

# A Survey of the Application of Graphic Calculator in the Schools in Johor, Malaysia

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**Abstract:** *Due to the sixth challenge in the Malaysian Vision 2020 that is to establish a society that contribute to the scientific and technological civilization of the future, many methods of teaching and learning with the aid of technology have been introduced so that the students will not only learn the theory or concept but also will be exposed to the technology. In 2004, selected secondary schools in Malaysia were given graphic calculators. Only two secondary schools in one of the districts in Johor were given 40 graphic calculators for each school. One of the schools is situated in the city and another in the rural area. Since then, no research was done to survey the use of graphic calculators in the schools. Hence, this study was conducted with the purpose of obtaining the feedback from the teachers regarding the use of graphic calculator in the teaching and learning mathematics. The participants of the Graphic Calculator Course conducted by the Universiti Tun Hussein Onn Malaysia (UTHM), which consisted of 31 secondary and primary school mathematics teachers, were chosen as the research samples. The research design used was of survey descriptive. Quantitative data was collected from the respondents using questionnaires. The data was analyzed to obtain the percentage, mean, and standard deviation. Research finding showed that even though the teachers agreed that graphic calculator can help the teachers in the teaching and learning mathematics but they never use the graphic calculator as they do not know how to use the tool. Thus, training and monitoring of any implementation is very important, as there is no point of spending so much money to buy graphic calculators or other teaching tools if the tools are not being used.*

## 1. Introduction

The sixth challenge in the Malaysian Vision 2020 is “the challenge of establishing a scientific and progressive society, a society that is innovative and forward-looking, one that is not only a consumer of technology but also a contributor to the scientific and technological civilization of the future” ([10]) . Since then many methods of teaching and learning with the aid of technology have been introduced so that the students will not only learn the theory or concept but also will be exposed to the technology. In 2004, only two secondary schools in one of the districts in Johor, were given 40 graphic calculators for each school. One of the schools is situated in the city and another in the rural area. Since then, no research was done to survey the use of graphic calculators in the schools. Hence, this study was conducted with the purpose of obtaining the feedback from the teachers in Batu Pahat regarding the use of graphic calculator in the teaching and learning mathematics.

## 2. Literature Review

Computers are used as a tool to help and simplify the process of teaching and learning. Scientific research shows that the process of remembering done in the human brain is faster when people receive many emphasizes in various form for a short period [1]. The concept of interactivity in

multimedia helps the human brain to improve the process of learning. In addition, different approaches of multimedia make lessons very entertaining besides giving information more effectively and faster [8]. However computers in schools are not portable and students have to go the computer lab which is often very inconvenient. As a result, teachers are very interested in using graphic calculator as the students have been using scientific calculator in class. In addition, according to [9], the use of graphic calculator can reduce extraneous cognitive load during learning.

Research in the effectiveness of the use of technology in class, such as graphic calculator, Computer Algebra Systems (CAS) etc, has been done. For example, study done by [5], showed that the Class Pad lead to a “geometric approach, allowed the students to visualize and explore concepts. In addition the study showed that CAS led students to discover mathematical ideas for themselves. A study by [7] showed that the students who learned statistics with lab activities performed better than the students who learned statistics without lab activities. From the research done by [8], the master’s degree students agreed on the usefulness of the application of multimedia in the process of teaching and learning.

Research done by [9] showed that the use of graphic calculator has shown promising implication in the teaching mathematics at the Malaysian secondary school level. However, according to [4], the key in using calculators is the teacher, as the teachers must know and be willing to use the calculator in class. In this research, there was a sizeable minority group of teachers who opposed the use of calculators in the mathematics classroom.

### 3. Research Methods

The research design used was of survey descriptive. Quantitative data was collected from the teachers using questionnaires. Researchers designed questionnaire which consisted of five main sections for the respondents to answer. The five main sections of the questionnaire are shown in Table 1.

**Table 1**

*Main Sections*

Section	Item No	Data Analysis Method
A : Background	1 – 4	Percentage
B : Management	1 – 7	Score mean and std dev
C : Skill	1 – 7	Score mean and std dev
D : Acceptance	1 – 10	Score mean and std dev
E : Possibility	1 – 7	Score mean and std dev
F : Suggestions and comments		

The data was analyzed to obtain the percentage, mean, and standard deviation. Likert scale was used for section B, C, D and E. The participants of the Graphic Calculator Course conducted by the Universiti Tun Hussein Onn Malaysia (UTHM), which consisted of 31 mathematics school teachers, were chosen as the research samples. The Graphic Calculator course was opened for all the teachers in the secondary and primary schools in Batu Pahat, Johor, Malaysia. Before the questionnaire was given to the respondents, a pioneer test was done where ten teachers were randomly selected to answer the questionnaires. The values of Alpha-Cronbach are all greater than 0.6 as shown in Table 2 and according [3] that means the validity are high.

