ROLE OF MATHEMATICS SELF-EFFICACY IN THE ACHIEVEMENT OF MATHEMATICS

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Introduction

The failure in mathematics is one of the major problems in General Education. To improve mathematics performance, it is necessary to study the factors affecting the process of achievement in mathematics. Researchers have pointed out that the self-efficacy beliefs predict students mathematics performance (Bandura 1986, Betz 1989, Collins1982, Pajares, 1998). Furthermore, Bandura (1986, 1994) points out four major sources of self-efficacy beliefs namely: mastery experience, vicarious experience, verbal persuasion and physiological state. Human functions are activated through factors such as self-efficacy implementation, cognitive process, and motivational process, affective

Process and selection process. This study examines the relationship between self-efficacy and achievements in mathematics of the G.C.E O/L students. The specific objectives of the study were to build up a mathematics self-efficacy scale(MSES) , to determine the relationship between self-efficacy and achievement in mathematics and to build a model which shows the relationship between mathematics self-efficacy and mathematics achievement (MACH).

Materials and Methods

Under the descriptive research methodology, quantitative and qualitative methods were used to gather data. The sample consisted of 135 G.C.E O/L students from Kandy Education zone. A mathematics self-efficacy scale (MSES) was prepared according to Bandura's (1986) self-efficacy theory . The framework of mathematics curriculum in Sri Lanka also enumerates five essential skills: Knowledge and Skills ; Communication; Identifying Relationships, Reasoning ; problem-solving. These five skills have been interwoven in the seven major strands into which the achievement aims of mathematics education have

been grouped. These include: mathematical processes, number, measurement, geometry, algebra, probability, and statistics These seven strands were used as the main framework in designing the mathematics self-efficacy scale (MSES).

Results

Mathematics self-efficacy scale (MSES) comprised of 150 items in the Pilot questionnaire. ANOVA and LSD test feedback from the participants (n =34)were used to refine the

questionnaire. Then the refined 52 items on the questionnaire were subjected to a reliability analysis. The feedback from participants (n = 135) were used to refine the questionnaire further. All items which had item-total correlations less than 0.60 were dropped. Subscales which had alpha less than 0.70 were also removed. Linear Regression analysis was used to build a model in between mathematics self-efficacy and mathematics achievement.

Table 1: Reliability analysis

	Alpha
Mathematical processes	.8954
Number	.8924
Measurement	.9103
Geometry	.9066
Algebra	.9295
Probability	.9026
Statistics	.8894

Table 2. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.851[a]	.724	.716	11.6720

a. Predictors: (Constant), MACH

Table 3. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	10.423	8.097		1.287	.207
	MACH	.873	.095	.851	9.169	.000

a. Dependent Variable: MSES

Conclusion

Table 1 subscales of self efficacy for mathematics shows high reliability. According to the Table 2, R-value of 0.851 which is the correlation of coefficient between

self-efficacy and achievement in mathematics is high .

R-Square value of 0.724 which is the coefficient of determination shows the model accounted for 72% of the variation in mathematics achievement.

Table 3 shows that the parameter estimate value of MACH is significant at the ($p < 0.05$) level .

The standardized best model is MACH = 0.851 *MSES . That model indicates that mathematics self-efficacy beliefs predict students mathematics performance. Findings of this study support Bandura's (1986,1997) claim that self-efficacy predicts academic outcomes.

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