International Journal of Theoretical & Applied Sciences **6**(1): 20-35(2014)

ISSN No. (Print): 0975-1718
ISSN No. (Online): 2249-3247

Impact of Attitude and Self-Concept of the Students towards Mathematics upon their achievement in Mathematics

Dibyajyoti Mahanta

Associate Professor & Head, Department of Mathematics,
Nowgong Girls' College, Nagaon, Assam

(Received 15 November 2013, Accepted 10 January 2014)

ABSTRACT: In this paper an attempt has been made to highlight on how the attitude and self concept of the students can affect their understanding of the mathematics subject as well as their performance. Students of class X in Nagaon district were interviewed through a questionnaire prepared to study their beliefs, confidence and perceptions about the subject. Statistical instruments were then used to analyze the collected data.

***Keywords*:** Students' attitude, self-concept, medium of instruction, t-test, Karl Pearson's product moment

I. INTRODUCTION

It is observed by Damrongpanit, Reungtragul and Pittayanon (2007) [6] that in the present time, the students' academic achievement is underlined to become a major direction in the national education, because academic achievement of the students is the most suitable indicator to show the educational success. Therefore identifying the factors that affect students' learning and achievement continues to be an important object of research of educators across the countries. Researchers in mathematics education have expressed concern about the relationship of attitude and achievement in mathematics. Since in today's world mathematics has become a basic necessity of human life therefore they are concerned about the strategies for enhancing the quality and performance of the students in mathematics. There is no existent field of study which does not require the use of mathematical theories or numerical computations in some way or the other. Most of the recent technological landmarks right from astronomical and space researches to industrial advancements, have deep rooted foundations in mathematics. Even for non science related people, mathematics comes into the picture in almost every daily activity. Keeping this in mind, educationists and policy makers have made mathematics a compulsory subject in the elementary and high school curricula in every nook and corner of the world. That said, it has been observed in recent times that mathematics has become a subject which instils fear and despair in the minds of the learners. There is a large section of students which fails to clear their yearly examinations because of this one paper. Such events lower the confidence of the students even further and gradually the students take a completely negative approach with a view of just passing the test. Even most of the students who do fairly well in mathematics feel that it is a subject better avoided than courted and opt out of the subject as soon as the curriculum permits them too. The people in contact to the mathematics learners are also responsible for feeding them with their own experiences with the subject and this can also bring a change to the existing mindset of the students.

The entire reasons stated above club together to form perceptions of mathematics, i.e. its utility and complexity, and their own individual abilities in mathematics in the minds of young learners. This can be defined as the self-concept of the students. Another important parameter in a similar context is the attitude of the students towards mathematics. It denotes how the students approach the subject and tackle its problems.
The effects of self-concept and attitude of the students in their overall mathematics achievement is a topic that has had a long history of research amongst educationists. In order to implement educational policies it is important to understand how the positive or negative attitude and self concept of the students affect the students' achievement. Moreover, such a study will also be beneficial to the students so that they can chalk out their study plans and techniques in order to attain their desired level of performance. In this context it is also necessary to investigate the numerous psychological processes that are associated with the learning process particularly in a tricky subject such as mathematics.

II. REVIEW OF RELATED STUDY

Researchers have long since been studying the impact of the self concept and attitude of the students upon the achievement in mathematics. Aiken (1970) [1] defines attitude as "a learned predisposition or tendency on the part of an individual to respond positively or negatively to some object, situation, concept, or another person. According to Pajares and Miller (1994) [15], self-efficacy, self-concept and the perceived usefulness of mathematics were predictive of mathematical problem solving. Tsai and Walberg (1983) [21] also found that interviewed 13 year olds and found that their mathematics achievement was dependent on attitude. Furthermore, attitude towards mathematics was again dependent on factors like gender, ethnicity, parental education and home opportunities.

