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# Students' Attitudes to Learning Mathematics with Technology at Rural Schools in Sabah, Malaysia

***ABSTRACT:*** *The purpose of this study was to investigate students' attitudes to learning Mathematics with Technology at rural Secondary Schools in Sabah, Malaysia. This study involved 17 Secondary rural and non-rural Secondary Schools in Sabah. A total of 613 Form 4, Form 2, and Form 1 students were randomly chosen as respondents. Descriptive and inferential statistics were used to analyze the collected data. The reliability of the instrument was analyzed by using the Statistical Packages for Social Sciences (SPSS) version 13.0 for Windows. Descriptive statistical analysis showed that only 13.0% of rural Secondary School students possessed positive attitude to learning Mathematics with Technology as compared to 21.5% of students from non-rural Secondary Schools. Results of independent sample t-test has indicated that there was a significant difference ($t$ = -2.424, $df$ = 543, $p < 0.05$) in attitudes to learning Mathematics with Technology between rural and non-rural school students. Students from non-rural Secondary Schools possessed higher Confidence with Technology compared to students from rural schools. Inferentional statistical analysis also showed that there was no significant difference in students' attitudes to learning Mathematics with Technology based on gender, streaming, and level of schooling. Therefore, Mathematics teacher is the main factors in how technology is used in classroom. Finally, school administrators should encourage Mathematics teacher to use ICT (Information and Communication Technology) widely to enhance their teaching.*

***KEY WORD:*** *Students' attitudes, learning Mathematics with technology, rural Secondary Schools, and Mathematics teachers.*

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## INTRODUCTION

Technology advancement has made teaching and learning Mathematics easier nowadays. In the year 2003, the implementation of Teaching Science and Mathematics in English (TeSMe) policy in Malaysia has given a golden opportunity for teachers and students in schools to be exposed to the use of technology in the teaching and learning of Mathematics. Via this policy, most of the Science and Mathematics teachers are given notebooks, LCD projector, and teaching courseware to support the teaching and learning activities of Mathematics. Many educational technologies have been developed for the purpose of teaching and learning. One of the important inventions is computer. The capability of computer to do multi and complicated tasks has led us to use it for educational purposes.

## RESEARCH BACKGROUND AND OBJECTIVES

According to S. Suhardi (1999), Mathematics is always regarded as a subject which is boring, burden, and scary. Students tend to memorize the necessary formulas and steps in order to obtain good results in examination. Y.Z. Abidin (2005) stated also that memorizing formulas without understanding is regarded as low level of learning. A research done by N. Blackett and D.O. Tall (1991) had indicated that the versatile learning of trigonometry using interactive computer graphics would lead to a greater improvement compared to conventional teaching methods. In their research, computer was used so that students could focus on the changes of acute angle in a triangle when the lengths of the sides of triangles changed. According to N. Blackett and D.O. Tall (1991), the ability to use computer to carry out certain arduous constructions while the child can focus on specific relationships is known as the *principle of selective construction.*

On the other hand, M. Simmons (1993) stated that computer can be used to enrich the learning process of Mathematics. The use of computer for learning purposes will encourage the learner to be independent. Nevertheless, the use of teaching aids in Malaysia which involves multimedia technology is still limited when compared to developed countries such as USA (United States of America) and Japan (Abu Saman, Mazanah & Alinda Alias, 1996).

The main purpose of this research is to investigate students' attitudes to learning Mathematics with technology in Secondary Schools of Sabah, Malaysia. Specifically, this research is conducted to achieve the following objectives:

*First*, to gauge Secondary School students' attitudes to learning Mathematics with technology.

*Second*, to determine whether there is a significant difference in students' attitudes to learning Mathematics with technology based on school category.

*Third*, to determine whether there is a significant difference in students' confidence with technology based on school category.

*Fourth*, to determine whether there is a significant difference in students' attitude to learning Mathematics with technology based on gender.

*Fifth*, to determine whether there is a significant difference in students' attitude to learning Mathematics with technology based on streaming.

*Sixth*, to determine whether there is a significant difference in students' attitude to learning Mathematics with technology based on level of schooling.

*Seventh*, to determine whether there is any significant correlation among the five key concepts measured i.e. attitude to learning Mathematics with Technology (MT), Confidence with Technology (TC), Mathematics Confidence (MC), Affective Engagement (AE), and Behavioural Engagement (BE).

