Intention to Personal Computing among Secondary School Teachers in Malaysia: A Case Shaped by the Technology Acceptance Model

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Abstract

With the recent emphasis in the development of a knowledge based society, this paper provides a springboard by assessing the preponderance of secondary school teachers in personal computing through the application of Technology Acceptance Model (TAM). Chiefly, two main constructs of perceived ease of use (PEU) and perceived usefulness (PU) were used for the said purpose—in combination with 1915 responses gathered from a nationwide mail survey consisting of the 12 states in Peninsular Malaysia. The survey instrument was validated through Principal component factor analysis prior to investigating both, i.e. the relationship between PEU and PU towards the intention to use. PEU was found to have a strong influence on PU. However, it was discovered that PU exerted a stronger influence than PEU in explaining Personal Computer (PC) usage intention. This suggests that PC has to be continually perceived as useful to be used in the long run, while its ease of use is important in promoting initial usage. Implications for policy makers in the education sector are explored further.

Keywords: *Technology Acceptance Model (TAM), perceived ease of use, perceived usefulness, intention to use, Personal Computer (PC), secondary school teachers, factor analysis*

Sub Theme: **Accelerating Access to Education through ICT**

INTRODUCTION

In the past, powerful nations are ones which possess vast tangible resources, e.g. petroleum, gas and gold. In the knowledge based economy, tangible resources are known to erode. Failing to replace such resources with knowledge resources will be the downfall in this new

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era. Malaysia is no exception with a projection from the National Economic Action Council (NEAC), indicating a peak and stagnated growth of its manufacturing sector by 2005 (Mohamad, 1997). In anticipation of such event, Malaysia has developed a few key strategies and policies championed by the Multimedia Super Corridor (MSC). The smart school as one of the flagships of the MSC advocates the objectives of developing technology savvy individuals and eradicating computer illiteracy. Such "giant leap for mankind" strategies began with RM 150 million allocated for 1340 schools to develop their multimedia facilities and computer laboratories, thus paving the way for a revised school curriculum.

Nonetheless, resistance to technology remains considerably high. While technology supported teaching/learning has become increasingly important in education, skepticism is still prevalent among individual educators, including school administrator. Technology advocates, concerned government agencies and empowered teaching/learning paradigm merely become failed-facilitators without an all-encompassing technology acceptance by schoolteachers. As commented by Zuboff (1988) , "It is not the software but human side of the implementation cycle that will block progress in seeing that the delivered systems are used effectively".

Sadly, scant attention has been paid to investigate the level of personal computing acceptance among education providers, albeit the phenomenal impact of technology in the education sector. Thus, this study seeks to inquire into the issue by employing the Technology Acceptance Model (TAM) to predict the intention to use PC among secondary school teachers.

CONCEPTUAL MODEL

The Technology Acceptance Model (TAM) pioneered by Davis (1989) advances the TRA by postulating that perceived usefulness (PU) and perceived ease of use (PEU) are key determinants that inevitably lead to the actual usage of a particular technology or system. Perceived usefulness is defined as "the degree to which an individual believes that using a particular system would enhance his or her productivity" while perceived ease of use is defined as "the degree an individual believes that using a particular system would be free of effort" (Davis, 1989). Between the two, perceived ease of use has a direct effect on both perceived usefulness and technology usage (Adams, Nelson & Todd, 1992; Davis, 1989).
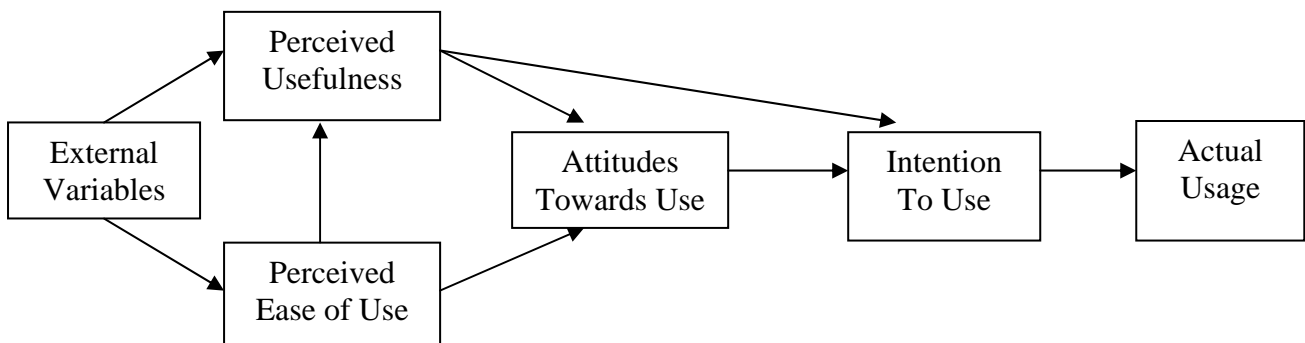

