Exploring Mathematics Anxiety among Computer Science Students

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ABSTRACT

Mathematics anxiety related with feeling of tension or fear that interferes with math performance. Mathematics anxiety is also called as Mathematic Phobia. The purpose of the study is to determine the Diploma in Computer Sciences students' anxiety level after taking a few mathematical subjects in Universiti Teknologi MARA (UiTM). This study also to check whether gender of students and study technique will influence the students' mathematics anxiety level. To gather the finding, 96 fifth semester Diploma in Computer Sciences (CS110) students were involved in this survey. Most of CS110 has moderate anxiety level. This study also shows that there is no relationship between parents' education level and students' study technique with their anxiety level. This study will provide a useful information for improving the teaching and learning process for mathematic courses in UiTM.

Keywords: *mathematic anxiety, computer science student, gender*

Introduction

According to Mark and Elizabeth (2010), failure rate of mathematics subject may occur caused of mathematical anxiety and their self-esteem in mathematics. They also stated that mathematics anxiety as "a feeling of tension, apprehension, or fear that interferes with math performance". Mathematics anxiety also kwon as mathematics phobia (Wikipedia, 2013).

Mathematics subject is a core subject for Diploma in Computer Sciences (CS110) students in Universiti Teknologi MARA (UiTM). CS110 students must take four mathematical subjects during their studies. Table 1 shows the list of mathematics subject taken by CS110 students.

Table 1: Mathematics Subject Taken by CS110 Students

Course Code	Course Name	Semester Taken
MAT 210	Discrete Mathematics	1
MAT 183	Calculus 1	2
MAT 233	Calculus 2	3
MAT 263	Linear Algebra 1	4

From the examination report, analysis for CS110 at UiTM Pahang it shows that the percentage of failure rate can be considered as high for some subjects like MAT183 and MAT233. Table 2 shows the percentages' failure rate for mathematics subject at UiTM Pahang.

Table 2: Failure Rate for Mathematics Subject

Course Code	December 2011 -April 2012	June - October 2012	December 2012 - April 2013
MAT 210	0	2	3
MAT 183	32	53	53
MAT 233	39	45	20
MAT 263	6	20	11

According to Mark and Elizabeth (2010), failure rate of mathematics subject may occur caused of mathematical anxiety and their self-esteem in mathematics. They also stated that mathematics anxiety as "a feeling of tension, apprehension, or fear that interferes with math performance".

Furthermore, the mathematics subjects taken by CS110 students were relate with each other. For example, if a student failed in MAT 183, he cannot register for MAT 233 in the following semester. This situation will cause an increase of student number that should extend their studies to complete their Mathematical subjects.

This objective of this study is mathematics anxiety level among CS110 students after they already take all the mathematics subjects. This study also to check whether gender of students' were influence the level of mathematics anxiety.

Mathematical Anxiety

Mathematical anxiety is a situation that happen to some people when facing a mathematical problem. Good feeling towards mathematics brings good perception about mathematics, and vice versa. Therefore, emotions play the most important part in this situation. Wondimu et al. (2012) states that mathematical anxiety refers to the uneasy feeling such as panic, clueless and helplessness when working on something related to mathematics that will affect student's performance in mathematics, as mentioned by Mark and Elizabeth (2010). In addition, their findings also found that mathematical self-concept and mathematical anxiety are related. This finding is supported by Prima et al. (2010) whom had listed that mathematic anxiety makes students feel the subject is a difficult subject, will always fail in mathematics, always write down in mathematics class, anxious if does not understand and lost interest in mathematics. It can be categorized as self-esteem issues in mathematics subject.

Currently, there are many jobs related to mathematics subject that will provide good income such as programmer, scientist, accountant, and engineer. Tobias (1993) came out with several researches related to mathematical anxiety admitted that when a person is experiencing mathematics anxiety, they will try to avoid venturing into matters involving quantitative and computational skills such as courses or careers related to mathematics. This may attract students trying to take any field that is not related to computational skills. Any perception given to it, mathematics has to be accepted as a passport to either being able to continue for further education or a promise to a better-paid job in either the government or private sectors. Tobias (1993) also mentioned that a strong background in mathematics becomes the most important criteria for many job opportunities.

