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Teachers' Readiness to Use Technology in the Classroom: An Empirical Study

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Abstract

The growing body of literature associated with educational computer use has examined numerous variables and interrelationships in order to gain a better understanding of computer beliefs and use of computers within education. Teachers' computer acceptance is an important factor to the successful use of computers in education. Thus there is a need to examine the factors affecting teachers' computer use and its implications to teachers' professional development strategies. This article reports a research on the relationship between actual usage of computer (AUC) and technology acceptance constructs among secondary school Mathematics, Science and English language (MSE) teachers in Malaysia. Overall, the study found that the AUC among MSE secondary school teachers were at the moderate level. Meanwhile, the constructs of attitude, perceived usefulness, perceived ease of use, job relevance, and computer compatibility showed significant positive relationship with AUC. Practical recommendations for school administrators and teachers been discussed.

Keywords: Information technology, secondary schools, classroom, teachers, Malaysia

Introduction

Organizations of all types and sizes, including schools, have recognized that the usage of computers in the work environment is important as it presents with unprecedented challenges that helps individuals to acquire an inquiring, critical and creative mind to capitalize on the opportunities driven by the explosive growth of information, knowledge and technology. Indeed computer technology had begun influencing students' learning experience for more than 25 years ago though it was only in a moderate manner (Cuban, 2001). However, for the past decade there is a major push toward integrating computer technology into public classrooms because of the vast promise it offers such as cheap, accessible and instantaneous information, enormous potential for interactivity and media-rich communication and powerful educational tools it will put at the service of students (Mouza, 2002). Geisert and Futrell

(2001) exclaimed that if teachers were to revolutionize their classrooms with computers, ordinary students would make massive gains, wherever illiteracy is a problem, it would be dissolved, and students would have immense new vistas opened to them. Moreover, policy makers hoping to improve the quality and quantity of student learning have become increasingly willing to make major investments of fiscal and human resources into hardware, software, and training.

Information technology (IT) has opened wide opportunities for educators to integrate technology-supported materials in the teaching-learning process and to improve the achievement of students (Jonassen, 1995). The use of computer-aided technology in the classroom will, no doubt, inspire the teachers to approach their tasks with a greater sense of purpose and, more importantly, a sense of play to make the learning process fun for students. Using computer-based technology such as data-logging and simulations is important for modeling subjects such as science and mathematics. Modeling is an important part of science and computers are good for modeling things such as nuclear testing and molecules calculations. Furthermore, the availability of vast amounts of up-to-date information in the teaching and learning of different subjects are found on the World Wide Web. The internet provides far more up-to-date information than text books. Besides, looking for books and go in search for them and then discovering that it is not the one that has the kind of information you want can be time consuming and frustrating. The Net, on the other hand is very efficient. Up and above that, textbook can become obsolete with out off date information that could misguide students into believing that there is no further development after that discovery.

It is also an undeniable fact that the multimedia and interactive nature of software programmes on CD-roms and on the World Wide Web assist with students' learning. The computer motivates and caters for different learning abilities. Students generally enjoy using the computer and with enjoyment come motivation. In particular, the presence of computer-based technology changes the way subjects such as science and mathematics is being taught. It is believed that the current era relate to computers as part of their up-bringing and being relevant in a technologically oriented society. In the homes of increasing number of students, computers play an essential role in students' recreation and learning. It changes the way different subjects such as science is taught as IT tends to accord more closely with the way students think (Dywer, 2000).

Undoubtedly the recent advancement in information technology innovations and computer usage is rapidly transforming work culture and teachers cannot escape the fact that today's classrooms must provide technology-supported learning (Angers & Machtmes, 2005). Being prepared to adopt and use technology and knowing how that technology can support student learning must become integral skills in every teacher's professional repertoire. District and school policy and professional development workshops and training are designed to positively influence teachers' adoption and usage of computer technology. However, the usage of computer technology in the classroom has been slow over the years (Krysa, 1998).

