SOCIAL SCIENCES & HUMANITIES

Teachers' Uptake on ICT Integration in Teaching and Learning – A Case of Malaysian Teachers

Termit, K.* and Ganisha, V.

School of Educational Studies, Universiti Sains Malaysia, 11800 Penang, Malaysia

ABSTRACT

This research is an attempt to explore teachers' attitudes toward Information and Communication Technology in secondary schools in the island state of Penang, Malaysia. The focus of this study is on teachers' attitudes towards accessing and using information and communication technology (ICT) in the teaching and learning processes. The Technology Acceptance Model is used in this study as the underlying theoretical framework, with the main thrust of the research being to explore the influence of teachers' attitude, Perceived Ease of Use, Perceived Usefulness and Behavioural Intentions in using ICT. The findings of the study revealed behavioural intention as the most significant factor that influences teachers' attitude in using ICT in the course of their teaching and learning processes. The two behavioural constructs of Perceived Ease of Use and Perceived Usefulness have less influence on an individual intention to use technologies. The authors conclude by making some recommendations for practitioners to help them work towards giving increased importance to ICT use in their work responsibilities.

Keywords: ICT, Teaching and Learning, TAM, technology integration

INTRODUCTION

With the onset of the digital age and ICT pervading all aspects of the human life, the education domain is striving to incorporate ICT literacy into the curriculum to bridge the country's digital divide and empower learners. The Malaysian Government has introduced various initiatives to facilitate greater adoption and dissemination of ICT and improve capacities in every field of business, industry, education, and life in general. These measures include enhancement of education and training programmes, provision of an environment

conducive to the development of ICT, provision of incentives for computerisation and automation, and creation of venture capital funds. In view of this, currently, Malaysia is in full gear steering towards a knowledge-based economy (Chan, 2002).

BACKGROUND OF THE STUDY

In 2012, the Malaysian Government devoted an education budget of 16% (RM37 billion), with commitment to education as a national priority (Malaysia Education Blueprint 2013–2025: Executive Summary; E-19). To digitally advance and globally lead Malaysia into the 21st century, government initiatives such as (MSC-Multimedia Super Corridor) and Vision 2020 were enacted as impetus to fuel the use of ICT in Malaysia (Ngah & Masood, 2006). Teachers are expected to be skilled and proficient in employing these tools, as much has been invested on ICT infrastructures with the advent of an increased emphasis on the use of ICT in teaching. Ideally, teachers should be open to adopting and implementing ICT in education, bearing in mind that the effective use of ICT with multimedia and graphics can supplement the teaching process and improve interactivity in learning (Lau & Sim, 2008).

The Ministry of Education Malaysia has focused on three main areas in its ICT in education policy; teaching and learning tools in education, ICT as an independent subject and ICT integrated in the subjects taught. RM5 billion was allocated for the term of 2002-2008 under the national budget to provide training, launching grants and educational aid to schools nationwide for the smooth implementation of the ICT policy. Teachers were given laptop computers and teaching courseware to assist in teaching and for professional tasks, while classrooms were equipped with LCD projector, screen and trolley with speakers, as well as software like power point, flash and interactive courseware to support teaching and learning throughout schools in Malaysia' (Lau & Sim, 2008, p. 19). In fact, some schools received extra facilities like computer laboratories, wireless internet connection and local area network to assist teachers, in addition to a launching grant of RM5000 to RM15000 to acquire additional reference resources.

According to the Executive Summary of the 'Malaysia Education Blueprint 2013 – 2025', more than RM6 billion was spent on ICT by MOE over the past ten years for educational initiatives. Nevertheless, ICT usage in schools 'continues to lag behind expectations—both in terms of quantity and quality'. MOE's study in 2010 revealed that nearly '80% of teachers spent less than one hour a week using ICT', while only a third of students perceived that their teachers use ICT on a regular basis (E-19). Despite the extensive provision of facilities and training, studies on teachers' readiness for ICT generally suggest that there is still a long way to go before schools in the region are able to take full advantage of the opportunities provided by 21st century technology (Ya'acob *et al*., 2005, cited in Lau & Sim, 2008). It is noteworthy that Ngah and Masood (2006) found that

'although accessibility is no longer an issue for most primary school teachers in our studies; computers are only being used as a glorified typewriters'(p. 234). This is corroborated by the 2012 UNESCO review which highlighted that ICT usage has not gone much beyond using word-processing applications when they should be used as instructional tools (Malaysia Education Blueprint 2013–2025: Executive Summary; E- 19).

