THE IMPACT OF SELF-EFFICACY ON ACADEMIC ACHIEVEMENT OF THE HIGH ACHIEVING SCIENCE STUDENTS IN MALAYSIA SCHOOLS

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ABSTRACT— The primary aim of this study is to investigate the impact of self-efficacy beliefs on the academic achievement (CGPA) of high achieving school students in science subjects. Students' self-efficacy refers to their self-confidence in their own ability to perform a given task. The Malaysian high achieving school students in the science stream were randomly selected to participate in this study applying the Principal Component Analysis (PCA) and the Structural Equation Modeling (SEM) to answer two research questions: 1) what is the relationship between the control of learning beliefs and self-efficacy belief for learning of the high achieving school students in science stream? 2) What is the impact of self-efficacy beliefs on the academic achievement of the high achieving school students in the science stream? The finding shows a considerable relationship between the variables of self-efficacy beliefs and indicates the effects of self-efficacy beliefs on science achievement significantly. The direct effect of control of learning beliefs on the academic achievement was.51 while the direct effect of self-efficacy belief for learning on the academic achievement was also. 60 indicating that self-efficacy beliefs play a crucial role in the lofty attainment of the participants. In conclusion, educators should strategically maintain high self-efficacy beliefs of high achieving students to boost science attainment in the country.

Keywords—self-efficacy, academic achievement, science subject

1.0 INTRODUCTION

Self-efficacy beliefs and academic performance

Self-efficacy is an individual's self-belief in his own capabilities to carry out a given task effectively [1]. Self-efficacy is people's judgments about their abilities to perform a task successfully [2]. It was emphasized by Pajares that Self-efficacy beliefs enhance one's accomplishments feelings to remain strong when approaching difficulties and challenging tasks [3]. Developing students' self-efficacy in multiple areas increases their confidence to master new domains, explore new ideas, encourage them to set higher expectation goals for future performances and better persistence than before [4]. The Self efficacy beliefs actively inject and facilitate other factors of success, such as motivation and self-regulation. Accordingly, self-efficacy thoughts regulate human execution through cognitive function and elements of motivation [1, 5]. Self-efficacy is probably one of the most important factors that leads to academic performance, including, science subject attainments of the high achieving students. It was found that there is a correlation between self-efficacy and subject attainment. According to Klassam & Lynch, (2007)[6], students with high self-efficacy tend to attain predicted expectations while low self-efficacy students often do not attain their true potentials. Individuals who have a high degree of self-efficacy are more likely to attempt challenging tasks, persist longer in them, and to exert more effort in the process [1, 7]. The study of Schunk &Pajares, 2002)[8] reported that the boys were often found to have higher self-efficacy beliefs. This may relate to the boys' social exposure and security compared to the girls in human societies.

Emily, (2014)[9] discovered that lack of self-efficacy makes students perceive math and science to be more difficult subjects, and at the same time, the processing involved in self-efficacy beliefs development help students to build up capabilities to excel in mathematics and science. Self-efficacy beliefs also enable students to monitor study activities, solve problems, and persist to carry out a given task than peers with low self-efficacy beliefs. Students who possess high degrees of self-efficacy do not give up easily to achieve academic goals [10, 11, 12]. It was reported by Ellen et al. [13], that students who are confident in their academic capabilities seem to evaluate their progress frequently and regulate their studies strategically in which promotes success in their academic performances. Learners with high self-efficacy attribute failure to low effort while low self-efficacy students associate low performance to low ability [14]. Researchers have investigated the relationship between self-efficacy and its four hypothesized sources. Accordingly, there are many reasons for people to believe in themselves. The reasons are related to four factors: 1) past mastery experiences, 2) exposure to vicarious experiences), 3) access to verbal persuasion, and 4) experience of emotional arousal to task performance [15]. The main influential source of self-efficacy is the interpreted result of one's past performance or individual's mastery experience. Viewing past accomplishments positively is a powerful key to boost students' self-efficacy further [16].

2.0   METHOD

A total number of 988 high achieving school students in the science stream were randomly selected from several Malaysia upper secondary schools located in Tanjung Malim, Ipoh, Wilayah Persekutuan, Selangor, and Putrajaya. In this study, the principal component analysis with Varimax was employed on the construct of self-efficacy beliefs to investigate the validity of the two dimensions, control of learning beliefs sub-scale and self-efficacy belief for learning and performances sub-scale. Initially, the control of learning beliefs sub-scale contains four items while self-efficacy belief for learning and performances sub-scale contains eight items respectively. Structural Equation Modeling (SEM) was used to investigate the model fit of the study. Finally, the reliability test was conducted to examine the internal consistency of the items.

