

## Chapter 5

# Investigating the Relationship Between Self-Efficacy and Academic Outcome in Mathematics: Using Teacher-Learners Partnership's Repetitive Attempts Online Homework Approach

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### **ABSTRACT**

*This study mainly aims to investigate the correlation between the learners' self-efficacy and their academic outcome in term of their assessments' results based on the teacher-learners partnership's repetitive attempts online homework approach. The present study relies on a survey of 75 students who enrolled in Calculus I module at Taylor's University using a 27 item-questions survey questionnaire together with all their different types of assessments' results. The data are analyzed using Pearson's correlation coefficient to determine the association between learners' self-efficacy and their academics outcome. Findings illustrate that students' self-efficacy and their academic outcomes are significantly correlated in this online homework partnership ambient. The statistical results also demonstrate that there is a very strong and significant relationship between students' quiz, test, and final examination results towards their overall academic result.*

DOI: 10.4018/978-1-7998-6445-5.ch005

## INTRODUCTION

Mathematics is a subject which serves as a base and foundation for science, engineering and technology related subjects. As a result, it is a compulsory subject for students in tertiary education especially for those who are major in science, engineering, information technology and business. However, problem such as student readiness and success rates, instructor time constraints, reform approaches and traditional approaches, curriculum demands, personal instruction, individualised instruction and computer-assisted instruction often arise within a higher education institution (Hastings, Gordon, Narayan, & Mathematical Association of America, 2006). It becomes very crucial that the challenges in mathematics education are happening at a moment when most experts believe that the students are lacking of skill in handling mathematics and they are needed to be improved in order to compete in the future workforce (American Mathematical Association of Two-Year College, 2006; National Council of Teacher of Mathematics, 2000). Therefore, various remedial steps are needed to be taken in order to help the students learn mathematics better.

In learning mathematics, teaching and learning quality is recognised as essential in classrooms where teachers' instructional approaches consistently incorporate cognitively challenging tasks that encourage high-level thinking in their students (National Council of Teachers of Mathematics, 2014). More often than not, teachers who adopt student-focused approaches in their teaching, view their role as facilitators of student learning outcome rather than simply transmitters of knowledge. They also view student learning as a process of conceptual change whereby learners are encouraged to construct their own knowledge (Trigwell, 2012) and apply assessment strategies that focus on deep understanding of mathematics concepts and processes rather than just getting the right answers based on the questions given (Stipek, Givvin, Salmon, and MacGyvers, 2001). Thus, establishing the teacher-learners partnership relation is deemed to be significant in ensuring the teaching and learning process a success.

Learning mathematics also requires students to perform and complete a wide variety of questions in order to master well in their computational and problem-solving skills. Hence, homework or assignment is a mandatory item to be given to students in all mathematics classes (Trautwein & Koller, 2003). However, students may feel demotivated when they are given with a lot of questions and exercises, especially when they are struggling in attempting those questions. In education, the notion of struggle is usually necessary in the aspect of learning including mathematics (Warshauer, 2015). However, leading them to the lack of initiatives and determination in getting the homework done. It is even worse for learners who struggle especially in mathematics. Usually, these learners show a strong tendency to avoid learning mathematics, hold negative attitudes towards mathematics, and have weak self-confidence in doing the mathematics homework (Wei, 2010). Even if the students may have attempted the questions, based on theories of learning, such as constructivism (Davis, Maher & Noddings, 1990) and social cognitive theory (Schunk, Pintrich & Meece, 2008), students' practices are necessarily to be followed by teacher's feedback for the students to verify their understanding. Consequently, students only be able to adjust their understanding and applying the correct method of solution. This attempt-feedback-reattempt loop (Zerr, 2007) is important in creating a great learning experience in mathematics among the students. Therefore, it becomes a challenging task for mathematics lecturers to feedback to the students promptly.

With the large number of assignment questions and the mathematical problems to solve, teacher may face time constraints in providing feedback for the students in a timely manner using conventional homework approach. Thus, it is a challenge to achieve the attempt-feedback-reattempt loop theoretical potential in this context. In the application of traditional homework approach, students may complete

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