In view of the teachers' dismal adoption of ICT usage and integration in the teaching and learning process, this study made an attempt to investigate the factors that influence their attitudes, focusing on their PeU, PU and BI in using ICT, based on the Technology Acceptance Model (TAM) framework. This study examined the external variables and factors that teachers perceive as useful and easy to use, which influences their attitude and behavioural intention towards actual ICT usage and integration.

TECHNOLOGY ACCEPTANCE MODEL

A Framework Used

Researchers have used the extensively researched Technology Acceptance Model (TAM) to explain adoption of new systems or technologies. This model claims that the overall technology acceptance or utilization is largely based on users' beliefs such as the perceived usefulness and the perceived ease of use. Both perceived ease of use and perceived usefulness are important factors that determine the attitude towards use of the technology and the behavioural Intentions of use of the technology (Nair & Das, 2012).

The Technology Acceptance Model is a (TAM) is an alteration of the Theory of Reasoned Action (TRA) to the field of information systems. TAM conjectures that perceived usefulness and perceived ease of use show an individual's intention to use a system with intention to use serving as a mediator of actual system use. According to this framework, perceived usefulness is also looked at as directly having an impact on perceived ease of use. Researchers have simplified TAM by removing the attitude construct found in TRA from the existing specification (Venkatesh *et al*., 2003). Attempts to extend TAM have in general, various approaches such as introducing factors from other related models, additional belief factors, examining moderators of perceived ease of use and perceived usefulness (Wixom & Todd, 2005).

Source: Davis et. al. (1989), Venkatesh et. al. (2003)
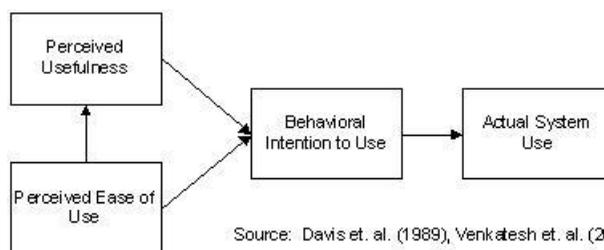
METHOD

Data were collected by administering a questionnaire to the teachers in three secondary schools.

INSTRUMENT

Empirical data were collected by means of a questionnaire containing 31 questions. The questions were organized into the following two groups: (1) demographic questions about the respondents' gender, years of working experience and areas of specialisation (see Table 1 for the list of characteristics); and (2) measures of Teachers Attitudes toward Information and Communication Technology. The attitude measuring items were on a 5-point Likert scale ranging from ''strongly disagree'' to ''strongly agree''. The instrument was composed of 15 items on Perceived Usefulness, 11 items on Perceived Ease of Use and 4 items on Behavioural Intentions. As this was a small-scale research, preliminary in nature, no pilot study or pre-tests were conducted.

The characteristics of the respondents are presented in Table 1. The typical respondent is a female teacher, having 1 to 5 years of working experience, with specialisation in the field of Language. It is worth highlighting that only 5 respondents have working experience of 21 years and above, constituting to less than 10% of the overall number of respondents.

ANALYSIS OF THE RESULTS

The statistical analysis comprised examining the descriptive statistics of the measurement items and assessed the reliability and validity of the measure used in this study. The questionnaires that were returned had a usable response rate of 77%. The data collected were processed using SPSS 19.0 (Statistical Package for Social Science) to analyse data for descriptive statistics. The

TABLE 1
Profile of the Respondents

Demographic Characteristics	Frequency	Percentage
Gender		
Male	27	38.57
Female	43	61.43
Years of Working Experience		
1 – 5 years	23	32.86
6 – 10 years	11	15.71
11 – 15 years	13	18.57
16 – 20 years	18	25.71
21 years and above	5	7.14
Areas of Specialisation		
Sciences	14	20.00
Arts	22	31.43
Language	24	34.29
Humanities	9	12.86
Religion	1	1.43

internal consistency of the survey items was derived by running a reliability test, as shown in Table 2 below.

