

**STUDENTS' PROBLEMS OF LEARNING MATHEMATICS IN
UiTM. A CASE STUDY ON DIFFERENTIATION & INTEGRATION**

BY

**KAHARTINI ABD RAHMAN
ROHANI AHMAD
SHARIF AH MUZLIA SYED MUSTAFA**

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ABSTRACT

A mathematics lecturer often has to meet the demands of an engineering department that expects students to know and apply advanced mathematical techniques. Lecturers also have to focus on students who lack confidence and sometimes ability in mathematics. Since the Civil Engineering Faculty introduced the Mathematics IIC (Differentiation & Integration) course in 2002, the rate of failure in this subject in UiTM, Shah Alam campus, was between 30% and 50%. Lecturers teaching the subject have been concerned about the failure rate of the students. Thus, it is the aim of this study to identify the problems faced by students in learning this subject. However, it is important to stress that the intention of this study is simply to determine and not to investigate the nature of these problems. The participants in this study were 46 Civil Engineering diploma students at UiTM Shah Alam campus who failed the second semester mathematic course at least once. The repeater responded to a survey that asked for their perceptions on learning mathematics as well as when learning mathematics in English, and the students' strategies when answering mathematics questions in English. A section of the questionnaire listed the subtopics in both differentiation and integration that the students have to indicate the problem(s) they face when learning the subtopic. Frequency distribution was used to analyze the data. Results show that in terms of attitude, many students believed that they were good at mathematics, actually looked forward to attending mathematics classes, liked to learn mathematics because of the precision in the concepts, as well as it being a thought-provoking subject. Half of the students admitted to feeling uncomfortable having to learn mathematics in English where all lectures and notes are given in the English language. Many wished that the subject were taught in Bahasa Melayu so that they would have an easier understanding of the words and vocabulary used. The respondents said that learning mathematics in English is difficult and achieving low grades in mathematics is attributed to the language being used. In terms of the students' strategies when encountering with mathematics questions in English, the respondents took a long time to understand the questions written in English. They would just look for keywords in the questions with the intention of searching for clues that would lead them to the correct answer, or they translated the questions to Bahasa Melayu as a first attempt when they tried to solve a mathematics question in English. When dealing with a new mathematical problem, most respondents in this study would try to recall the method that they have previously adapted to a similar question. The majority of the students have two main problems in learning differentiation and integration: the failure to remember the formulas essential to carry out the differentiation and integration processes, and the overall structure of the course which limits the students in having enough time to do extra exercises and revision. Other problems include weak understanding of the topic and failure to understand the English words in questions. Recommendations from the researchers include providing students with a formula booklet during mathematical tests and examinations, collaborative teaching between the mathematics and the English lecturers, and providing an English-Malay dictionary in all examination venues for students to refer to if necessary.

Keywords: Mathematics, problems, learning, differentiation and integration.

CHAPTER ONE

1.0 Introduction

The importance of mathematics as a tool for the description and analysis of engineering systems and processes has long been acknowledged. Mathematics is a prime constituent of the education of an engineer substantiated by the facts that it is often the only subject specified as a pre-requisite. It is a common feature in all-engineering courses. For most students in engineering, calculus is the entry-point to undergraduate mathematics. The Additional Mathematics subject at the secondary school level in Malaysia can be considered as a preparation for students taking calculus at higher level of learning, especially in engineering courses. Lack of confidence and ability in this subject will consequently ill affect the student's chances to do well in mathematics at higher level of learning in any engineering faculty.

A mathematics lecturer often has to meet the demands of an engineering department that expects students to know and apply advanced mathematical techniques. Lecturers also have to focus on students who lack confidence and sometimes ability in mathematics. Students embarking upon engineering diploma courses in the Mara University of Technology (UiTM) are required to demonstrate minimum levels of competence in mathematics through the achievement of good Additional Mathematics grades in Sijil Pelajaran Malaysia (SPM), which is a minimum of grade C. However, this study has found that most of the respondents repeating the mathematics course obtained as low as grades C6, P7 and P8 in their SPM Additional Mathematics subject. This indicates that students' foundational