

Laptop Initiative in Malaysia: Exploring Mathematics and Science Teachers' Laptop Use

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Abstract: Since 2003, when the medium of instruction was switched from Malay to English, every teacher teaching Mathematics or Science has been provided with a laptop by the Malaysian Ministry of Education to facilitate the teaching-learning of these two subjects. It has been nine years since the laptop initiative was introduced. How are the laptops being used by these teachers in the classroom? Is there a significant difference in the usage of laptops by Mathematics teachers compared with Science teachers? This quantitative study was carried out to test whether a significant difference exists in the usage of laptops among the Mathematics and Science teachers. Survey questionnaires were completed by 354 secondary school teachers from the state of Selangor, Malaysia. An independent t-test was conducted. Based on the finding, there was a significant difference ($t(354) = -12.16, p = .0001$) between the mean scores for Mathematics teachers ($M = 2.18, S.D. = 0.830$) and Science teachers ($M = 3.32, S.D. = 0.921$). It can be concluded that Science teachers use the laptops in teaching-learning process more than the Mathematics teachers. Therefore, appropriate steps should be taken by the government to understand why Mathematics teachers are making less use of laptop computers. More training sessions and more suitable courseware could be provided so that the full benefits of the laptop can be exploited to enhance the teaching-learning of Mathematics.

Keywords: Laptop Use, Mathematics, Science, Teachers

Introduction

The medium of instruction for Mathematics and Science was reverted from Malay to English in 2003. As these two subjects had been taught in the Malay language for about two decades previously, the Ministry of Education felt that the software for Mathematics and Science lessons in English would help both teachers and pupils cope with the new medium of instruction. Hence, teachers of the two subjects were provided with laptop with relevant software [1, 2]. This initiative by the Education Ministry was integrated with the government's Information and Communications Technology (ICT) blueprint for the use of technology to help the country progress at a more rapid pace.

The usefulness of embracing ICT in the classroom has been a topic of much debate. Studies have shown a difference in the usage of ICT among Mathematics and Science teachers [3, 4]. However, thus far there has not been any such study in Malaysia, specifically on the use of laptops in the teaching-learning of Mathematics and Science. Hence the main objective of this study was to ascertain whether there was a significant difference between Mathematics and Science teachers in their use of the laptops in the classroom.

1. Methodology

The data for this study were collected via questionnaires completed by teachers of Mathematics and Science regarding the use of laptops in the classroom. Eleven items were developed by the researchers based on a comprehensive review of relevant literature. These items used a five-point Likert scale to rate the use of the laptop for various functions in the classroom. The respondents were asked to rate their current usage of laptop in teaching-learning of Mathematics or Science. The responses were selected from “Never” (score = 1), “Once in a while” (score = 2), “Sometimes” (score = 3), “Often” (score = 4) and “Very Often” (score = 5). The content validity was established by a panel of four experts in the field of evaluation. Subsequently, a pilot test was conducted among 38 teachers; the overall reliability obtained was high and acceptable (Cronbach’s alpha coefficient = 0.928).

For the purpose of the study, an independent t-test was conducted to compare the mean scores between the Mathematics teachers and Science teachers. The respondents were 354 secondary school teachers (169 Mathematics teachers; 185 Science teachers) from the state of Selangor. Thirty nine of them were male teachers (11.0%) and the rest were females (89.0%). Their ages ranged from 22 to 56 years ($M = 36.26$; $S.D. = 9.045$).

2. Results and Discussion

Table 1: Laptop Use among Mathematics and Science Teachers in the Teaching-Learning Process

Item	Mathematics		Science	
	M	S. D.	M	S. D.
I use the laptop in the teaching-learning process.	2.38	0.944	3.84	1.095
I use the laptop to aid the usage of CD-ROM during the teaching-learning process.	2.28	0.971	3.65	1.083
I use the laptop to facilitate the various pedagogical approaches (e.g.: collaborative learning, problem-based learning etc.).	2.37	1.090	3.50	1.084
I use the laptop as a tool for multimedia presentation during the teaching-learning process.	2.30	0.986	3.64	1.134
I use the laptop to provide detailed explanations (e.g.: visual aids etc.) during the teaching-learning process.	2.25	1.018	3.75	1.125
I use the laptop in class to provide notes to the students.	2.01	1.044	3.19	1.245
I use the laptop to show examples (e.g.: pictures, animation, audio, video etc.) to enhance the students’ learning.	2.34	1.023	3.84	1.044
I use the laptop to facilitate the use of relevant Internet resources during the teaching-learning process.	2.14	1.093	2.72	1.204
I use the laptop to carry out classroom activities.	2.08	1.006	2.90	1.159
I use the laptop to carry out assessments in class.	1.93	1.003	2.60	1.185
I create a conducive learning environment (e.g.:	1.95	0.950	2.89	1.132

educational flash, jokes, music etc.) using the laptop to motivate the students to learn.

Table 1 illustrates the mean scores of laptop use among the Mathematics and Science teachers in the teaching-learning process. The item in the questionnaire received the highest mean score ($M = 2.38$, $S.D. = 0.944$) by the Mathematics teachers was: "I use the laptop in the teaching-learning process". As for the Science teachers, the two items which scored the highest mean with a mean value of 3.84 were: "I use the laptop in the teaching-learning process" ($S.D. = 1.095$) and "I use the laptop to show examples (e.g.: pictures, animation, audio, video etc.) to enhance the students' learning" ($S.D. = 1.044$). The item "I use the laptop to carry out assessments in class" item scored the lowest mean for both the Mathematics ($M = 2.08$, $S.D. = 1.006$) and Science ($M = 2.90$, $S.D. = 1.159$) teachers. The mean scores of laptop use for Science teachers were higher than those for Mathematics teachers for all the items.

Based on an independent t-test conducted, there was a significant difference ($t(354) = -12.16$, $p = .0001$) in the mean scores concerning the use of laptops between Mathematics teachers ($M = 2.18$, $SD = 0.830$) and Science teachers ($M = 3.32$, $SD = 0.921$) in Malaysian secondary schools. The magnitude of the differences was very large, $\eta^2=0.296$ [5]. These results show that Science teachers favour the use of laptops for teaching-learning process more than Mathematics teachers.

3. Conclusion

From the quantitative analysis of the data gathered from questionnaires, it can be concluded that teachers of Mathematics and Science have different views regarding the benefits of the laptop as a teaching-learning tool. This study found that Science teachers were more in favour of the integration of the laptop into their lessons compared with the Mathematics teachers. Therefore, appropriate steps should be taken by the Education Ministry to understand why Mathematics teachers are making relatively less use of laptop computers, compared to Science teachers. In addition, it is important to increase Mathematics teachers' awareness of the versatility of the laptop as teaching-learning tool. Perhaps the provision of more training sessions and suitable courseware would ensure that the full benefits of the laptop be exploited to enhance the teaching-learning of Mathematics.

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