Pakistan Journal of Psychological Research Vol. 21, Nos. 3-4, 2006, 61-78

The Impact of Self-efficacy on Mathematics Achievement of Primary School Children[#]

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The present study explored the relationship between mathematics self-efficacy and mathematics achievement amongst primary school children (N = 805) studying in grades 3, 4, and 5 of single gender schools in Lahore. The instrument battery consisted of Mathematics Self-efficacy Questionnaires (Anjum, 2004), Mathematics Placement Tests (Anjum, 2004), and Mathematics School Tests from Countdown Level Maths (Downes, Paling, & Dudeja, 2003a, 2003b, 2003c). A significant correlation was detected between mathematics self-efficacy and mathematics achievement in grade 3 which progressively increased for grades 4 and 5. Mathematics self-efficacy of girls was positively correlated to mathematics achievement at all grade levels whereas significant correlation was detected for boys in grades 4 and 5. Regression analyses showed mathematics self-efficacy to be a significant indicator of mathematics performance in grades 3 through 5.

Keywords: Mathematics self-efficacy, mathematics achievement, school grades.

Mathematics has a foundational status as being one of the core subjects in the curriculum document issued by Ministry of Education Pakistan (2000). The specific learning objectives for each grade have been framed after examining the mathematics curricula of Singapore, United Kingdom, United States of America, and Australia. This development to be in accord with the developed world in content and approach also puts exacting demands on teachers who are implementing the curriculum in their classrooms. Researchers have argued that beliefs of personal competence and of self-worth formed by the students during childhood become habits of thinking like any habit of conduct and keep influencing them throughout their lives. These beliefs serve as a filter through which subsequent performance is mediated (Abelson, 1979; Bargh & Chartrand, 1999; Schunk, 1989). The self-efficacy theory (Bandura, 1977) posits that the judgments of what one can do with whatever skills one possesses

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provide a mechanism by which students can navigate paths to achieve school success (Bandura, 1986).

Bandura (2001) contends that self-efficacy expectations form an important personal variable, and when combined with specific goals and knowledge of performance, this variable can serve as a significant contributor to future behavior. Although, self-efficacy particularly regarding mathematics has been found to be a strong predictor of mathematics achievement in western settings (Armstrong, 1980; Hackett & Betz, 1989; Pajares & Graham, 1999; Pajares & Schunk, 2001; Schunk, 1991; Zimmerman, 2000), very less is known about how self-efficacy operates for non-western samples. The present study examines the role of mathematics self-efficacy in mathematics achievement of Pakistani children in elementary grades 3 through 5.

Self-efficacy is 'ones' belief that he/she is able to organize and apply plans in order to achieve a certain task' (Bandura, 1997, p. 3). It has been studied in relation to different competencies of mathematics learning. Studies have formed it to be a good predictor of mathematics performance, irrespective of the performance indicators (Bandura, 1986; Pajares, 1996), regardless of other variables (Pajares & Graham, 1999) like self-concept, math anxiety, and self-regulation. This stance was supported by Bouffard-Bouchard (1989), who reported that children with high self-efficacy for mathematics exceeded the performance of those with low self-efficacy in mathematics at all ability levels.

In a series of studies by Schunk (1982, 1983, 1984, 1985) it was noted that regardless of the treatment condition, childrens' self-efficacy judgments bore a strong relationship to their subsequent demonstrated skills in mathematics. Path models by Pajares and Kranzler (1995) showed ability and self-efficacy to have strong direct effects on performance. Although, boys and girls did not differ in ability, self-efficacy, or performance, most students were over confident about their mathematics capability. Similar findings were reported by Pajares and Miller (1994, 1995).

Not all the researchers have found a significant relationship between self-efficacy and academic outcomes. Benson's study (1989) and research by Smith, Arnkoff, and Wright (1990) showed self-efficacy to be a weak predictor. But in these studies, self-efficacy did not indicate the specificity of the criterion task. Self-efficacy (Zimmerman, 1995) involves judgments of capabilities to perform activities rather than personal qualities and because self-efficacy is a

state not a trait that implies task specificity, it is highly malleable, changeable, and can be developed.