Parents and friends involvement could be an influencing factor for students' participation in mathematics subject positively in higher level institution. According to Aarnos and Perkkila's (2012) study, mathematic anxiety can be caused by environmental factor. They stated that negative experience with parents or teachers in viewing mathematical might affect their children as negative attitudes and beliefs towards mathematics. This finding is supported by Maryam et al. (2010) whom describes that students will try to avoid mathematic subject with negative attitudes and belief in mathematics. This will result their ability to complete mathematics problems successfully as mentioned by Nunez-Pena et al. (2013). In relation to the issue of the students' performance in mathematics subject, Nunez-Pena et al. (2013) found out that students who experienced mathematical anxiety will be badly affected in their mathematics' performance. In addition, Brian and Jeffrey (2012) also found out that emotional self-efficacy gave negative impact on mathematical anxiety.

Gender might also be a factor in influencing mathematical anxiety among students. A study by Erin et al. (2012) shows the evidence that there exists a relationship between sex and mathematical anxiety. In their study, they also found that female students have higher level of mathematics anxiety compared to male students. Allan and Judith (1988) also support these findings. In addition, Brenda et al. (2013) believed that gender difference in mathematical anxiety might be different in different cultures.

Mathematics anxiety can caused a low performance in mathematics subject because of some of negative perception on it. Minimizing the failure rate of students enrolled in universities would be one of the main concerns for academicians. The issue here is failure rate among students in mathematics subject becomes an issue especially in MAT183 and MAT233 among CS110 students in UiTM Pahang. From the past record, failure rate for both mathematics codes shows that the rate is more than 15% compared to the other codes.

Many studies have been conduct in investigating the performance level of mathematics and the factors affecting it. Hence, the general focus of this paper is to determine the mathematic anxiety level among CS110 students. This study is also conducted to investigate whether gender and study technique factor will influence the student's anxiety level.

Research Methodology

The data used in this study were drawn from a random sampling of CS110 students at UiTM Pahang during the June - October 2013 semester. The number of participants in the survey consists of 96 fifth semester students.

The questionnaire consists of three different parts. The first part is on students' profile background and followed by second part on their mathematics study technique. The last part is on students' opinion towards anxiety level in mathematics subject.

The data obtained were analyzed using statistical procedures executed by the SPSS 21.0 by using t-test procedure.

Findings and Discussion

In total, 96 students of semester 5 (41 males and 54 females' students) took part in the study. They are in between 18 to 22 years old.

Table 3 shows the mean score of mathematics anxiety level for Diploma in Computer Science for the fifth semester.

Table 3: Mean Score of Mathematics Anxiety Level.

	Mean score	Standard deviation
Anxiety level	3.3218	0.78853

From the result, the student are significant have a moderate level of anxiety in mathematics (p-value = 0.00).

From this study, it shows that the anxiety level of students not significantly different between male and female students (p-value = 0.709). The score of anxiety level for both genders are at moderate level. Table 4 shows the mean score of anxiety level for male and female CS110 students.

Table 4: Mean Score of Anxiety Level between Gender

Gender	Mean	Standard deviation
Male	3.2868	0.79844
Female	3.3484	0.78737

Third finding from this study shows that the mathematics education background is not affected the students' anxiety level. Table 5 shows the mean score of the result SPM's Additional Mathematic and the anxiety level on mathematic.

Table 5: Mean Score of Anxiety Level and result Additional Mathematics

Additional Mathematics result	Mean	Standard deviation
Excellent	3.2856	0.71504
Not excellent	3.4351	0.99445

The table 6 shows that there is very weak negative correlation between parents' education background level with students mathematics anxiety level.

Table 6: Correlation between Anxiety Level and Parents Education Background

	Level of Anxiety
Father's education level	-0.161
Mother's education level	-0.122

Lastly, in this study shows that the group discussion study technique did not decrease students' anxiety level. Table 7 shows the correlation between group discussion study technique and students' anxiety level.

Table 7: Correlation between Anxiety Level and Group Discussion Study Technique

	Level of Anxiety
Group Discussion Study Technique	-0.099

Conclusion and Recommendation

The mathematics anxiety level for CS110 students in UiTM Pahang was at moderate level. It can be concluded that the gender factor does not influence the CS110's mathematics anxiety level. Furthermore, the group discussion study technique does not help to decrease their mathematics anxiety level.

For the future study, the comparing for the student's anxiety level before taking mathematics subject and with those whom have taken mathematics subject in UiTM will be conducted.

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