Recognizing the paramount of importance of information technology, many countries including Malaysia have formulated special projects to enhance the usage of information technology. In the last two decades, Malaysian schools have experienced a dramatic growth in the use of computer-based technology for education purposes. During the 2003 budget speech, the then Prime Minister of Malaysia, YAB Dato Seri Dr. Mahathir Mohammad had announced that the government would implement the teaching of mathematics and science using softwares in English language in schools. Since then the Malaysian Education Ministry has given support and assistance to the Mathematics, Science, and English language (MSE) teachers in the form of providing Information and Communicating Technology (ICT) facilities, that is, ICT tools and teaching coursewares for use by the teachers to teach besides giving them additional financial incentives.

Moreover, the Malaysia Government had also allocated special budget for the training of MSE teachers and they were given three types of training that is English Language proficiency training, Curriculum Orientation and Pedagogy Course, and ICT Usage (Hishammudin, 2005; Sharifah, 2002). Such training or retraining is essential to give the MSE teachers the confidence and the necessary skills to enable them to actually use the computer in schools. Besides, the recent Malaysian Minister of

Education declared on the on-going massive distribution of the IT tools to schools in 12 states and at present almost all schools are equipped with IT tools. In line with this, MSE teachers should be ready to adopt and use computers and students should benefit and be geared towards the realization of vision 2020. The investment on MSE teachers are also anticipated to create a technologically literate workforce who in turn would generate a future generation that would be competent and confident to perform in a global, IT-intensive work environment. However, in the school settings, one of the major obstacles faced is the non-extensive usage of computers by the educators for classroom instruction. Clearly, something should be done to identify the root cause of this problem.

In Malaysia, a goal has been set by the Ministry of Education that by the year 2008 all schools should be using computers to teach Mathematics, Science and English language. Since 2003 the Ministry has introduced laptops in the teaching of mathematics and science in English under the Teaching and Learning of Science and Mathematics in English Programme. A total of 27,543 MSE teachers were given training in the year 2002 by the Ministry besides placing these teachers under the incentive scheme that covers the paying of critical allowances, salary increment and promotions. The above policy requires MSE teachers to integrate information technology in the process of teaching and learning.

However, in the preliminary observations it was found that MSE teachers are not fully utilizing these facilities in their teaching (Chong, Sharaf & Jacob, 2005). Although teachers are sent in batches for training to gain knowledge and skills in the Actual Usage of Computer (AUC) and ICT equipment, many have returned only to fall back onto their traditional mode of teaching. On average the MSE teachers in Malaysian schools only used ICT equipment for about 29 hours in the two year period which is considered to be very low (MHS, 2005).

According to Carlson and Gadio (2003) teachers' acceptance of technology is absolutely essential if technology provided to schools is to be used effectively. Simply put, it would be a sheer waste spending resources equipping schools with computer hardware and software without taking into account whether teachers' are comfortable using computers in schools. Studies carried out around the world in developed, industrialized and information based countries showed that teachers' use application of technology is the key determining factor for improved student performance in knowledge acquisition and skills development enabled by technology (North Central Regional Educational Laboratory, 2002). Educational technology is not, and never will be, transformative on its own - it requires teachers who can integrate technology into curriculum and use it to improve student learning.

Thus, it is clear that computers cannot replace teachers since teachers are the key to whether technology is used appropriately and effectively. Even if there are students who could learn independently how to use technology to enhance their learning and skills development, with little or no improvement from their teachers, they are highly unlikely to improve since teachers remain the gatekeepers for students' access to educational opportunities afforded by technology (Stryker, 2000). Hence, it is important for teachers to be computer literate, and be prepared to use information technology in schools.

Many attempts have been made to gain insight on the adoption of computer by secondary school teachers (Faw, 2005; Martin & Ofori-Attah, 2005; George, McEwin & Jenkins, 2000; Kellenberger & Hendricks, 2000; Brunner, Cornelia & William, 1999; Gibbons & Fairweather, 1998). Gibbons and Fairweather (1988) state that generally teachers use computers not just for the process of teaching and learning but also for a number of other reasons, though they may deem to be job-related. Furthermore, Martin and Ofori-Attah (2005) and Kellenberger and Hendricks (2000) identified that the AUC by teachers are divided into three main components namely, for teaching purposes, administration purposes, and personal purposes. In terms of teaching and learning, the actual usage of computer by the teachers in classrooms is mainly to impart knowledge, create variety, and to give them the confidence in the process of teaching and learning (George, McEwin & Jenkins, 2000; Kellenberger & Hendricks, 2000). Besides, Martin and Ofori-Attah (2005) state that teachers also use the computer to ease their administrative works especially in preparation of job-related materials and to

ensure the safe-keepings of data and information about students. On top of it, teachers resort to the computer for personal use too that would enable them to engage their free time in a beneficial and fruitful manner (Gibbons & Fairweather, 1998).