It has been claimed by Bandura (1986) that small children are generally over-confident about their abilities. Findings from numerous investigations (e.g., Bandura, 1997; Hackett & Betz, 1989; Pajares, 1996; Pajares & Miller, 1994) indicate that students have a tendency to over estimate their self-perceptions and gradually learn to be accurate in appraising their actual competence. Results from studies by Phan and Walker (2000) on Australian school children showed older students (grades 5 and 6) to be more congruent in their perceptions of mathematics abilities than younger students (grades 3 and 4). This argument, if pursued further leads to the term confidence gap, which is synonymous with gender differences on self-efficacy indices.

While gender differences in mathematics up to the high school level in USA and countries in Europe have diminished, the gender differences in mathematics competence self-perceptions of students may still be prevalent (Stipek, 2002). Viewed from the social cognitive perspective, gender differences in self-efficacy arise not from specific skills themselves but rather from their linkage to contexts (Bandura, 1997). Although, girl students typically judge their self-efficacy for mathematics lower than do boy students, these differences can disappear when women students report their self-efficacy for performing the same mathematics skills in everyday activities (Matsui & Tsukamoto, 1991).

Some researchers (see, for example, Lopez & Lent, 1992; Middleton & Midgley, 1997) have found no differences in mathematics self-efficacy beliefs of students at different grade levels in junior and high school grades. Differences are detected during middle school and .accentuates as students grow older. Putting together, it can be assumed that there is no definitive stance with regards to gender differences in self-efficacy and more research is warranted in this area (Armstrong, 1980).

Guided by the literature cited above, the present correlational study was undertaken to investigate the extent of relationship that exists between mathematics self-efficacy and mathematics achievement of primary school children. Mathematics self-efficacy was defined as an individual's judgment of his/her capabilities to solve specific mathematics problems in the Mathematics Self-efficacy Questionnaire (MSEQ). Likewise, mathematics achievement was viewed as the actual proficiency, mastery and understanding of

mathematics sequence and skills by the students on items in Mathematics Placement Test (MPT) and Mathematics School Test (MST) for each grade. The following was hypothesized:

(1) Mathematics self-efficacy is significantly positively correlated with mathematics achievement.

(2) School grade is significantly correlated with mathematics self-efficacy.

METHOD

Sample

Using the technique of cluster random sampling, the sample was drawn from seven English medium schools of Lahore. The children irrespective of their schools were taught by qualified mathematics teachers (minimum B.Sc/B.Ed, or M.Sc) and studied 'Countdown Mathematics' (textbook) which has the same specific learning objectives as stated in the Curriculum Document of Primary Education (Ministry of Education Pakistan, 2000). A cluster was defined as an intact classroom. Each cluster comprised of 30 to 35 students. Eight clusters (4 each for boys and girls) for each grade were randomly selected (N = 843). However, due to absentees during the testing sessions, final data was gathered from 805 students. The age range of sample was from 8 to 11 years (M = 8.4). Informed consent was obtained from the participants' parents through 'Consent Statement and Biographical Data Form' sent by each school.

Instruments

Mathematics Self-efficacy Questionnaire

It follows the model set by Mathematics Problem Solving Self-efficacy Scales by Pajares and Miller (1994) and is focused on assessing student's perceptions of their self-efficacy to solve 20 mathematics problems suited to their grade level. The Likert ratings 1, (I cannot solve this question at all) to 6 (I am certain that I can solve this question) have been used with scores ranging from 6 to 120. Bandura's caution (2001) that self-efficacy judgments should be consistent with and tailored to the domain of functioning and/or task under investigation has been followed in the construction of each MSEQ (Anjum, 2004). The capabilities assessed through MSEQ are similar to the capabilities tested by MPT. The school authorities too, were asked to devise MST for final term examination on the same pattern. The MSEQ items were pilot tested on a sub-sample of 194

students in grades 3 through 5. The test-retest reliability on this measure was found to be .85 for grade 3, .86 for grade 4 and .83 for grade 5.

Mathematics Placement Test

The Mathematics Placement Test (MPT; Anjum, 2004) for each grade consisted of supply items. These items were derived from Placement Tests for Singapore Primary Mathematics (2003) by a jury of 4 subject heads and 7 teachers, each having at least 5 years of experience in teaching mathematics to the elementary grades. The experts evaluated the appropriateness of the questions in the instrument format by comparing each relevant item from the Singapore Placement tests with the objectives spelled out in the Mathematics Countdown Levels (Downes, Paling, & Dudeja, 2003a, 2003b, 2003c), used as school textbooks. The MPT for each grade was based on 20 items, with each item carrying 5 marks. Each item was not marked 0 or 5 but was awarded marks according to the working required for it. The instruments were pilot tested on the same sub sample used for MSEQ. The split-half reliability using Guttman Split-half coefficient was found to be .85 for grade 3, .82 for grade 4, and .83 for grade 5.

