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Do Teacher Related Factors Play a Role in Laptop Use for Teaching-Learning?

Su Luan WONG[a*] & Priscilla Moses[b]
[a]*Faculty of Educational Studies, Universiti Putra Malaysia, Malaysia*
Faculty of Arts and Social Science, Universiti Tunku Abdul Rahman, Malaysia
*suluan@upm.edu.my

Abstract: Equipping laptops to Malaysian teachers is a much needed step to advance the education system. Central to this, teachers must be recognized as the change agent in the successful use of laptops and ICT innovation in schools. This study was conducted to explore the overall profile of teachers' laptop use and also to investigate if selected teacher related factors (age, gender, teaching experience, laptop experience, attitudes towards laptop use and laptop skills) play a role in laptop use for teaching-learning. A total of 463 teachers participated in this study and the findings indicate that teachers are not using laptops as much as they should in the classrooms. The findings also suggest that four teacher related factors (gender, laptop experience, attitudes towards laptop use and laptop skills) play a significant role in teachers' laptop use for teaching-learning.

Keywords: laptop use for teaching-learning, age, gender, teaching experience, laptop experience, attitudes towards laptop use, laptop skills

1. Introduction

In many countries, the respective governments have taken concrete steps to improve the teaching and learning environment by incorporating technology in the curricula. There have been moves to promote teachers' use of technology and thus, laptop initiatives have been introduced. Consistent with other countries, Malaysia also began the laptop initiative in 2003 by providing each Mathematics and Science teacher with a laptop. Moreover, to advance the wider use of technology in education, the Malaysian government is pursuing every effort to create an encouraging and ongoing ICT environment to improve laptop use among the teachers in schools. The laptop scheme is a significant move to take full advantage of technology in the teaching and learning processes.

Teachers undeniably play a crucial role in integrating ICT into their instructional practices via the laptop initiatives. In any teaching-learning environments, teacher related factors are seen to be one of the most powerful predictors of successful integration or use of ICT (Sang, Valcke, van Braak, Tondeur & Zhu, 2010). In other words, teachers play an important role in the success of ICT use in teaching and learning.

2. Related Studies

Laptop Use among Teachers

Within the Malaysian context, the findings from a small scale study conducted by Moses, Wong, Bakar & Mahmud (2012) among 38 Maths and Science teachers from one state suggested that teachers used the laptop moderately for lesson preparation and classroom instruction despite being equipped with laptops in schools. At the same time Khambari et al. (2012) conducted a similar study, albeit on a bigger scale, in another state to gauge the impact of laptops on 386 Maths and Science teachers. Their findings indicate that equipping these teachers with laptops have a moderate impact on their laptop use for teaching-learning. The researchers from both studies believed that the teachers are using laptops moderately because they are still trying to adapt to the learning environment and thus need more time to familiarise themselves with the laptops (Moses et al., 2012; Khambari et al., 2012).

Teacher Related Variables

Rahimi and Yadollahi (2011) stressed that teacher characteristics should not be overlooked when investigating factors contributing to ICT use. In this respect, past studies have suggested that teaching experience is linked to ICT integration or use. Van Braak, Tondeur and Valcke (2004) and Rahimi and Yadollahi (2011) found that there was an inverse relationship between teaching experience and computer use for teaching-learning. They postulated that those with more teaching experience are usually older teachers who shun technology use in classrooms. Denson (2005), however, concluded that there was no relationship between teachers' years of experience in the classroom and teachers' perceived levels of technology integration in the classroom. Braak et al. (2004) reported that there was an inverse significant relationship between age and supportive computer use which refers to the use of computers for pro-active and administrative tasks. At the same time, they also reported that the relationship between teachers' class use of computers and age could be ignored. On further investigation, they found that when controlled for computer experience, intensity of computer use and computer attitudes, age has no significant effect on support computer use. Cutler, Hendricks and Guyer (2003) added that the effects of age on computer use may be eliminated when key compositional factors such as gender, education, income, size of household, disabilities, employment and marital status, and race are controlled. It is also widely believed that the more teachers are familiar with computers, the higher their reported level of ICT use. Recently, Bakar, Wong, Wong and Hamzah (2013) also provided evidence that teachers who use computers for teaching-learning are those with more computer experience and are frequent computer users.