There have been many studies that were implemented to identify factors that facilitate or prohibit computer usage among teachers (Mumtaz, 2000). Based on the prominent models of IT usage, there are a number of personal, behavioral, and environmental factors that influence a teacher's use of technology and this could be classified as the technology acceptance constructs (Hu, Clark & Ma, 2003). Personal and behavioral factors that have been identified frequently are attitude, perceived ease of use, perceived usefulness, self-efficacy, and computer compatibility. On the other hand, the environmental factors of subjective norm and job relevance too may contribute to or inhibit teachers' performance in using computers (Dusick, 1998).

Despite the tremendous increase in the role of IT in education, it is facing considerably high resistance (Hu, et al., 2003; Gilbert, 1996). Rovai and Childress (2003) mentioned that many teachers actively resist using computers even though there are ample researches that clearly show achievement and opportunities to learn would increase with the application of information technology. As a result, fostering technology usage among individual teachers remains a critical challenge for school administrators, technology advocates and policy makers. Thus, it is reasonable then to identify conditions and determinants of technology usage among teachers in order to realize the shift of paradigm in the usage of computer with the advent of IT. The present study attempts to determine the AUC by MSE secondary school teachers, to describe the levels of the components of technology acceptance constructs among MSE secondary school teachers, and the factors that influence the degree of their technology usage that results in the AUC in classroom teaching.

Method

Self-administered questionnaire was employed to gather data for this study. The AUC means the intensity of the computer usage by the MSE teacher which would be measured in terms of how frequently the computer is used for job related and personal tasks. Hence, the AUC is divided into three subscales of (a) teaching and learning, (b) administration, and (c) personal needs. Forty three items were used to measure the AUC on a Likert scale with continuum from "1" equivalent to "never" and "5" represented "always". The AUC instrument developed by Kellenberger and Hendricks (2000) was adapted, refined and used in this study due to a number of reasons. The instrument focused on the AUC by school teachers and it is in tandem with the subjects in this study, that is, the Mathematics, Science and English language secondary school teachers. Moreover, the instrument was comprehensive in the sense that it divided the AUC by schoolteachers in not only preparation for /actual teaching and learning but two other elements, that is, administration and personal needs. This is believed to give a better picture on the AUC by the MSE secondary school teachers in Selangor, Malaysia. Furthermore, to the researchers knowledge there is yet any study on AUC among secondary school teachers in Malaysia that have used this instrument. A total of eighty six items were used to measure the technology acceptance constructions. Each statement of the instrument was measured on a common Likert scale, continuum of 1 to 5 with "1" representing "strongly disagree" and "5" representing "strongly agree". The items in the technology acceptance constructs were adapted from prior studies which have already established their reliability and validity (Davis, 1989, Hu et al., 2003; Luarn & Lin, 2004; Malhotra & Galletta, 1999; Shih, 2004, Venkatesh & Davis, 1996). The Cronbach alpha of all constructs (AUC and TAC) were between .80 - .92, exceeding Nunnally's (1978) recommended threshold of .7. Thus, the instrument used in this study showed a good level in terms of reliability.

The accessible population in this study was MSE secondary school teachers in the district of Petaling in Selangor and this constituted a total of 65 secondary schools with 3,432 teachers. Different statistical tests were conducted to calculate the required sample size using the GPower proposed by Faul and Erdfelder (1992) and Yamane (1967). The total sample size needed for this study was 358 seeing as it was the maximum value obtained from the calculation. The survey was distributed and

collected via help of principals of the respective schools. Out of 358 distributed questionnaires, 318 valid responses were obtained and used in the final analysis. Descriptive statistics and Pearson Product Moment Correlation were performed using the Statistical Package for Social Sciences (SPSS).