## CONCEPT DEFINITION

***On the Attitudes towards Use of Technology for Learning Mathematics***. According to C. Vale and G. Leder (2004), "Attitude to computer-based Mathematics" was defined as the degree to which students perceive that the use of computers in Mathematics provides relevance for Mathematics, aids their learning of Mathematics, and contributes to their achievement in Mathematics. Meanwhile, P. Galbraith and C. Haines (1998) used the term "computer and mathematics interaction" for a similar construct. In this research, we employ the meaning which is closer to that of C. Vale and G. Leder (2004) than P. Galbraith and C. Haines (1998).

***On the Confidence with Technology***. "Students' attitudes to technology (in the case of computer)" was defined as the students' perceptions of their achievement and their aspiration to achieve in these disciplines (Vale & Leder, 2004). Then, P. Galbraith and C. Haines (1998) defined this construct as a kind of self-assured in operating computers, believe they can master computer procedures required of them.

***On the Mathematics Confidence***. C. Vale and G. Leder (2004) see students' attitude to Mathematics as students' perceptions of their achievement and their aspiration to achieve in Mathematics. Further, P. Galbraith and C. Haines (1998) view this construct as evidenced by students who believe they obtain value for their effort, looking forward to get good results, not worry about learning difficult topics, and feel good about Mathematics as a subject. In this research, we defined this construct as student's perception of their ability to get good results and their assurance that they are able to handle difficulties in Mathematics.

***On the Affective and Behavioural Engagement***. In R. Pierce, K. Stacey and A.N. Barkatsas (2007), "engagement" is stated as multifaceted with three components: behavioural engagement, emotional engagement, and cognitive engagement. Behavioural engagement is defined as positive conduct at school, involvement in learning academic tasks, and participation in school-related activities. Emotional engagement is defined as affective reaction to school and classroom activities. Cognitive engagement is defined as cognition and strategic learning. In this research, we will examine how students feel about the subject (affective engagement in this research) and how they behave in learning the subject (behavioural engagement in this research).

Model for this research is as follows:

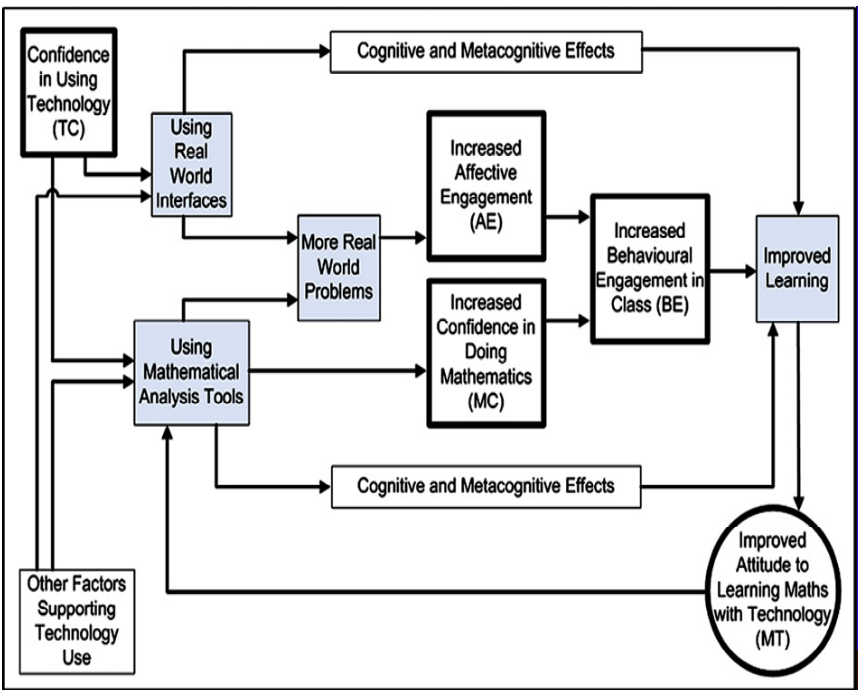


**Figure 1:**
Illustration of Hypothesized Affective Channel for Technology Use to Improve Mathematics Learning (Source: Pierce, Stacey & Barkatsas, 2007)

Looking at the centre row of boxes in figure 1, R. Pierce, K. Stacey and A.N. Barkatsas (2007) hypothesized that information technology in the classroom can enable more real world problem solving. Based on the figure 1, it is hypothesized that using real world interfaces and using Mathematical analysis tools will enable students to solve more real world problems and hence will increase affective engagement. Using Mathematical analysis tools will take away some computation burden from students and hence will increase confidence in doing Mathematics. The increase of affective engagement and confidence in doing Mathematics will lead to an increase of behavioural engagement in class. Finally, this will improve learning in classroom. When students can see the benefits of using technology, then it will improve their attitude to learning Mathematics with technology.