Singh *et al* (2002) [19] concluded that attitude towards mathematics was positively related to achievement. Ma (1997) [12] investigated the influence of the students' attitude and mathematical achievement. His findings were – (a) there is a reciprocal and not unilateral relationship between mathematics attitude and achievement, (b) the feeling of enjoyment directly affected mathematics achievement, (c) the feeling of difficulty functioned via the feeling of enjoyment and (d) the perception of mathematics was independent of other attitudinal measures. According to Steinkamp et al (1985) [20], males had a slight greater achievement in mathematics and this was due to their more positive attitude.

Schofield (1982) [18] found that attitude of the students affects their achievement but their relation depends on other variables like sex of the students, grade level and the type of achievement test. There was a more positive relationship between attitude and achievement in boys than in girls. Moreover, the influence of attitude grew stronger with successive grade levels. Anttonen (1969) [3] studied students over a period ranging from found late elementary to late secondary school and found a positive correlation between mathematics attitude and achievement. He also found a positive correlation between the mathematics attitude in lower grades and that in higher grades.

Researchers have also studied the formation process of a student's attitude towards mathematics. Brown et al(2008) [5] noted a growing disinterest among high school students in England. They found that boredom and anxiety were the primary reasons why students did not take up mathematics in higher education and these were in turn caused due to lack of confidence, perceived difficulty and failure to understand the relevance of the subject. According to Haladyna *et al* (1983) [10], teacher quality, social-psychological classroom environment and management organization affected a class's attitude towards mathematics at school.

Aiken Jr. and Dreger (1961) [2] proved their supposition that experiences with mathematics determine the students' attitudes and that attitudes contribute to the prediction of mathematics achievement. Reynolds and Walberg (1992) [17] tested a structural model of mathematics achievement and attitude and found that previous attitude had maximum impact on subsequent attitude and achievement although instructional quality and home environment were also notable causal variables.

Self- efficacy and self-concepts have also been established as decisive factors in student mathematics achievement. Although these two might appear similar to a layman, Bong and Skaalvik (2003) [4] argue that both are fundamentally different. According to them both predict motivation, emotion, and performance to varying degrees. The differences include integration vs. separation of cognition and affect, heavily normative vs. goal-referenced evaluation of competence, aggregated vs. context-specific judgment, hierarchical vs. loosely hierarchical structure, past vs. future orientation, and relative temporal stability vs. malleability. Self-efficacy acts as an active precursor of self-concept development and suggest that self-concept research separate out its multiple components and sub-processes and invest more effort toward making students less preoccupied with normative ability comparisons in school.

Hackett and Betz (1989) [9] found that mathematics achievement was correlated moderately but positively with mathematics self efficacy. Both performance and self efficacy were correlated positively with attitude towards math but self-efficacy dominated over performance and achievement variables when it came to choosing mathematics as a major in higher education. Pietsch *et al* (2003) [16] found self efficacy to be most highly related to achievement in mathematics and percentages.

House (1992) [11] studied the relationship between academic related expectancies, self concept and mathematics performance. After controlling the effects of prior mathematics achievement, it was found that students with higher academic self-concept earned significantly higher grades than other students. Gill and Reynolds (1999) [7] found that the expectations of their teachers and parents mediated the expectations of the students which again affected their mathematics performances.

Mathematics achievement has also been reported to boost the students' self concept. According to Marsh and Shavelson (1988) [13], the attainment of a positive self-concept in mathematics is a positive and desirable goal in personality and child development. Marsh *et al* (1985) [14] also found that mathematics achievement had a positive impact upon self-concept.

Guay *et al* (2003) [8] also opined that the relationship between attitude and achievement was bilateral. Their equation model for the total sample population supported reciprocal effects i.e. self concept positively affected achievement and vice versa.

III. RATIONALE OF THE STUDY

Mathematics achievement of the students has been one of the trending topics at educational journals. Numerous scholars have tried to identify the different causes that can be associated to a lack of satisfactory achievement of the learners in mathematics. The attitudes of the students and their self concept regarding their own aptitude in mathematics have been identified as important factors in predicting the mathematics performance and achievement.