Findings and Discussion

Actual Usage of Computers

Previous studies have shown that the secondary teachers in Malaysia have low and moderate levels in their AUC (Sia, 2000) and this may adversely affect the successful implementation of the education policies, and in the long run, the attainment of the goals of Vision 2020. To overcome this problem, the Malaysian Government has embarked on intensifying computer training programs for teachers to ensure that they have the adequate knowledge and skills in the IT arena. Hence, one of the pertinent aims of this study is to determine the current levels of MSE secondary school teachers' AUC.

The levels of AUC among the respondents were based on the mean scores of the three subscales of the variable. Three levels of AUC were categorized and they were Low ($1.00 \leq M \leq 2.50$), Moderate ($2.50 \leq M \leq 3.50$), and High ($3.50 \leq M \leq 5.00$). The findings as in Table 1 shows that majority of MSE secondary school teachers were still experiencing moderate levels in terms of their AUC whereby it accounted for 61.6% of the total respondents with a mean score of 3.39 and a standard deviation of 0.35. However, none of the respondents were at the low levels of AUC while 38.4% account for high level. The nature of such a finding that states an overall low level of AUC that was negligible could imply that the various training programs that have been conducted throughout the years have proved to be beneficial. Most MSE secondary school teachers who have attended such programs have begun to be more computer literates.

Table 1: Descriptive statistics for AUC and its Subscales (N=318)

Variable	Level	n (%)	Mean	SD
Overall Actual Usage of Computer			3.39	0.35
	Low Moderate High	0 (0) 196 (61.6) 122 (38.4)		
Teaching and Learning			3.44	0.38
	Low Moderate High	0 (0) 205 (64.5) 113 (35.5)		
Administration			3.94	0.42
	Low Moderate High	0 (0) 71 (22.3) 247 (77.7)		
Personal Needs			2.79	0.44
	Low Moderate High	150 (47.2) 85 (26.7) 83 (26.1)		

Note: *Low* ($1.00 \leq M \leq 2.50$); *Moderate* ($2.50 \leq M \leq 3.50$); *High* ($3.50 \leq M \leq 5.00$)

It is also note worthy that this study was conducted in urban and semi-urban secondary schools where most schools may be equipped with computer laboratories. Furthermore, most MSE secondary school teachers are also provided lap-tops to encourage the computer usage in the teaching-learning process. It could be due to these reasons that a moderate level of AUC was attained.

It cannot be discounted, however that the MSE secondary teachers have not shown a high level of AUC. This would be further elaborated and discussed later. In the mean time, it is good to note that the findings of this study suggest that more Malaysian MSE secondary school teachers are using computers in schools. This finding is consistent with the finding of Wong et al. (2002) but is not consistent with the finding of Norhayati (2000), Sia (2000), and Abdul Wahid (1998), as they reported

low to average usage of computer. This may be due to the different sample used, and lack of computer training for teachers during that period of time.

As mentioned earlier, the vast majority of MSE secondary school teachers in this study were from urban and semi-urban schools and this could also have played a key role in ensuring more usage of computers. On top of it, since the study was carried out in schools that were utilized with at least one computer laboratory and some laptops, this might have contributed to the greater usage of computers since accessibility to computers is available in schools.

Moreover, teachers in these schools might have schedules in their personal timetable that allowed them to use computer for their teaching and learning purposes. Besides, the on-going efforts of the Malaysian Ministry of Education to provide computer training to teachers and giving out lap-tops to MSE teachers could also be fundamental in ensuring further usage of computers.

The survey, however pointed to an alarming state of the actual finding. Instead of the AUC for the subscale of Teaching and Learning, the high usage was found to be for the subscale of Administration works. It was at a moderate level for the subscales of Teaching and Learning (M=3.44, SD=.38) and Personal Use (M=2.79, SD=.44). The reason for the inclusion of the levels of AUC in these three categories namely, Teaching and Learning, Administration works and Personal Use, was to find out the accessibility and ease-of use of computer by the MSE secondary school teachers. It reflected instead that most of the MSE secondary school teachers seem to use the computer for the administration works rather than to teach or prepare teaching materials. This could be so due to the fact that teachers, in general, are now burdened with numerous administrative works such as keying personal data, students' data, marks and preparation of examination questions and mark schemes. On top of that, most teachers, inclusive of MSE teachers could be form teachers and also teacher-advisors of various clubs, societies and games. These too demand much of the teachers' AUC in the preparation of numerous forms, letters, timetable, schedules and reports.