Figure 1: Technology Acceptance Model (TAM) (Davis et al., 1989)

The Research Model

The modified TAM model developed by Davis (1989) is applied to our research context as presented in Figure 2.
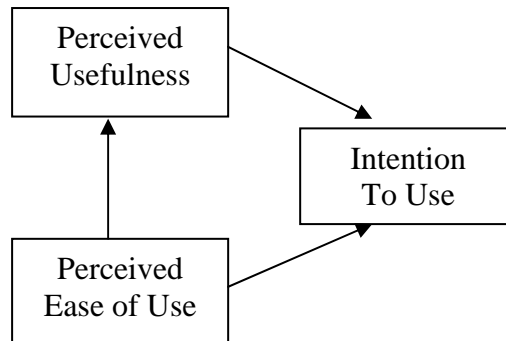

Figure 2: Research Model

In general, a system or technology that is perceived to be easy to use or learn would be anticipated to be more useful to the user. This notion was first supported by Davis, Bagozzi and Warshaw (1989) and again justified through many empirical tests (e.g. Mathieson, 1991; Chau, 2001; Ramayah et al, 2003a; Ramayah et al., 2003b; Ramayah and Aafaqi, 2004) that followed. Therefore, this study expects that:

H_1:   *The perceived ease of use will positively influence the perceived usefulness of PC usage among school teachers.*

Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). Effort is a finite resource that a person may allocate to the various activities for which he or she is responsible (Radner & Rothschild, 1975). All else being equal, an application perceived to be easier to use is more likely to be accepted by the users. Although most researches have found perceived usefulness to be directly related to usage, there are some findings that show no significant effect on usage such as Ndubisi, Jantan and Richardson (2001). There are also many researches that have found ease of use to be influential in system usage (Adams, Nelson & Todd, 1992; Davis, 1989; Ramayah, Dahlan, Mohamad & Siron, 2002; Ramayah et al, 2003a; Ramayah et al., 2003b). Thus we hypothesize that:

H_2:   *Perceived ease of use is positively related to intention to use a PC among school teachers.*

Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). Within the organizational context, a system that is high in perceived usefulness is one that the user believes will have a positive use-performance relationship. Past researches (Davis, 1989; Mathieson, 1991; Adams et al., 1992; Segars & Grover, 1993, Igbaria et al. 1995, 1996, 1997; Ndubisi et al., 2001; Ramayah et al., 2002; Ramayah et al., 2003a; Ramayah et al.,

2003b; Ramayah and Aafaqi, 2004) has shown that perceived usefulness influences computer usage directly. Thus we hypothesize that:

H_3:   *Perceived usefulness is positively related to intention to use a PC among school teachers.*

METHODOLOGY

This study employed a nationwide mail survey through a structured questionnaire adapted from Davis (1989). The population of this study consists of all secondary school teachers in the 12 states of Peninsular Malaysia. The sample was taken using a purposive method whereby 8 teachers were selected from the urban and rural schools in each state, respectively. The teachers selected were educators of Forms 1 and 2 as they are mandated to handle the new curricula. Subsequently, 8 teachers who were not involved in the teaching were chosen to act as a control mechanism. The cooperation from the schools was contributed by a letter from the Education Ministry of Malaysia. A total of 1915 responses were obtained through the nationwide survey.