However, none of such studies are complete in the sense that they have not identified or given due importance to each face of the problem of underachievement. Moreover, an overwhelming majority of such studies have been conducted in developed countries of the west. The prevailing educational climate in such nations is very different from India and approaches of the people also differ. Hence it is necessary to investigate the impact of positive/negative attitude and self-concept of the students upon their mathematics and overall academic achievement.

IV. HYPOTHESIS

There is no influence of attitude and self concept of the students upon their mathematics achievement.

V. DESIGN OF THE STUDY

Descriptive survey method was used to obtain relevant data for the study. The sample population consisted of 400 randomly selected students from 20 schools; 20 from each school. A questionnaire containing questions regarding the mathematics attitude, anxiety, expectations and perceptions of the students was prepared and administered to the students. The students had to choose one from five options: (i) strongly agree, (ii) agree, (iii) neutral, (iv) disagree and (v) strongly disagree for each question. The rating scale was 5,4,3,2 and 1 for the options in the above sequence in case of positive impact questions and reverse i.e. 1,2,3,4 and 5 for the negative ones. The numerical data collected was then analyzed using SD, t-test and Karl Pearson's product Moment.

VI. STATISTICAL ANALYSIS

The following tables show the analysis of the study. Here SD = Standard Deviation, SEM = Standard Error Mean, MD = Mean Difference, Df = Degrees of freedom

Estimated Distribution Parameters.

		students' attitude
Normal Distribution	Location	37.21
	Scale	6.780

The cases are unweighted.

Table 1: Positive attitude of boys in Assamese Medium School in case of class environment.

N = 25

Mean	39.16
SD	8.739
SEM	1.748

Test Value = 25					
t	df	Sig. (2-tailed)	M D	95% Confidence Interval of the Difference	
				Lower	Upper
22.403	24	.000	14.16	34.14	39.86

From table 1 and table 2 it is found that the positive attitude of boys of Assamese Medium schools is more than that of girls of Assamese Medium schools.

Table 2: Positive attitude of girls in Assamese Medium School in case of class environment.

N = 25

Mean	36.44
SD	6.956
SEM	1.391

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
26.197	24	.000	11.44	33.69	38.45

Table 3: Positive attitude of boys in English Medium School in case of class environment.

N = 25

Mean	38.19
SD	6.002
SEM	1.20

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
31.825	24	.000	13.19	34.42	40.61

Table 4: Positive attitude of girls in English Medium School in case of class environment.

N = 25

Mean	39.74
SD	7.19
SEM	1.438

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
27.636	24	.000	14.74	34.91	42.07

From table 3 and table 4 it is found that attitude of the girls of English Medium schools is more than that of the boys of English Medium schools.

Positive attitude of Assamese and English medium schools towards mathematics achievement

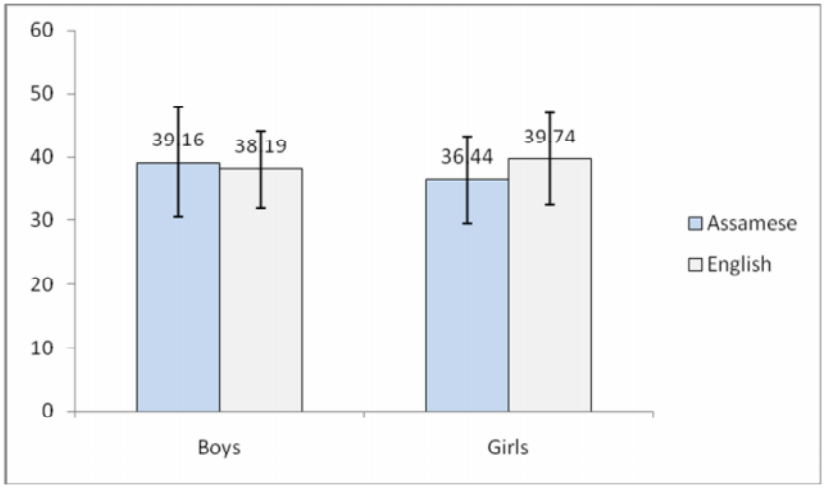

Table 5: Co-relation of positive attitude between boys and girls of Assamese Medium School in case of class environment.