**Table 2**  
*Alpha-Cronbach*

Section	Category	Item	Alpha-Cronbach
B	Management	7	0.818
C	Skill	7	0.914
D	Acceptance	10	0.935
E	Possibility	7	0.715

In Section B, C and D, data was analyzed in quantitative method form. Researchers analyzed data in section B, C and D through mean score based on the table which was adapted from [2] and [6] as shown in Table 3.

**Table 3**  
*Interpretation and Level of The Mean Score Interval*

Mean Score Interval	Interpretation	Level
1.00 – 2.49	Do not agree	Low
2.50– 3.49	Not totally agree	Moderate
3.50 – 5.00	Agree	High

#### 4. Results and Discussion

The background of the respondents is shown in Table 4.

**Table 4**  
*Respondents Background*

	Category	No of respondents	Percent (%)
Gender	Male	5	12.9
	Female	26	87.1
School	Primary (students : 7 – 12 years old)	17	54.8
	Secondary (students : 13 – 17 years old)	14	45.2
Years of Teaching	0 – 2	2	6.5
	3 – 5	1	3.2
	6 – 8	4	12.9
	9 – 11	12	38.7
	> 12	12	38.7
Subject Taught	Math	14	45.2
	Math & science	12	38.7
	Math & other subject	5	16.1

In section B, the researchers want to survey whether the school administration had made any effort to implement the usage of the graphic calculator. There are 7 items in this section and as shown in Table 5, the level of skill is moderate with the mean score of 3.42 and the standard deviation of 0.27.

**Table 5**  
*Management*

Section B	Mean Score	Standard deviation	Level
Implementation of Graphic Calculator by the School Management	3.42	0.27	Moderate

In section C, the researchers want to survey whether the level of the teacher's skill in operating the graphic calculator. There are 7 items in this section and as shown in Table 6, the level of skill is low with the mean score of 2.09 and the standard deviation of 0.48.

**Table 6**  
*Skill*

Section C	Mean Score	Standard deviation	Level
The Teachers' Skill	2.09	0.48	Low

In section D, the researchers want to survey whether the level of the teacher's acceptance in using the graphic calculator in class. There are 12 items in this section and as shown in Table 7, the level is high with the mean score of 3.73 and the standard deviation of 0.19.

**Table 7**  
*Acceptance*

Section D	Mean Score	Standard deviation	Level
The Teachers' Acceptance	3.73	0.19	High

In section E the researchers want to survey whether the level of possibility of using the graphic calculator in class. There are 7 items in this section and as shown in Table 8, the level is moderate with the mean score of 2.84 and the standard deviation of 0.33.

**Table 8**  
*Possibility*

Section E	Mean Score	Standard deviation	Level
The Possibility of Using Graphic Calculator	2.84	0.33	Moderate

## 5. Conclusion

Research finding showed that the respondents agreed that the school management informed and encouraged the teachers to use graphic calculator, however, the level of the skill and knowledge of the teachers on graphic calculator is low. They have never attended any graphic calculator course before coming for the Graphic Calculator Course organized by UTHM. For the course, UTHM borrowed the graphic calculators from the secondary school in the rural area of Batu Pahat. The calculators are still in the plastics and unopened since 2004 except for the two calculators for the teachers. Some of the batteries in the calculator are watery and spoiled. One of the mathematics teachers in that school had attended a one week course on how to use the graphic calculator. However since students are not allowed to use graphic calculators during exams, there was no in-house training for other mathematics teachers.

From the survey, the level of acceptance of using graphic calculator in the teaching and learning mathematics is high; however, the respondents do not use the graphic calculators as they are not confident. The respondents agreed that the use of graphic calculator can help the students and teachers in the teaching and learning mathematics but from this survey, it shows that the teachers do not use the graphic calculator as they do not know how to use the tool. Thus, training and monitoring of any implementation is very important, as there is no point of spending so much money to buy graphic calculators or other teaching tools if the tools are not being used.

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