## PREVIOUS STUDIES

According to Kenneth (1996) and R. Rosas *et al.* (2003), through the use of technologies in the classroom, there is evidence of a relationship among computer-supported recreational activities, positive attitudes towards Mathematics, improvement in Mathematical learning, and student performance. According to Jonanssen and Carr (2000), technology can be used to support the deep reflective thinking that is necessary for meaningful learning. According to D.S. Brandt (1997), the use of computers can be utilized as a new technological support for the visualization of abstract concepts through computer-generated virtual representations, allowing for the generation of mental models of the concept.

As noted by R. Henderson and E. Landesman (1992), a significant importance is given to the motivational components in the learning experience of Mathematics. According to S. Usun (2004), nowadays, computers which are seen as the most effective interactive device and most effective individual learning technology entered to educational systems and compose new approaches to school systems and learning process, developed new dimensions to existence models supplying information transfer.

According to J. Monaghan (2004), computers not only introduce new areas of Mathematics but bring with them new ways of thinking about Mathematics. Using information technologies effectively at Mathematics education is a subject that commonly discussed (Cockcroft, 1982). Further, according to G. López-Martio and G. López (2007), the use of Interactive Instructors of Recreational Mathematics (IIRM)-based electronic learning environment has positive motivation to the students' attitude toward Mathematics. Most of the students felt comfortable using multiuser games combined with instant messaging tool in classroom.

Based on Chee Keong Chong, Sharaf Horani and Jacob Daniel (2005) study, 49.5% Mathematics teachers use teaching courseware in class, 40.5% used ICT (Information and Communication Technology) as presentation tools, 8.1% used ICT as a graphical visualising tool, 6.3% used ICT as an online demonstration tool, and 3.6% used ICT for other purposes in classroom. The result showed that teachers seldom integrate ICT in teaching Mathematics. Mathematics teacher is the main factors in how technology is used in classroom. Hence, school administrators should encourage Mathematics teacher widely use ICT to enhance their teaching.

The Mathematics and Technology Attitude Scale (MTAS) is developed by R. Pierce, K. Stacey and A.N. Barkatsas (2007). It was used to examine five affective variables relevant to learning Mathematics with technology in middle secondary students. The five subscales are Mathematics Confidence (MC), Confidence with Technology (TC), attitude to learning Mathematics with Technology (MT), Affective Engagement (AE), and Behavioural Engagement (BE).

R. Pierce, K. Stacey and A.N. Barkatsas (2007) found out that confidence in using technology, attitude to learning Mathematics with technology and affective and behavioural engagement contribute to the effectiveness of learning processes. Besides, students who have positive attitudes toward learning Mathematics with technology overcome initial difficulties by using Mathematics computer tools to explore and develop their conceptual understanding.

Literature on student attitudes when learning Mathematics with computer tools shows that the idea of attitude can be defined in a variety ways (Galbraith & Haines, 1998; Ruffell, Mason & Allen, 1998; and Hannula, 2002). According to relevant literature, factors that play rule on students' motivation of using technology for learning are gender, previous experience, grade level, and content area of interest.

Research on the role of gender has contradictory results on students' attitude towards learning with technology. According to L. Temple and H. Lips (1989), there were no differences in personal interest and enjoyment of computers among males and females. However, A. Barkatsas, K. Kasimatis and V. Gialamas (2009) reported that males are expressed more positive views towards Mathematics and more positive views towards the use of technology in Mathematics, compared to females.

Based on research done by I.M. Gómez-Chacón and C. Haines (2008), they discovered that there was a low correlation between Mathematics and computer attitudes. Besides, they found out that in the learning of Mathematics with computers there was a strong relationship with computer attitudes than with Mathematics attitudes.