N=25	Mean	SD
Girls	36.44	6.956
Boys	39.16	8.739

Correlations

N=25	Positive attitude	Girls	Boys
Girls	Pearson Correlation	1	.772
	Sig. (2-tailed)		.000
Boys	Pearson Correlation	.772	1
	Sig. (2-tailed)	.000	

Correlation is significant at the 0.05 level (2-tailed)

Table 6: Co-relation of positive attitude between boys and girls of English Medium School in case of class environment.

N=25	Mean	SD
Girls	39.74	7.190
Boys	38.19	6.002

Correlations

N=25	Positive attitude	Girls	Boys
Girls	Pearson Correlation	1	.846
	Sig. (2-tailed)		.000
Boys	Pearson Correlation	.846	1
	Sig. (2-tailed)	.000	

Correlation is significant at the 0.05 level (2-tailed).

Table 7: Co-relation of positive attitude between girls of Assamese Medium and English Medium School in case of class environment.

N=25	Mean	SD
Assamese Medium	36.44	6.956
English Medium	39.74	7.19

Correlations

N=25		Girls (As med)	Girls (Eng med)
Assamese Medium	Pearson Correlation	1	.695
	Sig. (2-tailed)	.	.000
English Medium	Pearson Correlation	.695	1
	Sig. (2-tailed)	.000	.

Correlation is significant at 0.05 level (2-tailed)

Table 8: Co-relation of positive attitude between boys of Assamese Medium and English Medium School in case of class environment.

N=25	Mean	SD
Assamese Medium	39.16	8.739
English Medium	38.19	6.002

Correlations

N=25	Positive attitude	Boys (As Med)	Boys (Eng Med)
Assamese Medium	Pearson Correlation	1	.921
	Sig. (2-tailed)	.	.000
English Medium	Pearson Correlation	.921	1
	Sig. (2-tailed)	.000	.

Correlation is significant at the 0.05 level (2-tailed)

Table 9: t- Test for Assamese Medium School for positive attitude in case of class environment.

N = 50

Mean	37.815
SD	7.913
SEM	1.119

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
33.794	49	.000	13.58	35.23	40.61

Table 10: t-Test for English Medium School for positive attitude in case of class environment.

N = 50

Mean	38.965
SD	6.794
SEM	.961

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
40.546	49	.000	12.787	35.493	40.357

Table 11: Independent sample test of high and low positive attitude for Assamese Medium School in case of class environment.

	Attitude	N	Mean	SD	SEM
Boys and girls	>= 25	41	41.28	4.256	.665
	<25	9	22.03	3.514	1.171

Independent Samples Test (for boys and girls assuming equal variances)

t-test for Equality of Means						
t	Df	Sig. (2-tailed)	MD	SED	95% Confidence Interval of the Difference	
					Lower	Upper
12.59	48	.000	19.25	1.529	13.24	24.491

Table 12: Independent sample test of high and low positive attitude for English Medium School in case of class environment.

	Number	N	Mean	SD	SEM
Boys and girls	>= 25	45	40.94	7.322	1.091
	< 25	5	21.19	5.83	0.869

Independent Samples Test (for boys and girls assuming equal variances)

t-test for Equality of Means						
t	Df	Sig. (2-tailed)	MD	SED	95% Confidence Interval of the Difference	
					Lower	Upper
3.863	48	.000	19.75	5.113	2.169	29.946

Table 13: Negative attitude of boys in Assamese Medium School in case of class environment.

