

## **Self-Confidence in Mathematics: A case Study on Engineering Technology Students in FTK, UTeM**

Iskandar Waini<sup>a</sup>, Khairum Hamzah<sup>b</sup>, Rahaini Mohd Said<sup>c</sup>, Nor Hamizah Miswan<sup>d</sup>, Nurul Amira Zainal<sup>e</sup>, Aminah Ahmad<sup>f</sup>

Faculty of Engineering Technology, Universiti Teknikal Malaysia Melaka, Malaysia

### **Abstract**

*Self-confidence towards the studied subject is very important in order for students to succeed in their field of study. There is some relationship between self-confidence and the students' achievement. The main objective of this study was to understand and examine Engineering Technology (ET) students' attitudes towards the level of self-confidence or self-efficacy in mathematics during their class sessions at the Faculty of Engineering Technology (FTK), Universiti Teknikal Malaysia Melaka (UTeM). This study investigated the attitudes of 332 second year students in several field of studies at FTK, UTeM in the second semester of the 2013/2014 session. Students were given a set of questionnaire consisting of statements on their attitudes towards self-confidence in mathematics. This activity was performed during one of the classes. From the findings, a conclusion was drawn regarding the attitudes of ET students towards self-confidence in mathematics. The result shows that most ET students had positive self-confidence in mathematics. However, the level of confidence was not as high and depended on the students' situations and current environment.*

### **1. Introduction**

Nowadays, mathematics and factors influencing students' achievement in the subject of mathematics have become the most important issues in the educational system in Malaysia (Wan Zah et al., 2005). Although mathematics has been introduced as early as at the primary school level, a large number of students still have problems in solving basic mathematics questions at higher level institutions. Students are expected to already have achieved a certain level of standards in their mathematical knowledge prior to entering the university. However, the debate about the falling standards of students' achievement in mathematics has produced increasing attention among researchers, parents and educational authorities because of the importance of mathematics in all realms of life (Khairum, H. et al., 2014).

This is because most studies on mathematics achievement related it to psychological factors. The most important psychological factor related to mathematics achievement is mathematics self-confidence or self-efficacy. The Oxford Dictionary defines confidence as 'self-assurance resulting from a belief in one's own ability to achieve things'. According to Bandura (1977), self-efficacy is 'not a measure of the skills one has, but a belief about what one can do under different sets of conditions with whatever skills one possesses'. As seen, the definitions of self-confidence and self-efficacy are generally similar.

Researchers have demonstrated the value of self-efficacy in predicting a student's performance in mathematics. For example, Bandura (1977) postulated that self-efficacy, as a person's belief concerning his/her ability to successfully perform a given task or behavior, is a major determinant of whether a person will attempt at a given task and the amount of effort and persistence produced in pursuing the task. It was also demonstrated that based on the social cognitive theory, students' self-efficacy beliefs in the judgment of confidence in performing academic tasks or succeeding in academic activities will determine their subsequent capability to accomplish such tasks or succeed in the activity (Bandura, 1986). Meanwhile, the research by

Campbell and Hackett (1986) found that students believe their ability in mathematics is an important factor that will contribute toward their achievement in mathematics. Also, research findings by Hackett and Betz (1989) on 262 undergraduate students found a moderately strong relationship between mathematics self-efficacy and mathematics performance.

Believing in self-confidence or self-efficacy influences many aspects of life such as choosing goals, making decision, level of continuity and stability and encountering challenging problems. For example, Zimmerman et al. (1992) and Pajaris and Miller (1994) found that self-efficacy predicts mathematics problem-solving to a greater degree than self-beliefs such as mathematics anxiety or self-concept, previous mathematics experience, or self-efficacy for self-regulatory practices. Similarly, Pajares et al. (1999) showed that students' confidence in mathematics problem-solving skills is related to their problem-solving competence.

On the other hand, Parsons et al. (2009) conducted a study on engineering students' confidence in their ability in mathematics matter. It was found that the majority of students were fairly confident during their first year of university study. Similarly, according to Parsons et al. (2011), students gained confidence in mathematics during their first year of study and felt sufficiently confident in their future use of mathematics. Most students used the support for mathematics and described how it had helped them improve their ability and self-confidence.

Furthermore, Ayotola and Adedeji (2009) and Khezri Azar et al. (2010) revealed a strong positive relationship between mathematics self-efficacy and achievement in mathematics. Meanwhile, Wan Jaafar and Mohd Ayub (2010) found a positive correlation between mathematics performance and mathematics self-efficacy in a group of Malaysian university respondents. In addition, Shams et al. (2011) studied the mediating role of academic self-efficacy in the relationship between Five-Factor Model (FFM) of personality and mathematics performance. The finding showed a positive and significant correlation between openness to experience, conscientiousness, and agreeableness of FFM and mathematics performance. Recently, Ünlü and Ertekin (2013) investigated the relationship between mathematics teaching self-efficacy and mathematics self-efficacy, in which the results showed a positive relationship between them. In conclusion, the study about mathematics self-confidence or self-efficacy is important to identify how it contributes towards achievement in mathematics. Therefore, the main purpose of this study was to understand and examine mathematics self-confidence or self-efficacy in Engineering Technology (ET) students from the Faculty of Engineering Technology (FTK), Universiti Teknikal Malaysia Melaka (UTeM).