Goodness of Measure

A factor analysis with Varimax rotation was employed to ascertain the multi-dimensionality of the two constructs (i.e. PEU and PU) to be distinct. The results showed a 2 factor solution with eigenvalues greater than 1.0 and the total variance explained of 62.87%. KMO measure of sampling adequacy was 0.920, indicating sufficient intercorrelations while the Bartlett's Test of Sphericity proved to be acceptable (χ^2=13480.607, p< 0.01). The similar criterion of Igbaria et al. (1995) was used to interpret the rotated factors which were: each item should load 0.50 or greater on one factor and 0.35 or lower on the other factor. Table 1 shows the results of the factor analysis.

Table 1: Result of Factor Analysis for PU and PEU

Items	Factor 1	Factor 2
PEU1	0.232	**0.636**
PEU2	0.315	**0.629**
PEU3	0.363	**0.706**
PEU4	0.297	**0.737**
PEU5	-0.017	**0.688**
PEU6	0.245	**0.609**
PU1	**0.766**	0.263
PU2	**0.848**	0.214
PU3	**0.861**	0.263
PU4	**0.855**	0.252
PU5	**0.832**	0.246
PU6	**0.765**	0.242
Eigenvalue	4.49	3.05
Variance (62.87%)	37.43	25.44
Cronbach Alpha	0.93	0.80
Mean	4.02	3.56
Std. Deviation	0.71	0.65

A second factor analysis with a similar procedure was done to determine the unidimensionality of the intention to use construct. The results confirmed a one factor solution with eigenvalue greater than 1.0 and the total variance explained of 84.29%. KMO measure of sampling adequacy was 0.724, indicating sufficient intercorrelations while the Bartlett's Test of Sphericity was deemed satisfactory (χ^2=4000.374, p< 0.01). Thus it can be concluded that the intention to use is a unidimensional construct as presented in Table 2.

Table 2: Result of Factor Analysis for Intention to use

Items	Factor 1
Usage 1	0.920
Usage 2	0.945
Usage 3	0.888
Eigenvalue	2.53
Variance	84.29
Cronbach Alpha	0.91
Mean	3.88
Std. Deviation	0.86

In addition, Table 3 highlights the influential intercorrelations between the main variables of this study. There is evident predictive validity to investigate further the influence of the relationship between both perceived ease of use and perceived usefulness and intention to use. Perceived ease of use is also positively related to perceived usefulness.

Table 3: Intercorrelation matrix

	1	2	3
1. Perceived Usefulness	1.000		
2. Perceived Ease of Use	0.586[**]	1.000	
3. Intention to use	0.600[**]	0.508[**]	1.000

** p< 0.01

FINDINGS

Table 4 presents the profile of the respondents while Table 5 provides the percentages of tasks engaged by school teachers as part of their teaching responsibilities.

Table 4: Profile of Respondents

Demographic		Frequency	Percent
Position	Ordinary Teacher	1895	99.0
	Afternoon Supervisor	15	0.8
	Headmaster	5	0.2
Gender	Female	1337	69.8
	Male	578	30.2
Age	18 --23 years	44	2.3
	24 – 30 years	339	17.7
	31 – 36 years	534	27.9
	More than 36 years	998	52.1
Use computer to teach	Yes	1158	60.5
	No	757	39.5
Experience	Less than 2 years	184	9.6
	2 – 5 years	279	14.6
	6 – 9 years	382	19.9
	More than 9 years	1070	55.9
Education Level	Teaching Certificate	247	12.9
	Diploma	207	10.8
	Degree	1361	71.1
	Master	100	5.2
Own personal computer	Yes	1728	90.2
	No	187	9.8
School Category	Urban	1070	55.9
	Rural	845	44.1
Class	Form 1	806	42.1
	Form 2	1109	57.9
Involved in teaching	Yes	1177	61.5
	No	738	38.5

Table 5: Type of Usage

Task	Percentage
Preparing Letters	96.0
Students Bio data	83.6
Entering marks	91.5
Student notes	61.3
Student exercises	85.8
Meeting reports	93.8