The fact remains that MSE teachers need to use the computer more for teaching and learning purposes rather than administrative works. The teachers' preference to the AUC to be used in the classroom should be supported by the authorities with no interference of any kind (Chong, Sharaf & Jacob, 2005). Therefore, the policy makers must take into account of the present scenario and consider the seriousness of this matter.

Relationship between Technology Acceptance Constructs and AUC

Table 2 depicts the level of technology acceptance constructs of MSE secondary school teachers. The mean ratings for the technology acceptance constructs in descending order of high to low are attitude, computer compatibility, perceived usefulness, perceived ease-of-use, job relevance, subjective norm, and computer self-efficacy. These constructs were measured on a five-point scale ranging from "1" strongly disagree" and "5" "strongly agree".

Table 2: Descriptive statistics for Technology Acceptance Constructs

Variable	Mean	Std. Deviation
Attitude	3.6795	.28871
Perceived Usefulness	3.5023	.35518
Perceived Ease of Use	3.3808	.40709
Computer Self Efficacy	2.6293	.38901
Computer Compatibility	3.5548	.41377
Job Relevance	3.3339	.31255
Subjective Norm	2.9240	.30911

The following discussion will focused on the nature and the strength of correlation between respondents' AUC and the technology acceptance constructs. In doing so, it helps to identify to what extent technology acceptance constructs independently influence the AUC among secondary school teachers. The relationship between AUC and technology acceptance constructs was investigated using the Pearson-Product Moment correlation coefficient and the relationships between each of these

variables are depicted in Table 3. The Guilford simple rule of thumb was used as a guideline to describe the strength of the relationship. Preliminary analyses were performed to ensure no violation of the assumptions of normality and linearity.

Table 3: Pearson's Correlation between AUC and Technology Acceptance Constructs

Variable	AUC	Teaching & Learning	Administration	Personal Needs
Attitude	.162**	.144**	.186**	.278**
Perceived Usefulness	.526**	.265**	.377**	.282**
Perceived Ease of Use	.590**	.120*	.496**	.347**
Computer Self Efficacy	-.006	-.020	-.108	-.081
Computer Compatibility	.268**	.144**	.101**	.206**
Job Relevance	.462**	.085*	.379**	.282**
Subjective Norm	.107	.045	.251	.023

Note: ** Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

Attitude and AUC

Attitude in this study is referred to a teacher's general feeling of favorableness or unfavorableness toward computer. It is important to take into account the influence of attitude toward AUC since if teachers demonstrate proficiency in integrating computer technology in the process of teaching and learning but do not believe that computer technology has a use in the classroom, then they will probably not teach with computers despite their proficiency (Ropp, 1999). Numerous studies have shown the impact of attitude in predicting the AUC (Shih, 2004). Previous literature suggests that positive attitude would bring forth to a higher AUC. Similar result was found in this study whereby there is a significant positive relationship between attitude and AUC (r=.162, p=.003) of MSE secondary school teachers.

Moreover based on this study, it can be construed that teachers who viewed computer technology as positive were able to demonstrate greater usage of computer while those who viewed technology from a negative perspective did not acquire and integrate knowledge and skills on computer technology in their classrooms. It coincides with previous findings of other researchers that identified an apparent dominance of attitude with regard to computer use (Shih, 2004; Rovai and Childress, 2003; Yildirim, 2000; Becker, 1993; Woodrow, 1992).

Perceived Usefulness and AUC

Past studies have also investigated the impact of perceived usefulness and perceived ease of use on AUC and have identified signified positive results between these constructs (Hu et al., 2003). The findings of this study identified identical results. There was a significant positive relationship between perceived usefulness and AUC (r=.526, p=.0001) of MSE secondary school teachers and the results are in tandem with previous findings (Hu et al, 2003; Venkatesh & Morris, 2000).