An earlier study by Zhao, Pugh, Sheldon and Byers (2002), revealed that, teachers do not always have the knowledge and skills to meaningfully integrate technology into their classes. For computer technology to be successful in schools, teachers need to be trained and well prepared to competently integrate it into their curricular. Khan, Hasan and Clement (2012) agreed that one of the reasons for the low level of ICT integration in schools was because teachers were not proficient in the use of technology. Teachers' attitudes towards ICT can be considered to be another major obstacle to technology integration (Hermans, Tondeur, Valcke, & Van Braak, 2006). Teachers' attitudes have been found to have a direct influence in their intention to use technology (Luan & Teo, 2009). Braak et al. (2004) suggested that teachers with more positive computer attitudes used computers in the classroom to a greater extent. Sang et al. (2010) observed that attitudes towards ICT use in education influence ICT classroom integration through mediation of ICT motivation and ICT supportive use. In other words, "if primary teachers adopt favorable attitudes towards ICT in education, they are more eager to integrate ICT into their teaching" (Sang et al., 2010; p.11). Interestingly, in an older study, Ryan, Szechtman and Bodkin (1992) asserted that older individuals possess less favourable attitudes towards ICT and thus have lesser propensity to use it when it is available. This means that technology use declines with age but Cutler et al. (2003) cautioned that age differences in technology use are less apparent when compositional variability such as employment status, marital status, education and others are taken in account.

The effects of gender on technology use have also been widely studied. The issue of gender gap exists for technology use (Moses, Khambari & Luan, 2008; van Braak et al., 2004). The findings by Markauskaite (2006) indicated that male graduate trainee teachers use computers to a greater extent than females do. Male teachers also use computers more often than their female counterparts (van Braak et al., 2004). van Braak et al. (2004) concluded that there is a significant gender effect on supportive and class use. On the contrary, Wong, Bakar, Wong and Hamzah (2012) found no gender differences between male and female school teachers in terms of technology use for instructional purposes. They explained that this could be due to the expectations placed on teachers and also ICT use has become essential in Malaysian teachers' professional and daily lives.

3. Purpose of the Study

The literature suggests that the success of ICT use depends partly on teacher factors such as their age, gender, teaching experience, laptop experience, attitudes towards laptop use and laptop skills. In this respect, the main purpose of this study is to explore whether the aforementioned factors play a role in teachers' laptop use for teaching-learning. It is, therefore, critical to investigate this link given that the MMOE places strong emphasises on laptops as an effective tool to promote learning. Based on the aforesaid purpose, the research questions will be answered:

1. What is the overall profile of teachers' laptop use?
2. Is there a relationship between teacher related factors (age, laptop experience, laptop skills, attitudes towards laptop use and teaching experience) and laptop use?
3. Does laptop use differ by gender?

4. Methodology

Participants

The participants were 463 randomly selected secondary school teachers in Malaysia from three states. There were more female teachers (86.2%) than males (13.8%). In terms of their academic qualifications, 44 (9.5%) of the teachers held a masters degree, 414 (89.4%) held a bachelor degree, 3 (0.6%) respondents were at the diploma level and lastly 2 (0.4%) held a teaching certificate. Their overall mean for years of teaching experience and laptop experience was 11.63 years (S.D. = 8.25) and 4.95 years (S.D.=2.49) respectively. Their mean age was 37.09 years old (S.D.=8.81).

Instrumentation

The instrument used in this study captured information about the respondent's age, teaching experience, laptop experience, laptop skills, attitudes towards laptop use and laptop use for teaching-learning. Laptop skills was measured in terms of two dimensions—1. Basic Laptop Operation Skills and Setup, and 2. Maintenance and Troubleshooting of Laptop. Items were measured using a four point scale: "Not able to perform the task", "Able to perform the task with some assistance", "Able to perform the task without assistance" and "Able to teach others how to perform the task".