N = 25

Mean	30.14
SD	5.327
SEM	1.0654

One-Sample Test

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
28.289	24	.000	5.14	32.938	38.149

Table 14: Negative attitude of girls in Assamese Medium School in case of class environment.

N = 25

Mean	32.90
SD	7.726
SEM	1.545

One-Sample Test

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
21.294	24	.000	7.90	28.95	36.87

From table 13 and table 14 it is found that the negative attitude of boys of Assamese Medium schools is less than that of girls of Assamese Medium schools.

Table 15: Negative attitude of boys in English Medium School in case of class environment.

N = 25

Mean	35.24
SD	6.663
SEM	1.333

One-Sample Test

Test Value = 25					
t	df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
26.445	24	.000	10.24	30.36	36.59

Table 16: Negative attitude of girls in English Medium School in case of class environment.

N = 25

Mean	36.73
SD	8.017
SEM	1.603

One-Sample Test

From tables 15 and 16 it is observed that the negative attitude of boys and girls of English medium schools does not differ so much.

Test Value = 25					
t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
22.908	24	.000	11.73	32.70	41.98

Negative attitude of Assamese and English medium schools towards mathematics achievement.

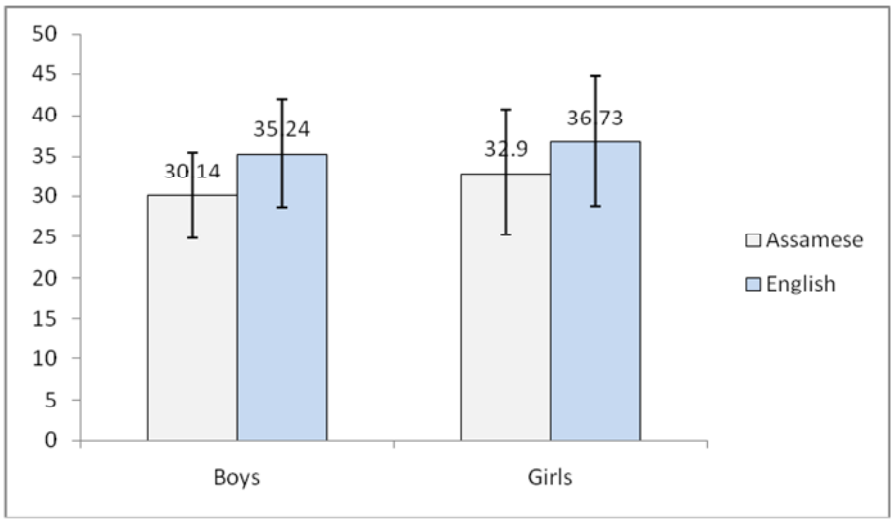

Table 17: Co-relation between girls and boys of Assamese Medium School in case of negative attitude in case of class environment.

N=25	Mean	SD
Girls	32.90	7.726
Boys	30.14	5.327

Correlations

N=25	Negative attitude	Girls	Boys
Girls	Pearson Correlation	1	.626
	Sig. (2-tailed)		.029
Boys	Pearson Correlation	.626	1
	Sig. (2-tailed)	.029	

Here the correlation is not significant at 0.05 level (2-tailed)

Table 18: Co-relation of negative attitude between girls and boys of English Medium School in case of class environment.

N=25	Mean	SD
Girls	36.73	8.017
Boys	35.24	6.663

Correlations

N=25	Negative attitude	Girls	Boys
Girls	Pearson Correlation	1	.587
	Sig. (2-tailed)		.188
Boys	Pearson Correlation	.587	1
	Sig. (2-tailed)	.188	

Correlation is not significant at the 0.05 level (2-tailed).

Table 19: Co-relation of negative attitude of girls of Assamese and English Medium School in case of class environment.