The positive relationship points out that as the perceived usefulness of computer amongst MSE secondary school teachers' increases, they experience better AUC. This is not surprising and it could be influenced by several factors and the most important of them all is that as teachers find the application of computer technology to be more useful, they would be determined to make full use of it.

Perceived Ease-of-Use and AUC

There had been contradictory ideas on the significant effect of perceived ease of use on AUC as some researchers found evidence of the significant effect while others proved otherwise (Luarn & Lin, 2004). In this study, it was identified that there was significant positive result between perceived ease of use and AUC of MSE secondary school teachers. However, in comparison based on the magnitude

of relationship, it was found that perceived ease of use (r=. 590) has a slightly higher magnitude compared with perceived usefulness (r=.526) on AUC among MSE secondary school teachers.

Based on this comparison, it could mean that perceived ease of use does have a great impact on AUC. This implies that teachers are likely to accept a technology simply because it is easy to use and this is similar to what had been stated by Davis, Bagozzi, and Warshaw (1992). Moreover, this finding also showed that MSE secondary school teachers perceive the ease of use of a particular system as slightly more important in contrast to the usefulness of the system in their quest towards using the system. This is in tandem with other studies of the past like Venkatesh and Morris (2000) and Agarwal and Prasad (1999). Thus, the importance of perceived ease of use should not be discounted. The outcome of this study showed that perceived ease of use has a strong influence on teachers' AUC. The positive linear relationship between perceived ease of use and AUC implied that the degree to which a teacher considers computer to be easy to use has a positive effect on his or her AUC.

Computer Compatibility and AUC

The finding of this study revealed that computer compatibility plays an important role in determining the AUC among MSE secondary school teachers. There was a positive linear relationship between computer compatibility and AUC and the strength of the relationship is (r=.268, p=.0001). The finding is parallel to the past research by Hu et al. (2003) and Morton (2002). Teachers perceive the importance of being compatible with computers as something that need to be given due attention for their AUC. Hardware and software compatibility unswervingly has an impact on a teacher's perception of a technology. By being compatible with computers they would have the depth of knowledge and understanding of computer hardware and software, how they function, and their advantages and disadvantages. Thus, it was not surprising to find similar results in this study as in the previous research and the alternative hypothesis was found to be true. Hence, the conclusion is that the higher is the teachers' computer compatibility perception, the greater is the AUC among teachers.

Job Relevance and AUC

Many researchers have explained that relevance of computer technology on teachers toward their jobs is a significant factor in the implementation of computers in education (Delcourt & Kinzie, 2002; Kellenberger, 2001; Marcinkiewicz, 1994). Teachers felt that their adoption of computer technology was successful and satisfactory when they could use it to seek and obtain job relevant information.

The study showed positive linear relationship between job relevance and AUC (r=.462, p=.0001). The finding implied that teachers generally view the importance of computers towards their job as important in determining their AUC and it is concurrent with previous findings (Becker & Riel, 2002; Kellenberger, 2001). The outcome pictures that if secondary school teachers intend to increase on their AUC, then the computer technology used must be relevant to their profession.

Computer Self-Efficacy and AUC

Previous studies have shown the impact of computer self-efficacy towards AUC. It is commonly known that if one believes that he or she has the ability to perform specific tasks, then he or she would be determined to accomplish the task (Compeau, Higgins, & Huff, 1999). For example if someone believes of his or her ability about using a software package, then he or she would have the confidence to use a computer. Studies carried out by researchers, for instance, Kukafka et al. (2003), Zhao et al. (2002), and Pajaras and Kranzler (1995), showed that computer self-efficacy has a highly positive Significant relationship towards AUC.

The data obtained from this study showed that there was no significant linear relationship between AUC and computer self-efficacy. The finding of this study is definitely in contradictory to what had been identified by most of the other researchers. However, Hu et al. (2003) found that the net influence of computer self-efficacy on individual's usage of computer decreases with added experience on computer usage. This could perhaps explain the finding of this study. Since it was identified earlier,

that the majority of the respondents are having moderate levels in their AUC thus computer self-efficacy does not have an impact on their decision to use the computer.