Mathematics School Test

Mathematics School Test (MST) for each grade was used to assess mathematics school achievement. The test was modeled according to the MPT format by the school teachers, except for the items were drawn from Mathematics Countdown Levels (Downes, Paling, & Dudeja, 2003a, 2003b, 2003c), and had been drilled in the classrooms throughout the academic year.

Procedure

The data were gathered in January-February of 2005 prior to the commencement of final examination in each school. The instruments were administered to each intact classroom or a cluster in two sessions. In the first session a viewgraph was used. Each item of MSEQ was shown on the screen. It was read aloud to the entire class and remained on the screen for 10 seconds. This time limit was set to enable the students to recognize the type of given operation but was brief to actually work out the solution. The students marked their options in the response sheets and completion time of MSEQ in each cluster varied from 7 to 11 minutes. Throughout the session, the class

teacher was present but was not involved in either giving instructions or presenting the test materials.

In the second session, the students were briefed that MSEQ was about how confident were they to solve mathematics problems, whereas the MPT was designed to assess their actual ability to solve mathematical problems. The instructions were read to them and during the test, any query from the students was answered. The completion time ranged from 77 to 100 minutes. The school authorities administered the MST for each grade during the final examinations held in March, 2005 and the teachers checked the answer scripts. A result statement for each cluster was provided a month later by the concerned school principal.

RESULTS

The statistical analyses were conducted using SPSS version 12.

Table 1

Relationship of Mathematics Self-efficacy with Mathematics Placement Test (MPT) and Mathematics School Test (MST; N = 805)

Variables	Math placement test	Math school test
Math self-efficacy	.31**	.29**

**$p<.01$

Table 1 shows that there is significant positive relationship between mathematics self-efficacy with MPT ($p< .01$) and MST ($p< .01$).

Table 2 shows the performance on MSEQ which indicates that boys and girls reported over confidence in their mathematics abilities in grades 3 through 5. However, the findings in grade 4 showed girls ($M = 100.50$) to be somewhat cautious than boys ($M = 104.12$) in assessing their mathematics self-efficacy. But this finding cannot be generalized for girls in grade 4 because isolated cases of under confidence in a sample of 131 may be responsible for this result. The mean achievement of boys in MPT ranged from 57.12 to 65.93 as compared to 61.98 to 67.17 in case of girls. The boys' performance in MST ($M = 69.80$ to 79.78) was observed to be better than girls ($M = 61.53$ to 74.42) but the overall pattern showed girls to excel in mathematics achievement.

Table 2

Means and Standard Deviations of Mathematics Self-efficacy (MESQ), Mathematics Placement Test (MPT) and Mathematics School Test (MST) for Grades 3, 4, and 5 (N = 805)

Sample	(MSEQ)		(MPT)		(MST)	
	Girls	Boys	Girls	Boys	Girls	Boys
Grade 3 (*n*=270)						
M	109.80	108.20	67.17	65.93	73.42	79.78
SD	13.37	13.10	16.60	13.40	15.99	11.50
Grade 4 (*n*=272)						
M	100.50	104.12	61.98	57.12	71.13	69.80
SD	14.10	14.8	14.94	13.23	16.58	16.28
Grade 5 (*n*=263)						
M	107.20	107.93	65.20	61.52	61.53	74.59
SD	11.55	9.42	16.38	14.42	14.42	14.50

Note. Grade 3: Girls=133, Boys=137; Grade 4: Girls=131, Boys=141; Grade 5: Girls=127, Boys=136; .Maximum marks for MSEQ are set at 120 and for MPT and MST are 100 each.