## POPULATION, SAMPLING, AND RESEARCH INSTRUMENT

In general, this research employed a convenience sampling method and purposive sampling method. Both non-probability sampling and techniques were chosen due to the degree of accessibility of the schools in Sabah, Malaysia. This indicated that not all the subjects will have as equal chance of being selected as samples. The chosen schools were those which can easily accessed by the researchers and at the same time are categorized as rural schools. Seventeen Secondary Schools were chosen and 613 students were involved in this research.

The instrument for this research was ”Mathematics Technology Attitude Scale” (MTAS) questionnaire which was adapted from R. Pierce, K. Stacey and A.N. Barkatsas (2007). In this research, the technology that we will focus on is computer or notebook. Five affective variables relevant to learning Mathematics with technology were measured using the MTAS questionnaire. The subscales measured were attitude to learning Mathematics with Technology (MT), Behavioral Engagement (BE), Confidence with Technology (TC), Affective Engagement (AE), and Mathematics Confidence (MC). The MTAS questionnaire was used as a tool for data collection because it possesed high reliability and validity.

There is two sections in this instrument. Part A is regarding respondents' demographic background information, whereas Part B is the MTAS items. The total number of items in Part A is 5 items and Part B is 20 items. In Part B of the MTAS questionnaire, item 1 to 4 were used to measure the Behavioral Engagement (BE), item 5 to 8 were used to measure Confidence with Technology (TC), item 9 to 12 were used to measure Mathematics Confidence (MC), item 13 to 16 were used to measure Affective Engagement (AE), and, lastly, item 17 to 20 were used to measure attitude to learning Mathematics with Technology (MT).

This instrument is considered appropriate for the study, because it is easy to administer and the estimated time needed to complete the questionnaire is only approximately 15-20 minutes. The responses given in the MTAS questionnaire are quantified. For item 1 to item 4, the range of coding for the response will be from 1 to 5 with 1 indicating ”Hardly Ever” and 5 indicating ”Nearly Always”. For item 5 to item 20, the range of the response is also from 1 to 5 with 1 indicating ”Strongly Disagree” and 5 indicating ”Strongly Agree”.

***On the Cronbach's Alpha Reliability of the MTAS***. In terms of validity, this MTAS (Mathematics Technology Attitude Scale) instrument was sent to expert in this field for validation. In terms of reliability, we used the Cronbach's Alpha method to determine its reliability. Based on the pilot test conducted on 36 Form 4 students of a Secondary School in Sabah, Malaysia, the Cronbach's Alpha coefficients for the five key concepts measured in this research were obtained. See table 1 as follows:

**Table 1:**
Cronbach's Alpha Reliability Coefficient for the Key Concepts Measured

| Key Concepts | Cronbach Alpha Reliability Coefficient |
|---|---|
| ***Attitude to learning:*** | |
| Mathematics with Technology (MT) | .913 |
| Confidence with Technology (TC) | .836 |
| Mathematics Confidence (MC) | .838 |
| Affective Engagement (AE) | .688 |
| Behavioural Engagement (BE) | .695 |
| Overall | .830 |

The overall Cronbach Alpha reliability coefficient for the MTAS questionnaire is 0.830. In general, when the value of Cronbach Alpha coefficient is above 0.60, then the instrument – according to Kerlinger – is considered as reliable (cited by Sidek Mohd Noah, 2002).

## RESEARCH FINDINGS

According to table 2 (see below), analysis performed by using descriptive statistic showed that only 13.0% of students from rural schools possessed positive attitude to learning Mathematics with technology, whereas 21.5% of students from non-rural schools possessed positive attitude to learning Mathematics.

$H_{01}$*: There is no significant difference in students' attitudes to learning Mathematics with Technology (MT) based on school category.*

**Table 2:**
Attitude to Learning mathematics with Technology Based on School Category

| | | Attitude to Learning Mathematics with Technology (MT) Rank | | | Total |
|---|---|---|---|---|---|
| | | Negative Attitude | Moderate Attitude | Positive Attitude | |
| Rural Schools | Count% within School category | 109<br>47.2% | 92<br>39.8% | 30<br>13.0% | 231<br>100.0% |

| | | | | | |
|---|---|---|---|---|---|
| Non-Rural Schools | Count% within School category | 166 43.5% | 134 35.1% | 82 21.5% | 382 100.0% |
| Total | Count% within School category | 275 44.9% | 226 36.9% | 112 18.3% | 613 100.0% |

According to table 3, the MT (Mathematics with Technology) subscale mean score for rural school is 12.91 and for non-rural school is 13.59, therefore the mean score difference for the rural school and non-rural is merely 0.68. In order to determine the significance of the mean difference, therefore the independent-sample *t*-test was used. It was found that the difference in attitude to learning Mathematics with technology based on school category is significant ($t$ = -2.333, $df$ = 611, $p$ = 0.020).