Subjective Norm and AUC

In this study, subjective norm is referred to the working environment that influences an individual to make decisions. Previous research has shown the effect of subjective norm towards AUC. It was identified that there is a positive and significant relationship between subjective norm and AUC (Guha, 2003; Stefl-Mabry, 1999; Taylor, 1996). Teachers' readiness to use computer technology would increase with strong support from their colleagues, school administrators, and communities.

Despite the impact of the construct of subjective norm on AUC as demonstrated in previous research, in this study it showed a vice versa result. There was no significant relationship between subjective norm and AUC. The finding of this study showed that AUC is autonomous from the influence of subjective norm.

There could be a couple of explanations to this finding. As stated by Chong, Sharaf and Jacob (2005) the majority of the secondary school teachers in urban schools are self-directed in pursue to acquiring knowledge and skills needed for them to use computers. Or it could be that they perceive that the usage of computers in school is important for their self-development in their career and they do not require the additional support from their peers, administrators or communities.

Thus, the results imply that generally MSE secondary school teachers have the ability and confidence to use computers, and they are self-directed in terms of the usage of computers. This outcome could also perhaps mean some good news to the policy makers in their pursuit towards having more teachers to use computers since teachers believe that they have the ability to use the technology found in computer and they do not have to depend on their colleagues, school administrators, and others for them to utilize the technology.

Conclusion

The study showed that the AUC among secondary school teachers are at the moderate levels and thus more efforts need to be undertaken by teachers to improve on their usage of computers. These include investing in getting a computer besides taking their own initiative to acquire knowledge and skills pertaining to computer technology. The moment the MSE secondary school teachers see the light that the AUC makes the lesson interesting, exciting and easier to teach, they would perceive its usefulness and job relevance. It is the attitude of these teachers that need to accept the fact that teaching with the AUC is contemporary and teaching the old style will make them archaic. The benefits from the AUC must be realized as compatible and manageable.

Policy makers appear convinced that computer technology is essential if students are to be prepared to face the challenges of the borderless world. It is undeniable then that computers have become a potent production tool and it offers exciting approaches to teaching and learning, and if this technology is used extensively, and in proper manner, it could bring progress that would improve education radically. School administrators must lead the way to encourage technological development of teachers since this study had identified perceived ease of use, perceived usefulness, computer compatibility, job relevance, and attitude as pertinent factors in influencing the AUC. They could give several aspects of support.

Firstly, the administrators, namely the school principal, should encourage teachers to continue developing technology based skills. When there is a need for the MSE secondary school teachers to attend information technology courses, they should be allowed to go for these courses. It is recommended that teachers be constantly asked if they need to attend information technology courses and the feedback must be sent to the government for further action. The administrators need to be more open minded about towards the suggestions by the teachers and act accordingly. If a teacher feels handicapped and wishes to attend a course in information technology, then the teacher's wish must be

granted and should be recommended for the next course. This will make the teachers move towards the usage of the computer and find it useful in no time.

Secondly, the administrators should encourage teachers to pursue methods and strategies that link to their curriculum utilizing the latest computer technology. The MSE secondary school teachers who have already attended the course should be observed if the knowledge they have acquired is put to good use. If necessary, a one-to-one dialogue between the administrators, in this case the Head of Department, and the teacher concerned must be carried out to find out the reason why if the teacher concerned is not utilizing the skills acquired. If necessary the teacher in question should be sent for further training till the teacher becomes comfortable and finds the AUC to be easy and compatible.

Thirdly, the administrator should provide a built-in school time-table to develop teachers' computer skills without appearing that they are not performing their jobs. An illustration on this would be that a MSE secondary school teacher be given, say, two periods less but included as his/her teaching period whereby the teacher must be in the computer laboratory with an expert to have hands-on experience to be confident with AUC. By taking this measure, the MSE teachers will be further exposed and become immune to the information technology tools. It will become a daily necessity and so a part and parcel of their teaching accessory. In time to come, all MSE teachers will find the computer easy to handle and a tool that is of most relevant to their job. The school administrators can call a stop to this once a MSE secondary school teacher has acquired adequate knowledge and confident in the AUC. Other junior MSE teachers will pursue on.