N=25	Mean	SD
Girls (As Med)	32.90	7.726
Girls (Eng Med)	36.73	8.017

Correlations

N=25	Negative attitude	Girls (As med)	Girls (Eng med)
Girls (As med	Pearson Correlation	1	.425
	Sig. (2-tailed)		.058
Girls (Eng med	Pearson Correlation	.425	1
	Sig. (2-tailed)	.058	

Here the Correlation is not significant at the 0.05 level (2-tailed).

Table 20: Co-relation of negative attitude of boys of Assamese and English Medium School in case of class environment.

N=25	Mean	SD
Boys (As med)	30.14	5.327
Boys (Eng med)	35.24	6.663

Correlations

N=25	Negative attitude	Boys of As med	Boys of Eng med
Boys of As med	Pearson Correlation	1	.412
	Sig. (2-tailed)		.341
Boys of Eng med	Pearson Correlation	.412	1
	Sig. (2-tailed)	.341	

Here the Correlation is not significant at the 0.05 level (2-tailed).

Table 21: t- Test for negative attitude in students of Assamese Medium Schools in case of class environment.

N = 50

Mean	31.52
SD	7.89
SEM	1.116

One-Sample Test

Test Value = 25					
t	Df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
28.248	49	.000	18.48	31.16	36.53

Table 22: t- Test for negative attitude in students of English Medium Schools in case of class environment.

N = 50

Mean	35.985
SD	8.154
SEM	1.153

One-Sample Test

Test Value = 25					
t	Df	Sig. (2-tailed)	MD	95% Confidence Interval of the Difference	
				Lower	Upper
31.206	49	.000	14.015	33.78	39.71

Table 23: Independent sample test of high and low positive attitude for Assamese Medium School for class environment.

	NUMBER	N	Mean	SD	SEM
Assamese Medium	>=25	36	36.21	6.532	1.088
	< 25	14	19.46	4.840	1.294

Independent Samples Test of Assamese medium students assuming equal variances

t-test for Equality of Means						
t	Df	Sig. (2-tailed)	MD	SED	95% Confidence Interval of the Difference	
					Lower	Upper
7.291	48	.000	16.75	2.297	12.732	18.143

Table 24: Independent sample test of high and low positive attitude for students of English Medium School for class environment.

	NUMBER	N	Mean	SD	SEM
English Medium	>= 25	43	39.07	4.619	0.704
	< 25	7	17.03	2.558	0.967

Independent Samples Test

t-test for Equality of Means						
t	Df	Sig. (2-tailed)	MD	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
6.562	48	.000	22.04	3.359	15.725	23.138

VII. CONCLUSION AND INFERENCE

The study found that most of the students have a positive attitude towards mathematics and understand the importance of the subject in the curriculum. Moreover, there is a positive correlation between positive attitude of the students and their mathematics achievement. The study arrived at the following conclusions regarding the attitude of the students towards mathematics:

(i) In Assamese medium schools, boys had more positive attitude but less negative attitude than that of the girls.

(ii) In English medium schools, girls had more positive attitude and also more negative attitude than that of the boys.

(iii) Boys of Assamese medium schools had more positive attitude and less negative attitude than that of their English medium counterparts.

(iv) Girls of English medium schools had more positive as well as negative attitude than girls of Assamese medium school.

(v) The Pearson's correlation revealed a positive relationship between attitude towards mathematics and achievement.

REFERENCES

[1]. Aiken Jr., Lewis R. (1970). Attitudes towards mathematics. *Review of Educational Research,* Vol. **40**, No. 4, *Science and Mathematics Education,* pp. 551-596.

[2]. Aiken Jr., Lewis R; Dreger, Ralph Mason. (1961). The effect of attitudes on performance in mathematics. *Journal of Educational Psychology,* Vol. **52**(1), pp. 19-24.

[3]. Anttonen, RG. (1969). A longitudinal study in mathematics attitude. *The Journal of Educational Research,* Vol. **62**, No. 10, pp. 467-471.