Table 3

Grade-wise Correlations of Mathematics Self-efficacy Questionnaire (MSEQ) with Mathematics Placement Test (MPT) and Mathematics School Test (MST; N = 805)

	Mathematics Self-efficacy		
Variables	Grade 3 (n = 270)	Grade 4 (n = 272)	Grade 5 (n = 263)
Math Placement Test	.25**	.26**	.35**
Math School Test	.22**	.28**	.28**

**p< .01

The grade wise correlations amongst the variables are shown in Table 3. At grade 3, a significant correlation existed between MSEQ and MPT (r = .25) and between MSEQ and MST (r = .22). With the increase in grade, the correlation between MSEQ and MPT showed some increase (r = .26) in grade 4 and a significant relationship emerged between MSEQ and MST (r = .28). In grade 5, mathematics self-efficacy showed a much stronger relationship with MPT (r = .35) and MST (r = .28).

Table 4

Gender-wise Correlations of Mathematics Self-efficacy, Mathematics Placement Test and Mathematics School Test (N = 805)

Variables	1	2	3	4	5	6	7	8	9
MSE									
1.Grade 3	-			.14			.12		
2.Grade 4		-		.24	**		.25	**	
3.Grade 5			-		.29			.21	
MPT	**					**			
4.Grade 3	.34			-		.80			
5.Grade 4		**			-		**		
6.Grade 5		.38	**			-	.90	**	
MST	**		.40	**			-	.89	
7.Grade 3	.35			.86				-	
8.Grade 4		**			**				-
9.Grade 5		.36	**		.94		**		
			.34			.90			-

Note. Correlations for the girls appear below the diagonal; correlations for the boys appear above the diagonal; ***p*<.01

Table 4 shows, a significant pattern for MPT (r = .34) and MST (r = .35) regarding girls in grade 3 as compared to in MPT (r =. 14) and MST (r = .12) for boys in the same grade. In grade 4, girls tend to be more perceptive about their self-efficacy indicating a stronger correlation (r = .38) with MPT and (r = .36) with MST. The mathematics self-efficacy of boys in grade 4 showed a significant relationship (r = .24) with MPT and (r = .25) with MST. Progressively, in grade 5, mathematics self-efficacy of boys showed a positively significant relationship with MPT (r = .29) and MST (r = .21). A similar and stronger relationship was observed in case of girls for MPT (r = .40) and MST (r =. 34) in grade 5.

Table 5 indicates that when self-efficacy was regressed on mathematics achievement, it was statistically significant (p< .000) for MPT and MST (R^2 =. 08 to .10). Overall, the change in girls' mathematics performance (R^2 = .08 to .15) was significant as compared to the change observed in the boys' mathematics performance (R^2 = .05 to .06). Mathematics self-efficacy was relatively a strong predictor (β = .34, β = .39) of mathematics performance for girls.

Table 5

Summary of Regression Analysis of Mathematics Self-efficacy as Predictor of Mathematics Achievement (N = 805)

Variables	*B*	*SEB*	*β*	*t*	*p*
Math Achievement (Placement Tests)					
Grades 3, 4, & 5 (R^2 = .10)	.35	.04	.31	9.23	.000
Grades 3, 4, & 5 (R^2 = .15) (Girls)	.45	.05	.39	8.33	.000
Grades 3, 4, & 5 (R^2 = .06) (Boys)	.27	.05	.24	4.90	.000
Math Achievement (School Tests)					
Grades 3, 4, & 5 (R^2 = .08)	.33	.04	.29	8.45	.000
Grades 3, 4, & 5 (R^2 = .11) (Girls)	.39	.06	.34	7.07	.000
Grades 3, 4, & 5 (R^2 = .05) (Boys)	.26	.06	.22	4.56	.000

Table 6 elaborates the findings in terms of grades. The R^2 (.25 to .06) in grade 3 indicated that mathematics self-efficacy could be an indicator for mathematics achievement but the gradual change of R^2 in grade 4 (.07 to .08) leading to a significant change in grade 5 (R^2 = .08 to .10) suggested that mathematics self-efficacy did influence and predict mathematics achievement in grades 4 and 5.