On top of it, the Principal should reduce internal problems by discussing a school vision and philosophy that support computer technology and how technology will be implemented and its impact on school culture. To ease the burden of the government, the administrators could, on their own initiative, try to raise funds to complete their laboratories and classrooms with the necessary hardware. This will encourage the teachers to play their role in using the hardware that had been purchased with much trouble and effort.

School administrators should also provide incentives and recognition to teachers who had attended and successfully completed a computer-training program. Teachers' need rewards and administrative support if they are being asked to open to technology change and incorporate these practices into new teaching methods. Hence, teachers should be given appropriate incentives so that it would create excitement among them to crave for technology. They could be asked to conduct in-house trainings and seminars to share their ideas to the rest of the teachers and relate the usefulness of the computer. This will not only make the teacher proud of his/her achievement but also further instil the need to use the computer in the teaching-learning process.

The administrators should also be careful and generous with the purchase of software for the school. A teacher who knows well about the works of the hardware and software should be assigned to look into this matter, probably a computer expert with the subject teacher concerned. Software should be checked thoroughly if it is user friendly before it is purchased. No teacher would be prompted to use the software that would pose too much of difficulties when wanting to use. Where generosity is concerned, a substantial amount should be placed aside for the purchase of software, apart from that which will be supplied be the government.

By doing the above, school administrators would support to enhance teachers' AUC as they had provided the resources for teachers, kept their teachers to focus on the implementation of computer technology without any internal and external distractions, had assisted teachers' trials of new innovation, and had modified existing policies to embark on a new paradigm shift. However, regardless of the suggestions and recommendations made, the elevation of the AUC among school teachers very much still depends on the teachers themselves. It boils down to the fact that they need to change their attitude towards the acceptance of the AUC. They need to change their mind-set from being a computer illiterate to one who is a competent and comfortable user of the computer. If they think of computer technology positively and take necessary measures to ensure that they are increasing their levels of AUC, whatever problems they might have, will diminish and finally be eliminated. After all, the greatest enemy to change is the individual himself.

It is indeed true that the implementation of the above by both the government and administrators may take time. To install the hardware in all classes and to be equipped with the best user friendly software is in fact a long term project. In time to come, hopefully within the next decade, this will become a reality in all schools. In the mean time, MSE secondary school teachers need to understand the need and importance of AUC and act accordingly. If, at the time being, students need to be taken to the computer rooms where the hardware is, then the teacher must take the effort and initiative to guide them there for the sake of the AUC. The students will benefit but the teacher needs to be more industrious and hardworking. So it would be with the case of getting the best software. The MSE secondary school teachers concerned need to watch the software prior to the lesson as decide if the software is appropriate to be used in class. Apart from that, until the school is fully equipped with the relevant software, teachers need to be on the look out for good software in the market and purchase them, even if they would have to use their own money first. Thus we see that with the recommendations for the Malaysian government, administrators and MSE secondary school teachers, it is anticipated that by 2020 Malaysia will be utilizing the information technology in a wide scale that would place her at par with the rest of the first world countries. Teachers and students will be working their way into the world of information technology with ease as they would have accepted its ease of use, usefulness, compatibility and job relevance.

Implications

The study has significant implications for the question often asked by researchers on information technology for teacher-education on the ineffective acceptance of school teachers on new technology and usage of computers, and negligible performance improvements resulting from technology implementation. IT is, though widespread and sounds ancient, is still new and ever evolving with numerous factors surrounding its usage that affects its actual usage by all teachers (Kukafka et al., 2003). Much so, the study thus implies that there are a number of factors that are in relation to the AUC by the MSE secondary school teachers which throws light onto the reasons for the nature of AUC by MSE teachers in secondary schools.

Limitations

The findings of this study should not be generalized to all MSE teachers in Malaysia, as the respondents involved were MSE teachers in a particular state in Malaysia. This population was selected because of ease of accessibility due to time constraint and limited financial resources. Moreover, the participants who took part in this study were teaching in urban and semi-urban schools in the state of Selangor and the outcome might be different if participants from rural schools were included. Thus, this places a limitation on the generalization that could be made on the findings of this study. The study relies very heavily on the honesty of its respondents. Some respondents might have a different attitude participating in this study, as they might perceive it as 'sensitive' to reveal the truth about them.

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