Items measuring attitudes towards laptop use were adapted from Albirini (2006). Each item in this scale used a five-point Likert-type. Based on this scale, the respondents rated their attitude towards laptop use on each item, from strongly "disagree" to "strongly agree".

Laptop use for teaching-learning was measured by the regularity of the current laptop usage in class as perceived by the teachers. The five-point Likert scale was used for these items so as to measure the frequency of laptop use. The items were rated by the respondent as "Never", "Once in a while", "Sometimes", "Often" or "Very Often"

5. Results

Teachers' Laptop Use for Teaching-Learning

Table 1 presents the teachers' responses in regard to their laptop use for teaching-learning as measured by 11 items. The mean scores for all items were not more than 4.0. This suggests that teachers do not use the laptops very often for classroom teaching. The information in the table also suggests that there are teachers who do not use the laptops in classrooms at all. Despite this worrying trend, Table 1 shows that about one third of the teachers use the laptop sometimes or often for teaching-learning. In other words, teachers are already incorporating laptops as a teaching-learning tool and using them for assessment in the classrooms.

Table 1: Descriptive Statistics of Laptop Use for Teaching-Learning

Item	Never	Once in a while	Sometimes	Often	Very often	M	S.D.
	f	f	f	f	f		
	(%)	(%)	(%)	(%)	(%)		
I use the laptop in the teaching and learning process.	0 0	113 24.4	133 28.7	133 28.7	84 18.1	3.41	1.05
I use the laptop to aid the usage of CD-ROM during the teaching and learning process.	29 6.3	102 22	141 30.5	132 28.5	59 12.7	3.19	1.11

I use the laptop to facilitate the various pedagogical approaches (e.g.: collaborative learning, problem-based learning etc.).	46 9.9	90 19.4	140 30.2	139 30	48 10.4	3.11	1.14
I use the laptop as a tool for multimedia presentation during the teaching and learning process.	42 9.1	95 20.5	122 26.3	139 30	65 14	3.19	1.18
I use the laptop to provide detailed explanations (e.g.: visual aids etc.) during the teaching and learning process.	37 8.0	100 21.6	120 25.9	130 28.1	76 16.4	3.23	1.19
I use the laptop in class to provide notes to the students.	89 19.2	100 21.6	133 28.7	88 19.0	53 11.4	2.82	1.27
I use the laptop to show examples (e.g.: pictures, animation, audio, video etc.) to enhance the students' learning.	31 6.7	86 18.6	129 27.9	137 29.6	80 17.3	3.32	1.16
I use the laptop to facilitate the use of relevant Internet resources during the teaching and learning process.	109 23.5	110 23.8	128 27.6	80 17.3	36 7.8	2.62	1.23
I use the laptop to carry out classroom activities.	82 17.7	127 27.4	144 31.1	78 16.8	32 6.9	2.68	1.15
I use the laptop to carry out assessments in class.	125 27.0	132 28.5	117 25.3	69 14.9	20 4.3	2.41	1.16
I create a conducive learning environment (e.g.: educational flash, jokes, music etc.) using the laptop to motivate the students to learn.	90 19.4	139 30.0	125 27.0	82 17.7	27 5.8	2.60	1.16

Relationship between teacher related factors and laptop use

Table 2 shows the correlation between laptop use for teaching-learning and the five teacher related factors— age, laptop experience, laptop skills, attitudes towards laptop use and teaching experience. The relationships were explored using the Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The rule of thumb by Sprinthall (1994) was used for interpreting the results of the r values in this study. The results revealed that laptop use was inversely and significantly correlated with age ($p < 0.05$). Laptop use was also inversely but not significantly correlated with teaching experience. However, the strength of the associations between laptop use and both these factors can be considered as negligible. The results also showed that laptop use was positively and even more significantly correlated with laptop experience ($p < 0.01$), laptop skills ($p < 0.01$) and attitudes towards laptop use ($p < 0.01$). However, it can be considered that a small but definite relationships existed between laptop use and laptop experience as the Pearson r correlation was close to .20. Substantial relationships existed between laptop use and the two remaining factors—laptop skills and attitudes towards laptop use.

