

Lecturers' Method of Teaching Mathematics: Engineering Technology Students' Perceptions in UTeM

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Abstract

Teaching Mathematics courses at the tertiary level institutions nowadays can be quite challenging especially when the delivery method for the subject matter is known to always be very traditional using the *chalk and board*. This study examined the Engineering Technology (ET) students' perceptions of their lecturers' teaching method for Mathematics courses at the Faculty of Engineering Technology (FTK), Universiti Teknikal Malaysia Melaka, Malaysia (UTeM). A mini survey with quantitative research methods was utilized. 264 second year ET students with different fields of studies at FTK, UTeM, were asked to complete a set of questionnaires administered during the final week of the semester. A questionnaire consists of questions regarding how students perceive their lecturers' teaching method during the class sessions. From the findings, conclusion has been drawn regarding the students' perceptions of their Mathematics lecturers in promoting different methods in teaching Mathematics. The result shows that most of the mathematics lecturers incorporated both active and passive teaching methods in teaching of the subject matter.

Keywords: perceptions, student-centred learning, teacher-centred learning, engineering technology

1. Introduction

Universiti Teknikal Malaysia Melaka (UTeM), has imposed all lecturers to shift from the passive, traditional way of teaching approach, that is the teacher-centred learning (TCL) approach, to an active, student-centred learning (SCL) approach in the teaching and learning at all faculties. This includes the 2-year old Faculty of Engineering Technology (FTK) which the main focus of the study is the application or practical based courses. This has no exceptions when comes to teaching Mathematics courses in this faculty.

To inculcate active learning in the teaching of Mathematics courses can be quite challenging, especially in higher learning institution. Students are expected to have already achieved a certain levels of standards in their mathematical knowledge prior to their entrance into the university. However, the debate about the falling standards in mathematics achievement has produced increasing attention for researchers, parents and education authorities because of the importance of mathematics in all realms of life (Blum, 2002).

In order to study mathematics, students should understand the theories and also memorize the formulae and this can become difficult to the students (Afza *et. al.*, 2007). In addition, to apply some of the theories and formulae, students need to be able to visualize the big picture of the problems. However, previous studies had shown that one of the reasons why learning mathematics is so difficult is the attitude of the students itself (Yushau, 2006). According to Lamb and Fullarton (2002), personal, classroom and school related factors are the factors that are different but yet interrelated factors affecting mathematics teaching and learning.

The role of mathematics lecturer as an educator is very important in teaching the subject matter in encouraging and effective way. A lot of studies have investigated into the impact of teacher related factors on the students learning mathematics and students performance in mathematics (Aubrey, 1997; Ball, 1991 and Mewborn, 2001). The way the lecturer teaches results from the good subject knowledge and the kind of perceptions that the lecturer has toward mathematics (Ernest, 1989). Normally, most of the lecturers use the TCL approach in the process of teaching and learning at universities (Arko-Cobbah, 2004). The TCL approach is the method of teaching which promotes the passive participation of students in the teaching and learning process (Ernest, 2012). According to Perkkila (2003), in solving mathematics problems the lecturers are more focused on textbooks, rules and procedures as their instructional practices and these lead to the TCL approach.

In promoting students active participations in the teaching and learning process, the new ways of mathematics teaching and learning should be introduced (Willis, 2010). According to Means (1994), to provide students with opportunities to take a more active role in their learning process, the SCL approach should be applied. The SCL approach encourages active participation among students (Ernest, 2012). Under SCL approach, students are encouraged to develop their own lenses through which to view the world and be able to argue and defend their view with confidence (Moustakim, 2007). This is very important in learning mathematics because

students must understand the theories and must know how and when to apply the appropriate formulae to solve the mathematical problems.

According to Lim (2007), by combining active and passive learning strategies it can give benefits to the students to structure their learning by following the lecturers' instructions and also take responsibility for their own learning by actively participating in the teaching and learning process. The results from the study by Ernest (2012) show that the students' perceptions of their learning mathematics consist of both active and passive learning experiences. It can be concluded that their lecturers were applying both TCL and SCL approaches in their teaching and learning process. Most of the students have a positive attitude toward their lecturers teaching and that their lecturers' teaching methods have a direct impact on their learning experiences (Ahmad & Aziz, 2009).

Since students are the only witnesses on what is happening in the classroom, then this study is significant to expose the information about lecturers teaching method in class session by examining their perceptions. Particularly, this study is significant to understand the perceptions of ET students about mathematics lecturers' method of teaching, since ET is one of the new education fields in Malaysia which focuses more on application and implementation compared to pure engineering field that focuses more on research and development (Craig *et. al.*, 2011). The objective of this study, therefore, is to examine ET students' perceptions of their lecturers' teaching method for mathematics courses at FTK, UTeM..