**Table 3:**
Independent Sample *t*-Test Results for the Differences in Attitude to Learning Mathematics with Technology (MT) Based on School Category

| School Category | N | Mean | Std. Deviation | *t* | *df* | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Rural | 231 | 12.91 | 3.160 | -2.333* | 611 | .020 |
| Non-rural | 382 | 13.59 | 3.692 | | | |

*$p$<.05

Therefore, the first null hypothesis was rejected. The mean difference of -0.681 indicated that students from non-rural schools possessed a more positive attitude to learning Mathematics with technology. Hence, there was a significant difference in attitude to learning Mathematics with technology based on school category.

*$H_{02}$: There is no significant difference in students' Confidence with Technology (TC) based on school category.*

**Table 4:**
Independent Sample t-Test Results for the Difference in Confidence with Technology (TC) Based on School Category

| School Category | N | Mean | Std. Deviation | *t* | *df* | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Rural | 230 | 12.74 | 2.495 | -3.959* | 609 | .0005 |
| Non-rural | 381 | 13.59 | 2.615 | | | |

*$p$<0.05

In order to test the afore-mentioned hypothesis, we analyse the key concept or subscale of Confidence in Technology (TC) with respect to school category. According to table 4, the TC subscale mean score for rural school is 12.74 and for non-rural school is 13.59, therefore the mean score difference for the rural school and non-rural is merely 0.85. In order to determine whether this difference is significant or not, the independent sample *t*-test was used. According to table 4, it was statistically shown that the difference in Confidence with Technology based on school category was significant ($t$ = -3.959, $df$ = 609, $p$ = 0.0005). Therefore, the null hypothesis was rejected. The mean difference of -0.850 indicated that students from rural schools have less Confidence with Technology. Hence, there was a significant difference in Confidence with Technology based on school category.

*$H_{03}$: There is no significant difference in students' attitudes to learning mathematics with technology based on gender.*

**Table 5:**
Independent Sample *t*-Test for the Difference in Attitude to Learning Mathematics with Technology (MT) Based on Gender

| Gender | N | Mean | Std. Deviation | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Male | 261 | 13.28 | 3.571 | -.342* | 609 | .733 |
| Female | 350 | 13.37 | 3.481 | | | |

*$p$<0.05

According to table 5, the MT (learning Mathematics with Technology) subscale mean score for male is 13.28 and for female is 13.37, therefore the difference of mean score for the male and female is merely .09. It is statistically shown that the difference in attitude to learning Mathematics with Technology based on gender is not significant ($t$ = -.342, $df$ = 609, $p$ = .733). Therefore, null hypothesis was failed to be rejected. Hence, there was no significant difference in attitude to learning Mathematics with technology based on gender.

*$H_{04}$: There is no significant difference in students' attitudes to learning Mathematics with Technology based on streaming.*

In order to test the above hypothesis, we analysed the key concept or subscale for attitude to learning Mathematics with Technology (MT) with respect to streaming. According to table 6, the MT subscale mean score for Science students is 13.22 and for Arts students is 13.58; therefore, the difference of mean score for Science and Arts students is 0.36. It is statistically shown that the difference in attitude to learning Mathematics with Technology based on streaming is not significant ($t$ = -.890, $df$ = 443, $p$ = .374). Therefore, null hypothesis was failed to be rejected. Hence, there was no significant difference in attitude to learning Mathematics with technology based on streaming.