[4]. Bong, Mimi; Skaalvik, Einar M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review,* Vol. **15**, Issue 1, pp. 1-40.

[5]. Brown, Margaret; Brown, Peter; Bibby, Tamara. (2008). "I would rather die": Reasons given by 16-year-olds for not continuing their study of mathematics. *Research in Mathematics Education,* Vol. **10**, issue 1, pp. 3-18.

[6]. Damrongpanit, S.; Reungtragul, A. ; and Pittayanon, T. (2007) " An Investigation of the effects between Academic Self Concept, Non-academic Self Concept and Academic Achievement: Causal Ordering Models" *Research in Higher Education Journal*, Vol **1**, N0 2. [7]. Gill, Sukhdeep; Reynolds, Arthur J. (1999). Educational expectations and school achievement of urban African American children. *Journal of School Psychology,* Vol. **37**, Issue 4, pp. 457-463.

[8]. Guay, F; Marsh, H W; Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology,* Vol. **95**(1), pp. 124-136.

[9]. Hackett, Gail; Betz, Nancy E. (1989). An exploration of the mathematics self efficacy/mathematics performance correspondence. *Journal for Research in Mathematics Education,* Vol. **20**, No. 3, pp. 261-273.

[10]. Haladyna, Tom; Shaughnessy, Joan; Shaughnessy, J Michael. (1983). A causal analysis of attitude towards mathematics. *Journal for Research in Mathematics Education,* Vol. **14**, No. 1, pp. 19-29.

[11]. House, J Daniel. (1992). Achievement related expectancies, academic self concept, and mathematics performance of academically underprepared adolescent students. *The Journal of Genetic Psychology: Research and Theory on Human Development,* Vol. **154**, Issue 1, pp. 61-71.

[12]. Ma, Xin. (1997). Reciprocal relationships between attitude toward mathematics and achievement in mathematics. *The Journal of Educational Research,* Vol. **90**, Issue 4, pp. 221-229.

[13]. Marsh, H W; Byrne, B M; Shavelson, R J. (1988). A multi-faceted academic self-concept: Its hierarchical structure and its relation to academic achievement. *Journal of Educational Psychology,* Vol. **80**(3), pp. 366-380.

[14]. Marsh, H W; Shavelson, R J. (1985). Self-concept: Its multifaceted hierarchical structure. *Educational Psychologist,* Vol. **20**, Issue 3, pp. 107-123.

[15]. Pajares, Frank; Miller, M. David. (1994). Role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. *Journal of Educational Psychology,* Vol. **86**(2), pp. 193-203.

[16]. Pietsch, James; Walker, Richard; Chapman, Elaine. (2003). The relationship among self concept, self efficacy and performance in mathematics during secondary school. *Journal of Educational Psychology,* Vol. **95**(3), pp. 589-603.

[17]. Reynolds, A J; Walberg, H J. (1992). A process model of mathematics achievement and attitude. *Journal for Research in Mathematics Education,* Vol. **23**, No. 4, pp. 306-328.

[18]. Schofield, Hillary L. (1982). Sex, grade, and the relationship between mathematics attitude and achievement in children. *The Journal of Educational Research,* Vol. **75**, No. 5, pp. 280-284.

[19]. Singh, Kusum; Granville, Monique; Dika, Sandra. (2002). Mathematics and science achievement: Effects of motivation, interest and academic engagement. *The Journal of Educational Research,* Vol. **95**, Issue 6, pp. 323-332.

[20]. Steinkamp, M W; Harnisch, D L; Walberg, H J; Tsai, S L. (1985). *Cross-national gender differences in mathematics attitude and achievement among 13-year olds.*

[21]. Tsai, S L; Walberg, H J. (1983). Mathematics achievement and attitude productivity in junior high school. *The Journal of Educational Research,* Vol. **76**, No. 5, pp. 267-272.