2. Methodology

A mini survey has been carried in order to gather information on students' perceptions about the way their Mathematics lecturers teach the subject matter using the SCL and TCL approaches. The target sample for the study was the 264 second year ET students who specializing various fields of studies at FTK. The questions in the questionnaires are focused more on the ET students' perceptions of their lecturers' teaching method for mathematics courses. This mini survey method consists of semi-structured questionnaire that was adopted from prior studies by Ernest (2012). The questionnaire was divided into two sections. The first section examines the students' perceptions of their lecturers' teaching method using the SCL approach. The second section examines the students' perceptions of their lecturers regarding the TCL approach. The survey was conducted by one of the authors during the final week of the semester. The result was then analyzed by using the Microsoft Excel to obtain a few simple statistics to draw some conclusions.

3. Result and Discussion

Table 1 below shows the result of students' perceptions of their Mathematics lecturers' method of teaching Mathematics courses using SCL approach.

Table 1: Students' Perceptions of their Mathematics Lecturers' Teaching: SCL Approach

Statement	Percentage (%)	
	Agree	Disagree
The lecturer expects us to learn through discussion of ideas in class	94	6
The lecturer asks us to compare different methods for solving questions	92	8
The lecturer encourages us to make and discuss the mistakes	97	3
The lecturer asks us to work in pairs or in small groups	80	20
The lecturer encourages us to use our own methods	72	28

In general, most of the ET students agreed that their lecturers encourage active participation among them during the teaching and learning Mathematics courses. 94% of them agreed that the lecturers expect them to discuss their ideas in order to solve the mathematical problems. 92% of them agreed that they were also asked to compare different methods in solving mathematical problems among friends. It is also shown that the highest percentage (97%) of them agreed that their lecturers would encourage them to make mistakes and to discuss

them as part of the active learning process. Workings in pairs or in small groups were also being encouraged by their Mathematics lecturers. However, less percentage as compared to other statements in regards to lecturers encourages students to use their own methods, based on their understanding of the subject matter to solve problems. Anyhow, 72% is still can be considered as fairly high in percentage. The reason for the dropping in the percentage could mean the students did not expose into various types of solving similar problems before. In conclusion, for this particular section of the questionnaire, the result shows that the lecturers are applying some of the active learning strategies in the teaching and delivering Mathematics knowledge at FTK during face to face sessions.

Table 2 on the other hand, shows the result of students' perceptions of their Mathematics lecturers' method of teaching Mathematics course using TCL approach. As known, TCL approach is the method of teaching which promotes passive participations of the students in the teaching and learning process.

Table 2: Students' Perceptions of their Mathematics Lecturers' Teaching: TCL Approach

Statement	Percentage (%)	
	Agree	Disagree
The lecturer prevents us from making mistakes by explaining things very carefully	90	10
The lecturer asks us to work through practice exercises only	97	3
The lecturer asks us to follow methods shown by lecturers only	93	7
The lecturer tells us which questions to attempt	95	5
The lecturer asks us to follow the textbook method closely	71	29

It is very interesting to find out that the percentage of agreed statement in this particular section of the questionnaire is also very high. Majority of the ET students also agreed that during their learning of Mathematics courses, their lecturers also applied the TCL approach. 97%, which is the highest percentage of the students agreed that their lecturers did ask them to work through the practice exercises in the adopted textbook only. In order to master the mathematics subject, students should always be encouraged to work through the practice exercises as many as possible. 93% of them also agreed that their Mathematics lecturers always emphasize on following the methods shown by the lecturers only in order to solve mathematical problems. 95% of them also agreed that they have been guided to do specific questions as stipulated in the course outline. Interestingly, only 71% of the students agreed when come to lecturers asking them to just follow the textbook method to solve problems as stated in the examples in the textbook. Nevertheless, this percentage is still quite high. This result could be perhaps most of the mathematics lecturers are focusing more on just doing the questions in the textbook as compared to reading or referring the notes in the textbook.

By examining the results in both Table 1 and Table 2, it is found that the ET students agreed that their Mathematics lecturers are using both SCL and TCL approaches when comes to teaching and learning Mathematics courses in class.

5. Conclusion

In a nutshell, the finding shows that based on the students' perceptions of their Mathematics lecturers' teaching method, the role of the lecturer is very important in guiding them the proper ways and steps to solve mathematical problems. Most of the respondents perceive their lecturer as the source of knowledge. It has also shown that the lecturers encourage active participation among students by asking them to explore and develop their knowledge and at the same time guide them step by step in order to solve mathematical problems. In other words, ET students perceive their lecturers to apply both SCL and TCL approaches in teaching and learning Mathematics courses at FTK. It is hoped that this survey will also help lecturers to develop teaching mathematics in more easily, effective, and encouraging way.

The result of this study must be interpreted with caution and generalization is limited because the sample only consists of second year of ET students only. In future, larger samples should be collected where students from different years of studies will also be included so that we can make a comparison about the different perceptions towards lecturers' teaching method in Mathematics courses.

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