The overall reliability of Cronbach's alpha was 0.739, with 70 respondents and 31 survey items. This value exceeds the minimum threshold for the internal reliability test at 0.7. Cronbach's alpha is the most common measure of internal consistency or the reliability instrument employed, when a Likert scale is used. The reliability of the scales used in this study is thus confirmed. Skewness is the measure of the asymmetry of a distribution. The normal distribution is symmetric and has a skewness value of zero.

The skewness value for all the three constructs in this study is positive, with BI's value of 0.01 closest to zero. This indicates an almost symmetrical and normal distribution. Kurtosis is the measure of the extent to which observations cluster around a central point. For a normal distribution, the value of the kurtosis statistic is zero. Higher kurtosis means more of the variance is due to infrequent extreme deviations, as opposed to frequent modestly-sized deviations. The Kurtosis value in this study is 0.25 for the PeU construct and 0.6 for the PU construct, while the BI construct has a negative value of -0.6, which indicates a flat distribution.

Table 4 is a summary of the mean scores of each of the items surveyed in the questionnaire. All the measures used a 5-point scale ranging from 1=Strongly Disagree to 5=Strongly Agree. The mean provides the representative value of the group of scores, while the standard deviation

TABLE 2
Reliability analysis of the survey items

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.724	.739	31

TABLE 3
Descriptive analysis of the constructs

Statistics							
		Teacher gender	Years of Working Experience	Area of Specialisation	Cons_ PeU	Cons_ PU	Cons_ BI
N	Valid	70	70	70	70	70	70
	Missing	0	0	0	0	0	0
Mean		0.61	1.59	2.46	46.90	69.40	17.67
Median		1	2	2.5	47	68.5	18
Mode		1	0	3	48	68	18
Std. Deviation		0.49	1.37	1.00	3.02	3.75	1.38
Skewness		-0.48	0.17	0.12	0.20	0.76	0.01
Std. Error of Skewness		0.29	0.29	0.29	0.29	0.29	0.29
Kurtosis		-1.82	-1.38	-0.65	0.25	0.60	-0.60
Std. Error of Kurtosis		0.57	0.57	0.57	0.57	0.57	0.57