*$H_{05}$: There is no significant difference in students' attitudes to learning Mathematics based on level of schooling.*

**Table 6:**
Independent Sample *t*-Test for the Difference in Attitude to Learning Mathematics with Technology (MT) Based on Streaming

| Streaming | N | Mean | Std. Deviation | *t* | *df* | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Science | 100 | 13.22 | 3.575 | -.890* | 443 | .374 |
| Arts | 345 | 13.58 | 3.516 | | | |

*$p$<.05

According to table 7, the MT (learning Mathematics with Technology) subscale mean score for upper secondary is 13.42 and for lower secondary is 13.09; therefore, the mean score difference for the lower secondary and upper secondary is 0.33. In order to determine whether this difference is significant or not, the independent sample t-test was used. It is statistically shown that the difference in attitude to learning Mathematics with Technology based on level of schooling was not significant ($t$ = -.980, $df$ = 611, $p$ = .328). Therefore, null hypothesis was failed to be rejected. Hence, there was no significant difference in attitude to learning Mathematics with Technology based on level of schooling.

*$H_{06}$: Is there any significant correlation among the 5 key concepts measured i.e. attitude to learning Mathematics with Technology (MT), Confidence with Technology (TC), Mathematics Confidence (MC), Affective Engagement (AE), and Behavioural Engagement (BE)*

**Table 7:**
Independent Sample *t*-Test for the Difference in Attitude to Learning Mathematics with Technology (MT) Based on Level of Schooling

| Level of Schooling | N | Mean | Std. Deviation | *t* | *df* | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Upper Secondary | 467 | 13.42 | 3.547 | -.980* | 611 | .328 |
| Lower Secondary | 146 | 13.09 | 3.404 | | | |

*$p$<.05

According to table 8, it is shown that all the 5 key concepts had significant correlations with each other. Technology Confidence (TC) is the key concept that is the most highly correlated with attitude to learning Mathematics with Technology (MT) when compared to other key concepts with the Pearson correlation of .320.

**Table 8:**
Pearson Correlation between the Five Key Concepts

| Key Concepts/Subscale Score | MT | AE | MC | TC | BE |
|---|---|---|---|---|---|
| MT | 1 | .205** | .081* | .320** | .157** |
| AE | .205** | 1 | .634** | .096* | .553** |
| MC | .081* | .634** | 1 | .146** | .537** |
| TC | .320** | .096* | .146** | 1 | .165** |
| BE | .157** | .553** | .537** | .165** | 1 |

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

## DISCUSSION

Based on the research findings, we discovered that majority of the respondents possess low attitude to learning Mathematics with technology regardless of school category. By analyzing the responses based on school category, we found that 21.5% of respondents from non-rural schools exhibited positive attitude to learning Mathematics with technology, whereas only 13.0% of respondents from rural schools exhibited positive attitude.

As noted by R. Henderson and E. Landesman (1992), a significant importance is given to the motivational components in the learning experience of Mathematics. Therefore, to possess high attitude to learning Mathematics with technology, teachers should emphasize the motivational aspect among students. Further analysis has led us to believe that there is a significant difference in attitude to learning Mathematics based on school category where the respondents from non-rural schools shown better attitude in this key concept.

Based on Chee Keong Chong, Sharaf Horani and Jacob Daniel (2005) study, 49.5% of Mathematics teachers used teaching courseware in class, 40.5% used ICT (Information and Communication Technology) as presentation tools, 8.1% used ICT as a graphical visualising tool, 6.3% used ICT as an online demonstration tool, and 3.6% used ICT for other purposes in the classroom.

In order to better understand the scenario, we had analysed the key concept for Confidence in Technology based on school category. We discovered that there is significant difference in Confidence in Technology based on school category. In relation to this, respondents from non-rural schools have better attitude in Technology Confidence when compared to respondents from rural schools.

We had also conducted the hypothesis testing for attitude to learning Mathematics with technology based on gender. There is no significant difference in attitude to learning Mathematics with technology based on gender. Research on the role of gender has contradictory results on students' attitude towards learning Mathematics with technology. According to L. Temple and H. Lips (1989), there were no differences in personal interest and enjoyment of computers among males and females. However, A. Barkatsas, K. Kasimatis and V. Gialamas (2009) reported that males expressed more positive views towards Mathematics and more positive views towards the use of Technology in mathematics compared to females.