3.0   FINDINGS
3.1   THE RESULT OF THE PCA AND CFA ON SELF-EFFICACY BELIEFS

The results of the Principal Component Analysis on the self-efficacy beliefs revealed that all the loadings for the two dimensions were strong and valid and no items need to be deleted. The Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) was .912 while Bartlett's test of Sphericity yielded a significant level p=.000. The anti-image correlation within each item was ranged between.9 and above indicating that all items were statistically and adequately related. In the same vein, the communality was also employed for the data which met a required level of at least .5. The eigenvalues extracted were greater than one and accounted for 66% of the proportion of total variance.

The two factors were used for the PCA named control of learning beliefs to construct (COLEB - 4 items) and self-efficacy beliefs for learning and performance factor (SEBLAP - 8 items). According to the first result, the items A2 and A4, A9, A11, and A12 were suggested to be deleted due to small and high loadings. Modification indices were checked which shows that e5< >e8, e5< >e9, e2 < > e10, e1 < > e9, e1 < > e8 and e1 < > e5 must connect together by setting them as a free parameter. It was re-run again and model fits improved which means the items measured the underlying constructs. The results showed that CMIN was 25.328, CMIN/DF 3.618, CFI .995, TLI .984, NFI .993 and RMSEA .052. The model fit met the required level. Likewise, the standardized regression weight demonstrated that the two underlying factors were acceptable at 0.001. For that reason, the results signified that CFA's fit indices for the construct of the self-efficacy beliefs satisfied the best fits. Item reliability and the critical values of the measurement model were between the minimum suggested

CMIN=25.328
CMIN/DF=3.618
CFI=.995
TLI=.984
NFI=993
RMSEA=.052

3.2   RESULT OF DIRECT EFFECT ESTIMATION

Analysis of direct effect technique was conducted to examine the causal relations between control of learning beliefs, self-efficacy belief for learning and performance, and student's academic performance ((Figure 1.0).

Belief

Significantly, the direct effect of control of learning beliefs on students' academic achievement was .51 while the direct effect of self-efficacy belief for learning on students' academic achievement was .60. The correlation between the two factors in the model was .64.

4.0   CONCLUSION OF THE STUDY

In this study, the PCA and SEM were used to validate the instrument and to answer the research questions involving 988 Malaysian high achieving school students in science. Accordingly, the measurement model of this study is an apt model with reliable psychometric properties. The finding shows a considerable relationship between the control of learning beliefs and self-efficacy beliefs for learning of the high achieving science stream students. The results of direct and indirect techniques indicate the effects of self-efficacy beliefs on the students' science achievement significantly.

The present study also shows a strong relationship between the self-efficacy beliefs of Malaysian secondary school students in the science stream and their high science attainment. These findings were supported by past studies. For illustration, students with high self-efficacy tend to attain predicted expectations. They are more likely to attempt challenging tasks, persist longer at them, and spend more effort in the process (Bandura, 1986; Witt-Rose, 2003). The implication of this study is summarized here; 1) Malaysia educators and stakeholders should strategically maintain high self-efficacy beliefs of high achieving secondary school students in the science stream to maintain their high science attainment. Likewise, 2) the self-efficacy beliefs of low and medium secondary school students in the science stream should be improved to boost their high science attainment since the high self-efficacy students master new domains, explore new ideas, and actively inject other factors of success into their academic interactions and requirements.
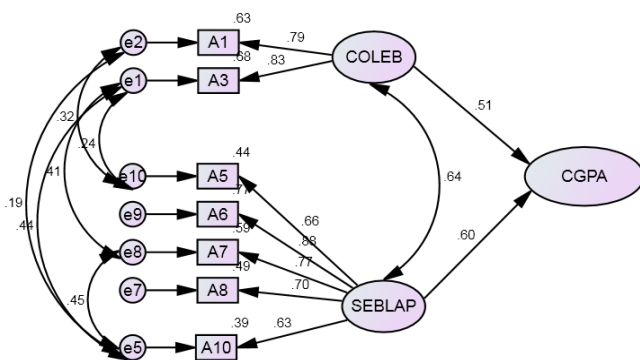
levels.

Figure 1.0: Structural Equation Model for Self-Efficacy

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