TABLE 4
Descriptive analysis of the Constructs and Individual Items

Items and Scale		Mean	S.D.
Perceived Ease of Use (PeU)		4.26	0.65
PeU1	The usage of ICT in the courses brings too much overload.	2.51	1.05
PeU2	I think that it is difficult to use ICT in the courses.	3.94	1.30
PeU3	I think that students participate actively in the course with the usage of ICT	3.44	1.46
PeU4	I think that the usage of ICT makes students passive.	2.69	1.63
PeU5	I think that one of the major problems in our educational system is not having efficient use of ICT.	4.60	0.58
PeU6	I believe that course will be more efficient when ICT possibilities are implemented.	4.00	1.22
PeU7	It is a great enjoyment for me to teach with the help of ICT.	3.41	1.44
PeU8	I think that ICT restricts the creativity of the teachers.	2.41	1.49
PeU9	I believe that it is necessary to have knowledge and skills in order to use ICT tools.	2.86	1.68
PeU10	I believe that it is necessary to use ICT applications in order to be more effective in teaching.	2.37	1.47
PeU11	I think that the usage of ICT restricts the creativity of the students.	1.76	0.98
Perceived Usefulness (PU)		4.34	0.6
PU1	I believe that the usage of ICT is important in achieving the aims of curriculum.	4.46	0.70
PU2	I think that the usage of ICT improves the teacher's performance.	4.43	0.71
PU3	I believe that the students will be more interested in the courses that are implemented with ICT.	4.44	0.69
PU4	It is luxurious to use ICT in schools in our country.	2.67	1.51
PU5	I think that it is a waste of time to use ICT tools in the courses.	2.13	1.28
PU6	I believe that ICT support facilitates the learning.	3.71	1.47
PU7	I think that the usage of ICT in the courses will improve the students' success.	3.86	1.25
PU8	I think that ICT has important contributions to the taught subject.	3.03	1.69
PU9	The usage of ICT in education is not suitable for my country.	1.84	1.20
PU10	I believe that ICT improves the quality of education.	4.01	1.42
PU11	I think ICT is a threat to teachers.	1.59	0.79
PU12	I believe that audio-visual tools enhance the learning process.	4.03	1.38
PU13	I think that all teachers should be continuously informed about ICT.	4.49	0.68
PU14	I don't feel the need to get acquainted with the application areas of ICT in education.	2.40	1.56
PU15	I think that it is not necessary to use ICT to achieve the special targets of our education.	2.67	1.45
PU16	I believe that ICT enhances the motivation of the students.	4.49	0.65
Behavioural Intentions (BI)		4.42	0.63
BI1	I would like to use audio-visual tools in my courses.	4.00	1.26
BI2	It is my ideal to teach students with ICT supported courses.	4.17	1.17
BI3	I like to use ICT educational tools in my courses.	3.93	1.17
BI4	I think that the efficient usage of ICT is one of the requirements for being a "good teacher".	2.36	1.44

provides the approximate average amount that scores differ from the mean. The descriptive statistics for each construct items are shown in Table 4. All the constructs' means are greater than 4.0, indicating an overall positive response to the constructs that were measured in this study. The standard deviations for all the variables are approximately one and this indicates that the item scores are around the mean scores. The PeU dimension attained a mean of 4.26 (SD = 0.645), while PU achieved a mean of 4.34 (SD = 0.6), and this was followed by BI with a mean of 4.42 (SD = 0.63).

The research question in this study is 'What is the most significant factor that influences teachers' attitude in using ICT in the course of their teaching and learning processes?' With the mean of 4.42 (SD = 0.63), the BI dimension is the highest, followed PU and the PeU dimension. This answers the research question that Behavioural Intention is the most significant factor that influences teachers' attitude in using ICT in the course of their teaching and learning process. Research by Ngah and Masood (2006) shows that teachers are not using ICT to make more learning happen but in many cases, they only use some tools such as the computers as glorified typewriters. Meanwhile, the examination of the means and standard deviations reveals that the teachers' BI is most influential in their attitudes to use and integrate ICT in the course of their teaching and learning processes. The PU factor trails this while the PeU dimension is the least influential factor of the three dimensions examined.

This confirms that the teachers in this study find that the eventual intention of using ICT is the most important factor that leads them to use and integrate ICT in the course of their teaching and learning process. The PeU dimension which scored the lowest mean score probably reflects that the teachers still perceive ICT as something that is unfamiler and difficult to use. Additionally, it is observed that PeU5 scored the highest mean of 4.6 (SD=0.58), which indicates that most of the teachers acquiesce one of the major problems in our educational system is not having efficient use of ICT.

Research by Fariza Khalid, Mokhtar Hj Nawawi and Samsilah Roslan (2009) found that a major problem for teachers not using ICT in schools is the lack of ongoing training for teachers and the lack of continuos support on the use of ICT in schools. Most teachers are also in general agreement that all teachers should be continuously informed about ICT (SD = 0.68) and that ICT enhances the motivation of the students (SD = 0.65), with both items achieving a mean of 4.49. Teachers also found that the usage of ICT is important in achieving the aims of the curriculum (M = 4.46, SD = 0.7), students will be more interested in the courses that are implemented with ICT(M = 4.44, SD = 0.69) and that the usage of ICT improves the teacher's performance (M = 4.43, SD = 0.71). PU11 scored the lowest mean of 1. 59 (SD=0. 79), and this signifies that the teachers do not find ICT as a threat to teachers. Similarly, a few of them agree that the usage of ICT in education is not suitable for the country (M = 1.84, SD =

1.2) and that the usage of ICT restricts the creativity of the students (M = 1.76, SD = 0.98). This shows most teachers agree with the fact that ICT is suitable and benefits teaching and learning. At large, teachers are of the opinion that ICT should be used and they are also of the belief that it will help to increase creativity of the students.