We have also discovered that there was no significant difference in attitude to learning Mathematics based on streaming and level of schooling. In order to determine the relationships among the five key concepts measured, we used SPSS (Statistical Packages for Social Sciences) to compute the Pearson correlation coefficients of the five key concepts. We discovered that all the five concepts shown significant correlations with each other. Attitude to learning Mathematics with technology correlated to Confidence in Technology ($r = .320$). Mathematics Confidence correlated to Affective Engagement ($r = .634$) and Behavioural Engagement ($r = .537$). Affective Engagement correlated significantly to Behavioural Engagement ($r = .553$).

## CONCLUSION

In general, based on the data analysis conducted, it is statistically evidenced that most of the respondents have low attitude to learning Mathematics with technology. In this case, the technology which we are referring to is computer. The hypothesis testing conducted also shown that there is a significant difference in attitude to learning Mathematics with technology based on school category. In this research, the schools are categorized as rural school and non-rural school. There is a significant difference in Technology Confidence based on school category as well.

Meanwhile, it is statistically shown that there is no significant difference in attitude to learning Mathematics with technology based on gender, streaming, and level of schooling. There is a significant correlations among the five key concepts measured in this study. Research done by past researchers has proven that teachers seldom integrate ICT (Information and Communication Technology) in teaching Mathematics. Therefore, Mathematics teacher is the main factors in how technology is used in classroom. Hence, school administrators should encourage Mathematics teacher to use ICT widely to enhance their teaching.

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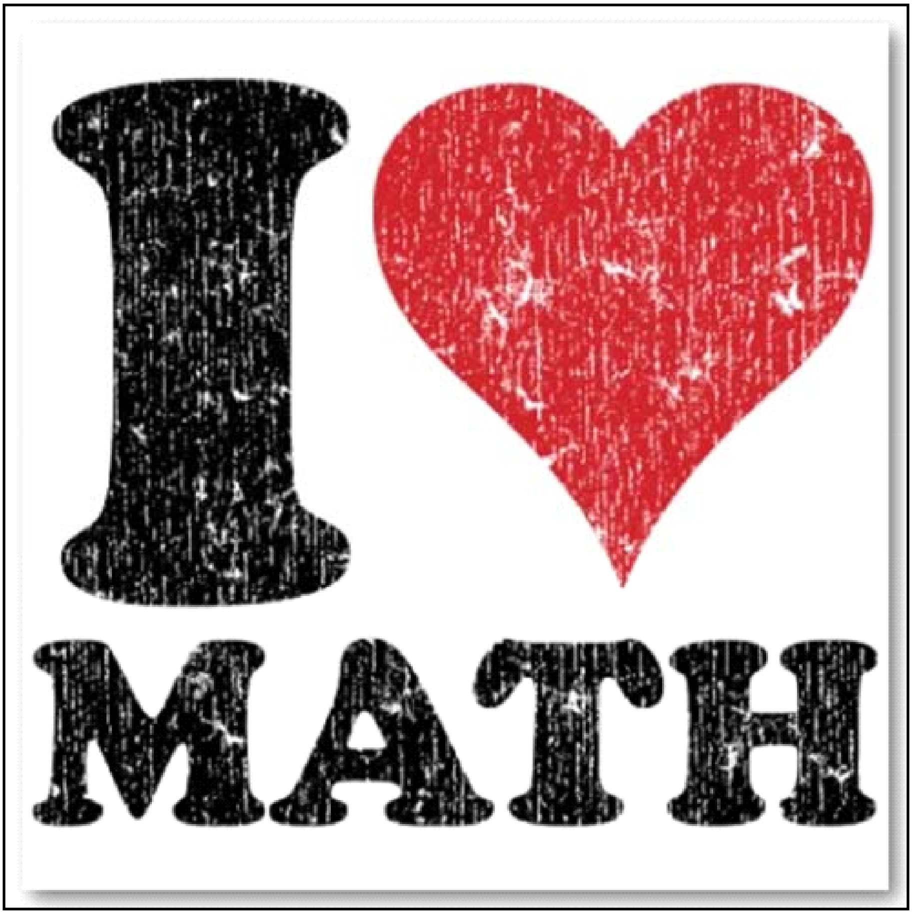


Research done by past researchers has proven that teachers seldom integrate ICT (Information and Communication Technology) in teaching Mathematics. Therefore, Mathematics teacher is the main factors in how technology is used in classroom. Hence, school administrators should encourage Mathematics teacher to use ICT widely to enhance their teaching.