Table 6

Grade-wise Regression Analysis of Mathematics Self-efficacy as Predictor of Mathematics Achievement (N = 805)

Variables	*B*	*SEB*	*β*	*t*	*p*
Mathematics Achievement (Placement tests)					
Grade 3 (R^2 = .06)	.28	.07	.25	4.18	.000
Grade 4 (R^2 = .07)	.26	.06	.26	4.46	.000
Grade 5 (R^2 = .10)	.84	.15	.33	5.67	.000
Mathematics Achievement (School Tests)					
Grade 3 (R^2 = .05)	.24	.06	.22	3.76	.000
Grade 4 (R^2 = .08)	.32	.07	.30	4.78	.000
Grade 5 (R^2 = .09)	.74	.15	.30	5.12	.000

Table 7

Gender-wise Regression Analysis of Mathematics Self-efficacy as Predictor of Mathematics Achievement (N=805)

Variables	*B*	*SEB*	*β*	*t*	*P*
Math Achievement (Placement Tests)					
(Girls)					
Grade 3 ($R^2 = .12$)	.42	.10	.34	4.12	.000
Grade 4($R^2 = .15$)	.40	.09	.38	4.66	.000
Grade 5 ($R^2 = .16$)	.57	.12	.40	4.92	.000
(Boys)					
Grade 3 ($R^2 = .02$)	.14	.09	.14	1.60	.112
Grade 4 ($R^2 = .06$)	.22	.08	.24	2.88	.005
Grade 5 ($R^2 = .08$)	.44	.13	.29	3.50	.001
Math Achievement (School Tests)					
(Girls)					
Grade 3 ($R^2 = .12$)	.42	.10	.35	4.23	.000
Grade 4 ($R^2 = .13$)	.42	.10	.36	4.40	.000
Grade 5 ($R^2 = .11$)	.46	.17	.34	4.02	.000
(Boys)					
Grade 3 ($R^2 = .01$)	.10	.08	.12	1.34	.181
Grade 4 ($R^2 = .06$)	.28	.10	.25	2.98	.003
Grade 5 ($R^2 = .04$)	.32	.13	.21	2.50	.014

Table 7 further shows the regression of mathematics self-efficacy on subsequent achievement with regard to gender in each grade. Mathematics self-efficacy accounted for 11% to 16% of the variance in mathematics achievement of girls in grades 3, 4, and 5, indicating significant β values (.34 to .40) for mathematics achievement. Likewise, this trend was noticeable in grades 4 and 5 as regards boys where the variation in R^2 (.04 to .08) with β values of .26 to .29 for MPT and $\beta = .21$ to .27 for MST showed that mathematics self-efficacy model was statistically significant. Overall, the mathematics self-efficacy model was significantly supported at each grade level as regards girls, but as regards to boys, the model fitted grades 4 and 5 only.

DISCUSSION

The central finding to emerge was that mathematics self-efficacy was positively and significantly related to mathematics achievement at each grade level. The results supported the findings of Kabari and

Kiamanesh (2003) on 8th graders from Teheran, were congruent with Klassen's (2002) findings based on 7th grade. Anglo and Canadians students, and Phan and Walker's (2001) conclusions that self-efficacy was a significant determinant of mathematics performance of 5th and 6th graders from government schools in Australia. Therefore, the underlying assumption of the research on children aged 8 to 12 years in schools of West Berlin, East Berlin, Moscow, and Los Angles by Oettingen, Little, Lindenberger, and Balters (1993) was upheld in present study that self-efficacy beliefs have similar effects on human functioning across culture.

Although self-efficacy is seen as domain, subject and task-specific, Bong and Clark (1999) reported that it appears to be less differentiated in younger children. Skinner (1995) agrees that children show considerable developmental changes in self-perceptions as casual agents, from 7 to 12 years of age. Usually, at early school grades motivation is a weak predictor of achievement (Stipek & Ryan, 1997) because children report higher perceptions of capability, although their academic skills are far below those of their peers.

In most of the research literature, due to the language complexities involved in assessing the child's perception of causality, reliable assessments of control beliefs have not been reported below third grade (Hegland & Colbert, 2001). The third graders in this research study especially boys have demonstrated tendencies to overrate their mathematics capabilities, which was consistent with similar investigations reported by Phan and Walker (2000). The students in grade 4 and 5 were observed to be more ambitious in their self-efficacy judgments of mathematics problems than students in grade 3, suggesting a pattern of hierarchical nature i.e., with the increase in grade, self-perceptions tended to be more accurate. Usually, with time and promotion to a higher grade in the elementary school, students learn to be realistic in appraising their mathematics capabilities. From a correspondence of $r = .22$ at grade 3 (see Table 3; $p<.01$), the correlation between self-efficacy and mathematics outcomes is $r = .35$ (see Table 3; $p<.01$), at grade 5 in this study signifying that older children possess and develop more accurate appraisals about their actual competencies. Research in the field of mathematics has confirmed that age of the student moderates efficacy-achievement relationship. Findings by Multon, Brown, and Lent (1991) have shown that older students in higher grades evidenced stronger effect sizes than did younger populations.