DISCUSSION AND RECOMMENDATIONS

The findings of the study revealed that Behavioural Intentions is the most significant factor influencing teachers' attitude in using ICT in the course of their teaching and learning processes. TAM implies that the two behavioural beliefs, PU and PEU, have influence on an individual's intention to use technologies. PU and PEU refer to process expectancy and outcome expectancy respectively, while BI leads to actual use of technologies (Teo, Wong, & Chai, 2008). BI was used in this study as it is a practical way to measure actual use. Thus, it is deemed essential to measure respondents' intention as well as their actual use. In view of the findings that the teachers' behavioural intentions are the most significant factor which influences teachers' attitude in using ICT, they should be provided with opportunities and scope to employ various ICT tools in the course of their teaching and learning processes.

As in similar studies (Cheung, Lee, & Chen, 2005; Saade et al., 2007), TAM is a useful theoretical base that can be employed to understand users' intentions to use ICT. It also confirms that in order to motivate user's to use ICT in their environment, it is essential to demonstrate a positive perception of technology usefulness. This is particularly important as teachers may not have a positive perception of ICT usefulness in teaching and learning.

Given the fact that the intention to use is the major deciding factor in actually using ICT, teachers will be more ready to use and integrate ICT if given tasks and projects to motivate them to use the various facilities and resources widely available to support their teaching process, as well as to enhance their creativity and innovative skills. This in effect will have an impact on their perceived ease of use and perceived usefulness of ICT integration in the course of their teaching and learning processes.

In relation to this, to warrant the implementation of an innovation, in this case, ICT, Hajar Mohd Nor (2005) concedes that the availability of resources is a major condition that must be present in the schools and accessible to adopters. Without adequate resources, both in the form of materials and human support, the integration of ICT in class instruction cannot be carried out properly even though all the other conditions are present.

Abdul Malek Kasim (2002), Hajar Mohd Nor (2005), Mohammed Tajuddin Sidek (2000), Norin Mustaffa (2004) and Zuraidah Saidon (1998) found that teachers who faced the problem of adequate resources cannot make the best use of the ICT facilities although they acquire the skills and knowledge to do so. Apart from the lack of resources, in the Malaysian context,

teachers are also given one off trainings and expected to use ICT widely in their teaching and learning. At most times, they are lost for the lack of technical assistance. This makes them look at ICT as problematic and an issue to use in teaching and learning. Thus, continuous support will bring about comfort and ease of use among the teachers. This will lead to teachers eventually becoming comfortable in using ICT and hence, there will be a change in their attitude towards the use of ICT in teaching and learning.

Teachers require the motivation and continued support to facilitate implementation of an innovation, especially in classroom endeavours (Ely, 1993). On a similar note, Stein (1997) stresses such participation is vital because without it, the integration of ICT in teaching and learning, most likely would not be endeavoured by the teachers.

It is therefore recommended that teachers be given support to use ICT in schools. It is suggested that ongoing professional development be carried out. Peer coaching is a concept that has been researched on and proven to be effective in guiding and supporting teachers on ICT use in teaching and learning.

CONCLUSION

This study has revealed that behavioural intention is influential in teachers' usage and integration of ICT in the course of their teaching and learning processes. Schools should also make state-of-the-art computer facilities available to all teachers as a creative teaching resource in classrooms.

There should also be emphasis on organising and providing continuous staff training to better equip the teachers. The most practical method to achieve these would be to implement initiatives to fully integrate ICT in the teaching and learning of specific subjects such as languages, Mathematics, Physical Education, Science, History and Creative Arts. In more specific, languages and Physical Education can benefit from digital videos and photography, while simulations and animations can enable students to grasp more complex concepts in Mathematics and Science. Thus, it is recommended that teachers be trained on a continuous, instead of on a one-off basis so as to ensure that their IT knowledge progresses and is also upgraded over time (Lau & Sim, 2008).

