whitney U test when applied to perceived attributes: Compatibility and Observability found that there were significant differences between UiTM and UNISEL academicians for Compatibility ($p = 0.00$). While there was no significant relationship found for Observability ($p = 0.14$). Table 3 explains the differences where both perceived attributes Compatibility and Observability that were significantly different between UiTM and UNISEL academicians were found higher among UNISEL academicians compared to UiTM academicians (Compatibility: Mean = 4.77, SD = 0.34) and (Observability: Mean = 4.16, SD = 0.65).

Table 3: Mann-Whitney U for comparing perceived attributes between UiTM and UNISEL academicians

Perceived Attributes	U	Sig. (2-tailed)
Compatibility	845	0.00*
Observability	1310	0.14

Grouping Variable: Faculty

* $p < 0.05$

Table 4: Comparing means for perceived attributes across academicians

Academicians/ Perceived Attributes	FOMT	FIIT
Compatibility	4.37 (Means) 0.51 (SD)	4.77 (Means) 0.34 (SD)
Observability	4.02 (Means) 0.50 (SD)	4.16 (Means) 0.65 (SD)

5.0 Conclusion

Based on the findings, both UiTM and UNISEL academicians are competent in using ICT.

Academicians from both institutions indicated that they are using ICT more for Personal Use, followed by Classroom Practice, Professional Development, and the least for Administration purpose. For UNISEL, the data shows that its academicians were also using ICT more for Personal Use. However, the ensuing use for ICT in UNISEL differs from UiTM in which the subsequent usages of ICT are in the area of Administration, Professional Development, and Classroom Practice.

For UiTM and UNISEL academicians, their acceptances towards ICT usage are based on the following perceived attributes of the ICT which are Compatibility and Observability. The findings using Pearson analysis for both UiTM and UNISEL concur with the research hypothesis that espouses that a positive relationship exists between perceived attributes and level of ICT usage. The results of the correlation at this stage for both institutions are rather similar in which they suggest that the level of ICT usage among academicians from both institutions is greatly influenced by each of the perceived attribute. Therefore, the hypothesis is accepted.

Further analysis made between UiTM and UNISEL data verified the hypotheses that UiTM and UNISEL academicians differ significantly in their level of ICT usage ($t = -4.77$, $df = 110$, $p = 0.00$). For both institutions' academicians, there are significant differences between their respective academicians for Compatibility ($p = 0.00$). However, there is no significant relationship for Observability ($p = 0.14$). Therefore, both hypotheses are accepted.

Based on the findings, both UiTM and UNISEL academicians are competent in using ICT. It is indicated that they are using ICT more for Personal Use, followed by Classroom Practice, Professional Development, and the least for Administration purpose. For UNISEL, the data shows that its academicians were also using ICT more for Personal Use. However, the ensuing use for ICT in UNISEL differs from UiTM in which the subsequent usages of ICT are in the area of Administration, Professional Development, and Classroom Practice.

In term of application, academicians at UiTM utilize IT the most in the area of Internet application, MS Office application and online database. This arrangement of application is also the same for UNISEL academicians where their utilization of ICT usage is on Internet application, MS Office application and online database.

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References

- Askar, P., Usluel, Y. K. & Mumcu, F. K. (2006). Logistic Regression Modeling for Predicting Task-Related ICT Use in Teaching, *Educational Technology & Society*, 9(2): 141-151.
- Crede, A. & Manell, R. (1998). Importance of Information and Communication Technologies (ICTSs) in Making a Healthy Information Society: A Case Study of Ethiope East Local Government Area of Delta State, Nigeria. *Library Philosophy and Practice* 2008.
- Davis, F.D. (1993). User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavioural Impacts, *Int. J. Man-machine Studies*, 475-487.
- Krejcie, R. V. & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30: 607-610.
- Lee, A.C.K. (2003). Undergraduate Students' Gender Differences in IT Skills and Attitudes. *Journal of Computer Assisted Learning*, 19: 488-500.
- Moses, P., Md. Khambari, M. & Wong, S. L. (2008). Laptop Use and Its Antecedents among Educators: A Review Of The Literature. *European Journal of Social Sciences – Vol. 7, No. 1*.
- Rogers, M. E. (2003). *Diffusion of Innovations* (5th edition). New York: The Free Press.
- Salkind, N. J. (2003). *Exploring Research*. 5th edition, Upper Saddle River, N.J: Prentice Hall.
- Sekaran, Uma (2003). *Research Methods for Business*. John Wiley and Sons, University Press. William G.
- Taylor, R. & Lee, H. (2005). Occupational Therapists' Perception of Usage of Information and Communication Technology (ICT) in Western Australia and the Association of Availability of ICT on Recruitment and Retention of Therapists Working in Rural Areas. *Australian Occupational Therapy Journal*, 52: 51-56.
- Teo, T., Lee, C. B. & Chai, C. S. (2008). Understanding Pre-Service Teachers' Computer Attitudes: Applying and Extending the Technology Acceptance Model. *Journal of Computer-Assisted Learning*, 24(2): 128-143.
- Usluel, Y. K., Askar, P. & Bas, T. (2008). A Structural Equation Model for ICT Usage in Higher Education. *Educational Technology & Society*, 11(2): 262-273.
- Zakaria, Z. (2001). Factors Related to Information Technology Implementation in the Malaysian Ministry of Education Polytechnics.
- Zamalia, M. (2009). *Handbook of Research Methodology: A Simplified Version*. University Publication Centre (UPENA), Universiti Teknologi MARA.