Related to this finding is the tendency towards over estimation of mathematics self-efficacy which is prevalent at all grade levels

amongst the study sample. Bandura's (1986) view on this issue is that although successful functioning is best served by reasonably accurate self-efficacy beliefs, the stronger the self-efficacy, the more likely are persons to select challenging tasks and for this, over estimation serves to increase effect and persistence. He further contends (Bandura, 1997) that accurate estimation of capability while it enables the students to assess their problem-solving strategies more accurately, it does however, limit students sense of optimism. Therefore, over confidence of students in this study, it seems reasonable to suggest here, needs to be viewed as a motivational tool by the teachers to promote effort and resilience amongst the students in self-efficacy oriented classrooms.

On the issue of gender, the results showed a consistent pattern for girls in assessing their mathematics self-efficacy, more towards an optimistic and yet somewhat realistic evaluation of their capability leading to a stronger association with mathematics achievement ($r = .34$, $r = .35$; $p<.01$), even at grade 3. The boys performance, on the other hand showed a much weaker correlation with their mathematics efficacy beliefs ($r = .14$, $r = .12$) in the same grade. The result showed that there was a difference between genders in mathematics self-efficacy and achievement relationship. This was in agreement with the findings of Ghanbarzadeh (2001) and offered a contrast to research findings coming from the Western settings (Fouad & Smith, 1996; Lopez & Lent, 1992; Middleton & Midgley, 1997; Pajares & Graham, 1999). This result may be attributed to the single gender schools having female teachers, teaching mathematics to boys and girls in elementary grades, sampled in this study.

The research literature can offer several explanations in this regard. Boys tend to be behind girls in development all the way through the primary school (Dean, 2000). Boys also tend to get more attention from the teacher, possibly because they are demanding (Docking, 1990). Girls had a more positive attitude at school than boys (Mortimore, Sammons, Stoll, Lewis, & Ecob, 1988). Girls were more worried about failure and more sensitive to negative information, evident from the age of about four (Parsons, Ruble, Hodges, & Small, 1976). Teachers tended to assess girls' ability as being lower than that of boys (Tizard, Blatchford, Burke, Farqahar, & Lewis, 1988). However, one of the factors contributing to the over estimation of self-efficacy beliefs of boys in this study, could be the general lack of attention on the part of boys to focus on the nature of questions during the test administration. The girls were found to be

more receptive and reflective in their behavior during the test administration at each grade level.

The comparatively better performance of girls in grade 3 and 4 can arise as a function of home, culture, and educational influences at school. According to Zeldin and Pajares (2000) girls develop higher mathematics self-efficacy in homes and classrooms in which parents and teachers stress the importance and value of mathematical skills, encourage girls to persist and persevere in the face of academic and social obstacles. This could well be a plausible explanation for overall mathematics achievement of both boys and girls in grade 5. The findings clearly, represent the influence of gender on mathematics self-efficacy and mathematics achievements at each grade. But to assess how underestimation and overestimation of perceptions affect actual capability of boys and girls in elementary classrooms, a developmental aspect of middle childhood too, needs to be explored in this context.

Limitations and Suggestions

The present investigation is one-shot in nature whereas self-efficacy beliefs that individuals create, are a function of thinking and feeling and can change with time (Bandura, 1997). The sample was drawn from seven schools of one major city and is not representative of the whole Pakistani population. The entire test measures were administered on the same day, and the fatigue and boredom factor for the younger children in the study could have had impact on the results. However, the findings of this study have important implications for applied research because the construct of self-efficacy was put to test in real classrooms. The major finding of the study that self-efficacy is a significant contributor and predictor of mathematics achievement calls for extending the same enquires to other core subjects such as Science and English. Research studies on young children are an understudied area, and considering our national priorities towards improving the school practices at elementary level, this study provides potential insights for educators to develop a culture of efficacy based learning in local school settings.