## **2. Methodology**

This study was primarily quantitative, and adopted from the previous study by Galbraith and Hines (1998) that used the method of mini survey for data collection. This mini survey used questionnaires in order to understand and examine the students' attitudes towards the level of confidence in mathematics. The focus was on ET students' self-confidence or self-efficacy in mathematics involving 332 second year students in FTK, UTeM as a sample for the whole population. The survey was conducted by the authors during the final week of the semester. The results were then analyzed using Microsoft Excel to obtain the statistics for each of the questions.

## **3. Results and Discussion**

All 332 questionnaires distributed to ET students' were analyzed. Most of the ET students' had confidence in mathematics. Table 1 below shows the descriptive statistics of ET students' attitudes towards confidence in mathematics.

**Table 1: Students’ Attitudes towards Confidence in Mathematics**

Statement	Percentage (%)	
	Agree	Disagree
Mathematics is a subject in which I get value for effort	97	3
The prospect of having to learn new mathematics make me nervous	66	34
I can get good results in mathematics	83	17
I am more worried about mathematics than any other subject	59	41
Having to learn difficult topics in mathematics is always difficult for me	52	48
No matter how much I study, mathematics is always difficult for me	52	48
I am not naturally good at mathematics	66	34
I have a lot of confidence when it comes to mathematics	67	33

Majority of ET students had the level of confidence or self-efficacy towards mathematics. However, the level of confidence was not quite high, as shown in Table 1 above. This result gave some ideas to achieve the objective of this study, which was to understand and examine ET students’ attitudes towards self-confidence in mathematics during their class session at FTK, UTeM. Most of the students believed that by studying mathematics, they could get the value from their effort. This was shown in 323 out of 332 respondents, which was 97%, who agreed with the statement that mathematics was a subject in which they could get value for their effort. In other words, ET students’ understood and believed about the importance of mathematics in their fields of studies.

In order to succeed in studies, especially at the university level, the level of confidence is very important, similar to mathematics, which is one of the core subjects for ET students’. From 332 respondents, 276 were confident that they could get good results in mathematics, while the rest were not confident about their results, which show that most ET students, which was 83%, had very high confidence that they could get good results in mathematics. This attitude towards mathematics is very important because the level of confidence is the first step to success in mathematics and also in their field of studies. When the statement was directed to the confidence towards mathematics, then they did show high confidence from ET students’, which was shown by just 67% respondents agreed with the statement that they had a lot of confidence when it comes to mathematics. However, this result did not show the lowest confidence about mathematics, but the percentage was not high compared to what the students should have. It can affect the achievement in mathematics because the attitude of ET students towards the level of confidence in mathematics is very important.

This study revealed that some ET students’ were not sure about their confidence on the difficulty of mathematics because almost half of the respondents, which was 52%, agreed with the statement that having to learn difficult topics in mathematics was always difficult for them. ET students’ also did not have confidence on their hard work, which was shown by 52% of respondents agreeing with the statement that no matter how much they studied, mathematics was always difficult for them. This finding shows that the attitude of ET students about the level of confidence towards mathematics was not quite high and they were still not sure about their confidence level. These results can affect their success in mathematics and are not good signs for the ET students’ towards their field of studies.

Some ET students were more worried about mathematics compared to others subjects, as shown by 196 out of 332 respondents, which was 59%, who agreed that they were more worried about mathematics than any others subjects. This situation could also affect because the ET students’ already had a negative mindset about mathematics. For example, 66% of ET students’ had the mindset that they were not naturally good at mathematics, which show that the attitudes of the ET students’ towards their level of confidence in mathematics were very weak.

## 4. Conclusion

The main objective of this study was to understand and examine ET students' attitudes towards their level of self-confidence or self-efficacy in mathematics during their class session at FTK, UTeM. Nowadays, students' attitudes in their studies play a crucial role because of the environment of the new century itself. The same situation also occurs on the attitudes of the students towards their self-confidence in mathematics because of the importance of mathematics, especially for ET students. It is also important for students' to achieve better results in mathematics. From this study, it can be concluded that most ET students, as discussed previously, had good attitudes towards their self-confidence in mathematics during their studies at FTK, UTeM. However, the level of self-confidence were not very high and depended on the situation of the ET students' themselves. Some students had the mindset that mathematics was difficult for them, but were confident in obtaining good results in mathematics. If this situation could not be controlled by the students, it could become the negative side and the effect would be poor achievement of the students' in mathematics and of course also their field area.

Most of the ET students who responded to the questionnaire felt confident in their abilities to be successful in mathematics. Much like the "Chicken and the Egg" debate, it could not be determined whether ET students' self-confidence came from their general success in mathematics or if their success in mathematics built their self-confidence. Likely, it was some combinations of the two and may be a subject for further study. In future studies, larger samples should be collected and ET students from other year of study should be included, so that a proper conclusion may be derived for all ET students.

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