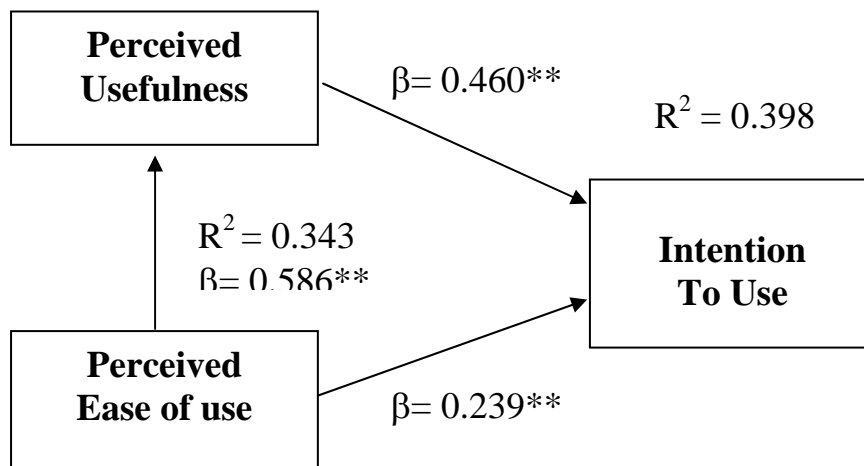Figure 1 shows a summary of the regressed hypothesized relationships.

Figure 3: Results of the regression analyses

Perceived ease of use is found to have a positive influence ($\beta = 0.586$, p<0.01) on intention to use (H_1 supported). The positive paths from perceived ease of use ($\beta = 0.239$, p<0.01) and perceived usefulness ($\beta = 0.460$, p<0.01) to intention to use also exhibits support for H_2 and H_3 of the study. Both ease of use and usefulness collectively explain 39.8% of the variation in the intention to engage in personal computing, with perceived usefulness being the more dominant driver.

DISCUSSION AND CONCLUSION

The findings suggest that the Technology Acceptance Model (Davis, 1989) is a valid model that can be used to predict PC usage amongst teachers in Malaysia. This was concluded from the regression analysis which registered a high R^2 value of approximately 40 percent. Perceived ease of use was found to have a positive impact on the perceived usefulness of PC. In general, the findings support the notion that a system or technology that is perceived to be easy to use or learn would be projected as more useful from the perspective of the user (Davis, Bagozzi & Warshaw, 1989; Mathieson, 1991; Chau, 2001; Ramayah et al., 2003a; Ramayah et al., 2003b; Ramayah & Aafaqi, 2004).

Perceived ease of use was also found to have a positive influence on the intention to use a PC among secondary school teachers. As noted earlier in the literature, all else being equal, an application perceived to be easier to use is more likely to be accepted by the users. (Adams, Nelson & Todd, 1992; Davis, 1989; Ramayah, Dahlan, Mohamad & Siron, 2002, Ramayah et al, 2003a; Ramayah et al., 2003b).

Perceived usefulness was the more influential driver in our study in predicting the intention to use PC among secondary school teachers. As discussed earlier, a system that is high in perceived usefulness is one that the user believes that will reduce his/her task ambiguities and eventually increase work-related performance. This concurs with past researches (Davis, 1989; Mathieson, 1991; Adams et al., 1992; Segars & Grover, 1993, Igbaria et al. 1995,

1996, 1997; Ndubisi et al., 2001; Ramayah et al., 2002; Ramayah et al., 2003a; Ramayah et al., 2003b; Ramayah & Aafaqi, 2004) which have shown that perceived usefulness influences computer usage directly.

The findings imply that teachers have to be educated on the importance and usefulness of PCs in expediting their responsibilities. Few benefits arises from PC usage includes enhanced productivity in the delivery of job responsibilities, e.g. a reduction in the need for repetitive preparation of exam questions and student exercises due to the power and flexibility afforded by the widespread software applications, which ranges from word processing to database management.

PC will continue to be useful to the teaching profession in the future. Thus teachers have to rise to the call for a knowledge based society. Although early indicators show that these teachers are using PC in most of their tasks to a great extent, they should remain complacent due to the ever upgrading software applications. Given the short software life-cycle, it is imperative that school teachers need to upgrade their PC related knowledge continually.

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