Self-efficacy focuses on one's ability to successfully accomplish a particular task. The implications for teachers are to avoid social comparisons in the classrooms and help students to self-regulate their self-efficacy in a supportive environment (Woolfolk & Hoy, 2004). The suggestion by Hackett and Betz (1989) that "mathematics teachers should pay as much attention to (students') evaluations of

competence as to actual performance" (p. 271) is a clear indication for school authorities, to alter these beliefs when they are inaccurate and debilitating to children. In fact, more far reaching conclusions regarding how self-efficacy operates at elementary school grades await a longitudinal investigation, and the findings of this study holds substantive and methodological indicators for researchers in this area.

REFERENCES

Abelson, R. (1979). Differences between belief system and knowledge systems. *Cognitive Science, 3*, 355-366.

Anjum, R. (2004). *Mathematics self-efficacy questionnaire for children in primary grades: Guidelines for teachers*. Unpublished research project for Lahore garrison education system by the LGES academic affairs committee.

Armstrong, J. M. (1980). *Achievement and participation of women in mathematics: An overview*. Denver, Co: Education Commission of the States.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bandura, A. (2001). *Guide for constructing self-efficacy scales.* Available from Frank Pajares, Emory University.

Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist, 4*, 462-479.

Benson, J. (1989). Structural components of statistical test anxiety in adults: An exploratory study. *Journal of Experimental Education, 57*, 247-261.

Bong, M., & Clark, R. E. (1999). Comparison between self-concept and self-efficacy in academic motivation research. *Educational Psychologist, 34*(3), 139-153.

Bouffard-Bouchard, T. (1989). Influence of self-efficacy of performance in a cognitive task. *Journal of Social Psychology, 130,* 353-363.

Dean, J. (2000). *Improving children's learning: Effective teaching in the primary school.* London: Routledge.

Docking, J. (Ed.). (1990). *Education and alienation in the junior school.* London: Falmer.

Downes, W. L., Paling, D., & Dudeja, S. (2003a). *Countdown level three maths*. Karachi: Oxford University Press.

Downes, W. L., Paling, D., & Dudeja, S. (2003b). *Countdown level four maths*. Karachi: Oxford University Press.

Downes, W. L., Paling, D., & Dudeja, S. (2003c). *Countdown level five maths*. Karachi: Oxford University Press.

Fouad, N. A., & Smith, P. L. (1996). A test of a social cognitive model for middle school students: Math and science. *Journal of Counseling Psychology, 43*, 338-346.

Ghanbarzadeh, N. (2001). *An investigation of the relationship between mathematics attitude, self-efficacy beliefs and math performance expectations and the math performance of the 9th grade girl and boy students in Tehran.* Unpublished M. A. Thesis, University of Tehran, Tehran, Iran.

Hackett, G., & Betz, N. E. (1989). An exploration of the mathematics self-efficacy/mathematics performance correspondence. *Journal for Research in Mathematics Education, 20,* 261-273.

Hegland, S., & Colbert, K. (2001, April). *Influences on motivational belief in young children: A longitudinal study*. Paper presented at the Society for Research in Child Development, Minneapolis.

Kabari, M., & Kiamanesh, A. R. (2003). *The role of math self-efficacy in mathematics achievement with regard to personal variables.* Unpublished M. A. Thesis, Teachers Training University, Tehran, Iran.

Klassen, R. M. (2002). *Motivation beliefs of Indo-Canadian and Anglo-Canadian early adolescents: A cross cultural investigation of self and collective efficacy.* Unpublished Doctoral Dissertation, Simon Fraser University.

Lopez, F. G., & Lent, R. W. (1992). Sources of mathematics self-efficacy of high school students. *The Career Development Quarterly, 41*, 3-12.

Matsui, T., & Tsukamoto, S. (1991). Relation between career self-efficacy measures based on occupational titles and Holland codes and model environments: A methodological contribution. *Journal of Vocational Behavior, 38,* 78-91.

Middleton, M. J., & Midgley, C. (1997). Avoiding the demonstration of lack of ability: An under explored aspect of goal theory. *Journal of Educational Psychology, 89*, 710-718.

Ministry of Education Pakistan (2000). *Curriculum document primary education classes K-V:* Author.

Moretimore, P., Sammons, P., Scoll, L., Lewis, D., & Ecob, R. (1988). *School matters.* London: Open Books.

Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology, 38*, 30-38.

