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Attitudes towards Motivation in Mathematics: A Case Study on Engineering Technology Students at FTK, UTeM

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Abstract: ***The aims of this study were to understand and examine the Engineering Technology (ET) students' attitudes towards their motivation while learning mathematics during their studies at the Faculty of Engineering Technology (FTK), Universiti Teknikal Malaysia Melaka (UTeM). In this study, a set of questionnaire from a previous study by Galbraith and Haines (1998) was utilized, which included questions on the students' attitudes towards their motivation while learning mathematics. A total of 332 second year ET students at FTK, UTeM were requested to complete the questionnaire during the final week of semester two of the 2013/2014 session. From the findings, a conclusion was drawn regarding the ET students' attitudes towards motivation while learning mathematics. The result showed that most ET students had positive attitudes towards their motivation while learning mathematics during their studies at FTK, UTeM.***

Keywords: Attitudes, Behavior, Engineering Technology, Motivation, Mathematics

1. Introduction

Nowadays, it is important to know the attitude and behavior of those who are successful as the number and competency of students entering and succeeding in science, technology, engineering and mathematics (STEM) have to be increased for future career options and advancement. Further exploration on how to be successful is needed as it relates to quantitative competencies and foundational skills both for STEM and for functioning in the quantitative world [1]. Many institutions including the Faculty of Engineering Technology (FTK), Universiti Teknikal Malaysia Melaka (UTeM) have focused on engineering technology programs where more practical activities and hands-on are assessed, whereby one of the important subjects that supports and relates to this program is mathematics. The aims of this paper were to understand and examine Engineering Technology (ET) students' attitudes towards motivation while learning mathematics during their studies at FTK, UTeM.

There is a perception by young people that mathematics is boring and irrelevant [2], for which among the possible factors include poor teaching quality and learning experience, difficulty of the subject, failure of the curriculum to excite interest and provide appropriate motivation and lack of awareness of the importance of mathematical skills [2]. Mohamed and Waheed [3] identified three groups of factors that influenced students' attitudes: factors associated with the students themselves (mathematical achievement & motivation), factors associated with the school or university (teaching materials & classroom management) and finally factors from the home environment and society (educational background & parental expectations). Attitudes can be seen in positive or negative way. Positive attitudes towards mathematics reflect positive emotional disposition in relation to the subject and similarly, negative attitudes relate to negative emotional disposition [4]. There are three key domains of attitudes: confidence, engagement and motivation. Positive attitudes towards mathematics are needed because they influence one's willingness to learn and we need to know students' motives in order to understand their behavior [5].

Motivation is a potential to direct behavior that is built into the system that controls emotion. Students' motivation may be manifested through cognitive, emotion or behavior [6]. A person who is uninspired to act is characterized as unmotivated, while someone who is energized toward an end is considered as motivated [7]. Motivation can be divided into three broad categories: amotivation, extrinsic motivation and intrinsic motivation. Amotivation occurs when individuals feel that an activity has no value, feel incompetent to complete a task and expect no desirable outcome from the activity [7]. Academic intrinsic motivation is the desire of the student to engage in learning. Students who are intrinsically motivated engage in academic tasks because they enjoy them, while students who are extrinsically motivated engage in academic tasks because they want the rewards (good grades, approval from teachers and peers) or to avoid punishment (bad grades) and negative feedback [8]. All students must be motivated in some ways to engage in mathematical activities and the nature of motivation largely determines the success of their endeavor. Thus, intrinsic rather than extrinsic motivation benefits students in the process and results of the mathematical activities [9]. In this paper, we will examine how motivation affects the attitude of engineering technology students during their studies at FTK, UTeM.

2. Methodology

This study was primarily quantitative and used the method of mini survey for data collection. It also adopted a method from a previous study by [10] in order to collect the primary data. The mini survey used the method of questionnaire to

understand and examine the students' attitudes towards motivation while learning mathematics. The focus was on ET students' involving 332 second year bachelor degree students in FTK, UTeM as samples for the whole population. The survey was conducted in the final week of the semester. The data were then analyzed using Microsoft Excel to obtain the statistical result for each of the questions.

3. Results and Discussion

Table 1 below shows a summary of the attitudes of ET students' on their motivation in learning mathematics during their studies at FTK, UTeM.

Table 1: Attitudes' of students' towards motivation in mathematics

Statements	*Percentage (%)*	
	Agree	*Disagree*
Mathematics is a subject I enjoy studying	83	17
Spending a lot of time on a mathematical problem frustrates me	65	35
I don't understand how some people can get so enthusiastic about studying mathematics	63	37
I can become completely absorbed working on mathematical problems	75	25
If something about mathematics puzzles me, I would rather be given the answer than working it out myself	69	31
I like to stick to a mathematical problem until I can solve it	71	29
The defy of understanding mathematics is not appealing to me	70	30
If something about mathematics puzzles me, I will find the solution myself afterwards	77	23

As discussed previously, the motivation to learn something new may be intrinsic or extrinsic. The attitudes of students' were more intrinsic, which is very important in order to succeed in their studies. Most ET students' attitudes were very motivated to learn mathematics as shown by 276 out of 332 (83%) respondents who agreed with the statement that 'they enjoy studying mathematics. Enjoying studying mathematics can be the first step in being successful in this subject. 77% of ET students' agreed with the statement that, 'if something about mathematics puzzles them, they find the solution about it afterwards'. It can generate or produce students' who are always thinking ahead in any situation and not just accepting the situation without taking any action. Most students' experience difficulty when facing a problem in mathematics, however this situation it is not really applicable on ET students' because, they are not really stressful or in a difficulty when facing a problem in mathematics. It was shown that 249 out of 332 respondents, equivalent to 75%, agreed with the statement that, 'they can become completely absorbed when working on mathematical problems', showing that the motivation of ET students' towards mathematics was very positive. They also solve mathematical problem to completion because 71% of the respondents agreed that, 'they like to stick to a mathematical problem until they figure it out.

According to the questionnaire results as stated in Table 1, 63% of the respondents did not understand how some people could get so enthusiastic about studying mathematics. It shows that only 37% of ET students' really understood and had feelings about the attitudes of students' towards mathematics that should have intrinsic motivational, which had the lowest level of agreement with the statement agreed by the ET students'. An ET student was frustrated when they had to spend a lot of time on solving mathematical problems as shown by 216 ET students' out of 332 respondents, equivalent to 65%, who agreed with the statement that, 'having to spend a lot time on a mathematical problem frustrates them'. ET students' also felt that if something about mathematics puzzled them, then they would rather be given the answer than having to work it out themselves, as shown by 69% of the respondents who agreed with this statement. It shows that most ET students did not have the core motivation to solve a mathematical problem, especially when they face a mathematical problem with the highest level of difficulty.

4. Conclusion

In order to understand and examine ET students' attitudes towards motivation while learning mathematics during their studies at FTK, UTeM, the researcher should look at so many angles of the students' themselves. The environment, background, sources of study and etcetera are some of the factors that could affect the motivation of ET students' in their mathematical studies. The environment also included the students' hostel and background as they came from various types of studies previously, such as diploma, STPM and matriculation. In conclusion, this study showed that most ET students had the motivation in learning mathematics during their studies at FTK, UTeM. However, the level of motivation of ET students' in studying mathematics was quite low, especially that they received some reinforcement towards their studies. There is still a great deal of research that is required to understand and examine ET students' attitudes of towards their motivation in learning mathematics during their studies at FTK, UTeM.

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