Table 2: Correlation between Laptop Use and Teacher Related Variables

Variable	1	2	3	4	5	6
1. Laptop use	1.00					
2. Age	-.10*	1.00				
3. Teaching experience (years)	-.08	.91**	1.00			
4. Laptop experience (years)	.18**	.43**	.42**	1.00		
5. Laptop skills	.39**	-.30**	-.26**	.03	1.00	
6. Attitudes towards laptop use	.60**	-.13**	-.12**	.13**	.55*	1.00

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

Effects of Gender on Laptop Use for Teaching-Learning

The independent samples t-test was used to determine if there were differences in terms of gender for laptop use. The independent samples t-test analysis showed a significant difference in the laptop use for teaching-learning scores between females (M=32.08, S.D.=10.44) and males [M=35.83, S.D.=11.17; $t(461) = 2.64$, $p = .009$] . The effect size was small (eta squared=.01).

6. Discussion

The first research question explored the teachers' laptop use for teaching-learning. The findings suggest that teachers are using laptops in the classroom but not at a very encouraging rate despite having access to such facilities in schools. This is quite worrying because the laptop initiative was launched more than a decade ago. The finding of this study was similar to Moses et al. (2012) and Khambari et al.(2012) who reported that teachers' laptop use was at the moderate level only.

According to Khambari et al. (2012) some teachers find it difficult to embrace new technology because they are used to the traditional method of teaching in the classrooms. Likewise teachers may find it difficult to be updated with the latest ICT trends and lack time to explore the affordances of laptops as an instructional tool (Urwin, 2007). However, from a more optimistic point of view, the findings provide some evidence that teachers are making some efforts to embrace laptops as a teaching-learning tool and move away from the conventional method of teaching.

The second research question concerned the relationship between five teacher related variables and laptop use for teaching-learning. The present study ascertained that three teacher related variables (laptop experience, attitudes towards laptop use and laptop skills) are quite strongly and positively correlated with laptop. In other words, teachers with more laptop experience would use laptops in their teaching-learning to a greater extent. Teachers with more positive attitudes towards laptop use and who were proficient with the laptops tended to use them more in the classrooms. Findings of the current study showed parallelism with the findings of Braak et al. (2004) that suggested teachers' experience with technology was positively related to the use of technologies in classroom. The findings of the present study are also congruent with past studies (Khan et al., 2012) that provided evidence supporting ICT skill as a key factor in ICT integration. The inverse association of the remaining teacher variables (age and teaching experience) with laptop use was negligible. This finding contrasted with van Braak et al. (2004) and Rahimi and Yadollahi (2011). The negligible relationship between age and laptop use for teaching-learning could be due to the similar compositional characteristics that the majority of the teachers in the present study share such as their teaching qualification, employment with the Ministry of Education and moderate income level.

The last research question concerned the effects of gender on teachers' laptop use for teaching-learning. This study found laptop use for teaching-learning was dependent on gender. Male teachers used the laptops to a greater extent than female teachers did. This findings supports past research which suggested significant differences in technology use by gender (van Braak et al., 2004; Markauskaite, 2006) but contradicted Wong et al. (2012). Shapka and Ferrari (2003, p. 416) explained that gender differences may still exist when teachers are less familiar in the use of computer applications. For this reason, the authors can only conjecture at this point that male teachers are more comfortable and familiar with laptops than female teachers and this gives them the edge in laptop use during class hours.

7. Conclusion

The introduction of laptops as a teaching-learning tool in Malaysian classrooms is the right step forward to transform the learning environment and empower teachers. The investment on laptops must continue to push Malaysia to be at par with more developed countries. The MMOE is serious in their effort to strive for excellence in the education system through ICT. Central to this, teachers must be recognized as the change agent in the successful use of laptops and ICT innovation in schools. For this reason, it is important to learn more about the teacher related factors and their link with laptop use for teaching-learning. This study suggests that more needs to be done by the MMOE to promote teachers' laptop use for teaching-learning. It also provides some evidence that teacher related factors such as their laptop experience, laptop skills and attitudes towards laptop use and gender should not be ignored when steps are taken to enhance and sustain effective laptop use among Malaysian teachers.

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