Oettingen, G., Little, T. D., Lindenberger, V., & Balters, P. B. (1993, March). *School performance-related beliefs across political system and culture: A comparison of children in East Berlin, West Berlin, Moscow and Los Angeles.* Paper presented at the meeting of the Society for Research on Child Development, New Orleans.

Pajares, F. (1996). Self-efficacy belief and mathematical problem-solving of gifted students. *Contemporary Educational Psychology, 21*, 325-344.

Pajares, F., & Graham, L. (1999). Self-Efficacy, motivation constructs, and mathematics performance of entering middle school students. *Contemporary Educational Psychology, 24*, 124-139.

Pajares, F., & Kranzler, J. (1995, April). *Competence and confidence in mathematics: The role of self-efficacy, self-concept, anxiety and ability.* Paper presented at the meeting of the American Educational Research Association, San Francisco.

Pajares, F., & Miller, M. D. (1994). The role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. *Journal of Educational Psychology, 86*, 193-203.

Pajares, F., & Miller, M. D. (1995). Mathematics self-efficacy and mathematics performance: The need for specificity of assessment. *Journal of Counseling Psychology, 42*, 190-198.

Pajares, F., & Schunk, D. H. (2001). Self belief and school success: Self-efficacy, self-concept and school achievement. In R. Riding & S. Rayner (Eds.), *Self-perception* (pp. 239-265). London: Alex Publishing.

Parsons, J. E., Ruble, D. N., Hodges, K. L., & Small, A.V. (1976). Cognitive developmental factors in emerging sex differences in achievement related expectancies. *Journal of Social Issues 32*(3), 47-61.

Phan, A., & Walker, R. (2000, October). *Math self-efficacy in primary schools: Evidence of a hierarchical structure.* Paper presented at the inaugural session of International Self-concept Conference.

Phan, H. P., & Walker R. (2001). *Factors influencing the development and formation of academic self-efficacy perceptions.* Retrieved July, 2005, from file://C:\Documents and Settings\ Administrator\My Documents\Mye...\viewproposal text.ht

Placement Tests For Singapore Primary Mathematics. Retrieved, November, 27, 2003, from http://www.singaporemath.com. placement.htm.

Primary Tests For Singapore Mathematics (2004). Retrieved May, 2004, from http:/www.singapurmath.com/placement.htm.

Schunk, D. H. (1982). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. *Journal of Educational Psychology, 74, 548-556.*

Schunk, D. H. (1983). Developing children's self-efficacy and skills: The roles of social comparative information and goal setting. *Contemporary Educational Psychology, 8,* 76-86.

Schunk, D. H. (1984, April). *Participation in goal setting among learning disabled children.* Paper presented at the meeting of the American Educational Research Association, New Orleans, USA.

Schunk, D. H. (1985). Participation in goal setting: Effects on self-efficacy and skills of learning disabled children. *Journal of Special Education, 19(*3), 307-17.

Schunk, D. H. (1989). Self-efficacy and achievement behavior. *Educational Psychology Review, 01,* 173,208.

Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist, 26,* 207-231.

Skinner, E. A. (1995). *Perceived control, motivation, and coping.* Thousand Oaks, CA: Sage Publishers.

Smith, R. J., Arnkoff, D. B., & Wright, T. L. (1990). Test anxiety and academic competence: A comparison of alternative models. *Journal of Counseling Psychology, 37,* 313-321.

Stipek, D. J. (2002). *Motivation to learn* (4th ed.). Boston: Allyn & Bacon.

Stipek, D., & Ryan, R. (1997). Economically disadvantaged preschoolers: Ready to learn but further to go. *Developmental Psychology, 33(4),* 711-723.

Tizard, B. Blatchford, P., Burke, J., Farqahar, C., & Lewis, I. (1988). *Young children at school in the inner city.* London: Lawrence Erlbaum Associates.

Woolfolk, A. E., & Hoy, S. (2004, April). *What pre-service teachers should know about recent theory and research in motivation?* Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, USA.

Zeldin, A. L., & Pajares, F. (2000). Against the odds: Self-efficacy beliefs of women in mathematical, scientific, and technological careers. *American Educational Research Journal, 37,* 215-246.

Zimmerman, B. J. (1995). Self-efficacy and educational development. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 202-231). New York: Cambridge University Press.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25,* 82-91.

Received: ***January, 19, 2006.***