This study highlights the need for further research, especially qualitative studies to be conducted to investigate the factors that will encourage and motivate teachers to fully use and integrate ICT. Further studies could also be carried out to examine TAM using different sets of samples and a specific range of information technology applications. TAM model could then be expanded to include additional beliefs that could impact the use of ICT such as social influence.

REFERENCES

Chan, F. M. (2002). *ICT in Malaysian Schools: Policy and Strategies*. Educational Technology Division, Ministry of Education, Malaysia. Retrieved from http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan011288.pdf

Cheung, K., Lee, O., & Chen, Z. (2005). Acceptance of Internet-based learning medium: the role of extrinsic and intrinsic motivation. *Information & Management, 42*, 1095-1104.

Davies, D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Fariza Khalid, Mokhtar Hj Nawawi & Samsilah Roslan (2009*).* Integration of ICT in Malaysian Secondary Schools; What conditions will facilitate its use? *International Journal of Learning, 15*(12).

Lau, B. T. & Sim, C. H. (2008). Exploring the extent of ICT adoption among Secondary school teachers in Malaysia. *International Journal of Computing and ICT Research, 2*(2), 19-36. Retrieved May 5, 2013, from http://www.ijcir.org/volume2-number2/article 3.pdf.

Ministry of Education. (2012). *Preliminary Report: The Malaysia Education Blueprint (2013 – 2025)*. Retrieved from http://www.moe.gov.my/userfiles/file/PPP/Preliminary-Blueprint-Eng.pdf

Ministry of Science, Technology and Innovation (n.d.). National IT Agenda – NITA. Retrieved from http://nitc.mosti.gov.my/nitc_beta/index.php/national-ict-policies/national-it-agenda-nita

Nair, I. & Das V.M. (2012). Using Technology Acceptance Model to assess teachers' attitude towards use of technology as teaching tool : A SEM Approach. *International Journal of Computer Applications (0975 – 8887), 42*(2).

Ngah, N. A. & Masood, M. (2006). Development of ICT Instructional Materials Based on Needs Identified by Malaysia Secondary School Teachers. *Proceedings of the 2006 Informing Science and lT Education Joint Conference*. Retrieved from http://eprints.usm.my/5552/1/Development_Of_ICT_Instructional_Materials_Based__On_Needs__Identified_By_malaysia_Secondary_School_Teachers.pdf

Ministry of Education Malaysia & MSC Malaysia (2010). *Policy on ICT in Education Malaysia*. Retrieved from http://www.mscmalaysia.my/sites/default/files/pdf/publications_references/Policy%20on%20ICT%20in%20Education%20Malaysia%202010.pdf

Teo, T., Wong, S. L., & Chai, C. S. (2008). A cross-cultural examination of the intention to use technology between Singaporean and Malaysian pre-service teachers: an application of the Technology Acceptance Model (TAM). *Educational Technology & Society*, *11*(4), 265–280.

Shapka, J. D. & Ferrari, M. (2003) Computer-related attitudes and actions of teacher candidates. *Computers in HumanBehaviour, 19*, 319–344.

Sime, D. & Priestley, M. (2005) Student teachers' first reflections on information and communications technology and classroom learning: implications for initial teacher education. *Journal of Computer Assisted Learning, 21*,130–142.

Sugar, W., Crawley, F., & Fine, B. (2004). Examining teachers'decisions to adopt new technology. *Educational Technologyand Society, 7*, 201–213.

Taylor, S. & Todd, P. A. (1995). Understanding information technology usage: a test of competing models. *Information Systems Research, 6*, 144–176.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Venkatesh, V., Speier, C., & Morris, M. G. (2002). User acceptance enablers in individual decision making about technology: Toward an integrated model. *Decision Sciences, 33*(2), 297-316.

Wixom, B. H. & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research, 16*(1), 85-102.