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SELF EFFICACY AND PROBLEM SOLVING ABILITY IN MATHEMATICS: A CORRELATIONAL STUDY

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ABSTRUCT

The present study is aimed to investigate the relationship between self efficacy and problem solving ability in mathematics among secondary school students. Descriptive survey method was used to conduct this study. It adopted random sampling technique and selected 120 secondary school students (54 male & 66 female) of class IX from Yamuna Nagar district of Haryana. Self efficacy scale developed & standardized by Dr. G.B. Mathur & R. K. Bhatnagar and Problem-solving ability test developed & standardized by N. Dubey were used by the investigator to collect the data. Pearson Co-Efficient of correlation and t-test were used for data analysis in the present study. Finding revealed that a positive and significant relationship between self efficacy and problem solving ability was found. As a result this paper exhibited many strategies which can be used to foster the self efficacy among students. Variety of study strategies, and monitoring exercises should be provided to develop the problem solving ability among students so that students' effective learning & achievements can be ensured.

KEY WORDS: Self Efficacy, Problem Solving Ability, Mathematics

CONCEPT OF SELF EFFICACY

In a normal classroom some students have a willing to learn and tackle new challenges while other seems uninterested and unmotivated. Some students demonstrate high level of confidence in their abilities while other seems unsure of them. In this type of situations what type of strategies a teacher should use to increase students' confidence to learn the new material. Self efficacy shows how the students feel about their worth or value and how confidently they are performing their task. Problem solving ability is not possible in life without any hard work and continuously efforts. Nothing can be achieved without cognitive processes, determination, application of knowledge, and self efficacy. Individual's self-efficacy plays an important role in achieving goals, completing tasks effectively and challenges of life. We can measure self efficacy in two ways i.e. a) People with a strong sense of self-efficacy have high confidence level, risk taking capacity, problem solving ability, goal oriented and being resilient. b) People with a weak sense of self-efficacy: Avoid challenging tasks, Believe that difficult tasks and situations are beyond their capabilities, Focus on personal failings and negative outcomes and

quickly lose confidence in personal abilities. Self-efficacy can be manipulated through four types of interventions (a) Performance accomplishments (b) Vicarious experience (c) Verbal persuasion and (d) Emotional arousal-Furstenberg and Rounds, (1995). Among these, performance accomplishments, or actual mastery experience, are the most influential source. Past experience of successes are attributed to unchanging factors such as personal ability on a manageable level of task difficulty.

CONCEPT OF PROBLEM SOLVING ABILITY

Problem Solving is a mathematical process and always required cognitive processes and skills. These include the basic arithmetical processes and algorithm that go with them. Usually everybody want to become the perfect individual, in the process one can face a lot of obstacles, humps, barriers etc. these are called as the problems for which one must have the ability to counter those problems by ones innate capacity which includes the creativity, intelligence, emotional intelligence and some other psychological factors. The education should provide the individuals innate capacities to make him a perfect human being with progressive development of one's divergent thinking ability of the analysis. If students are given step-by-step instructions about how to reach an answer, no real problem is necessary. The problem solving attitude helps the students to enhance their capabilities. Usually, when teachers discuss problem solving on the part of students, they anticipate students will become involved with the thinking operations of analysis, synthesis, and evaluation (considered as higher-level thinking skills). The student must synthesize what he or she has learned, and applies it to a new and different situation. Creativity is always required in the solution of real world situations. It has been claimed that traditional classrooms and teaching approaches do not focus on the development of creativity. Students can apply their skills and knowledge of problem solving in mathematics in other fields of life because solutions of mathematic problem are similar to the general problem solving. Problem solving is not only a mental process but includes some specific attitudes and values. The training of problem solving gives the individual to cope with the world and environment, to be creative and to give flexibility to change or control the environment and requires a specific training system to be improved in all manners.

JUSTIFICATION OF THE STUDY

Learning is a cycle of being introduced to new information, organizing this information and understanding its real world applications, and finally integrating the material into our memory to develop problem solving ability for future decision making. It has been found that persons with high level of intelligence and their learning capacity can solve the complex problems quickly. Therefore, it is necessary to develop the better learning style and problem solving ability through proper education and training. Teachers must have some knowledge of students' perceived

strengths and weaknesses not simply in general learning, but in very specific learning tasks, so that they can prepare the students to get success in their life.

It is said that if an individual identify the problems at its root, the solution is most effective. Besides at a time when world's population is on the rise the competition has become tougher and is thus affecting a child's mind adversely. Teachers have the responsibility to nurture them and build their self-efficacy to develop strong problem solving capacity so that they can have better future in life. People possess a self-efficacy that enables them to have control over their thoughts, feelings, and actions. This self system is comprised of cognitive and affective components including the ability to learn from others, plan alternative strategies, regulate one's own behavior, and engage in self-reflection. Studies regarding the relationship between self-efficacy and academic performance have been conducted in the areas of mathematics (Hackett & Betz,1989), reading and writing tasks (Shell, Colvin,& Bruning, 1995),and the use self-regulatory strategies (Bandura,1989). This study will help us to identify the deficiency of students in their self efficacy and problem solving ability. When the deficiency has been identified, we can train our teachers to overcome these deficiencies and educate our students so that they can have better self efficacy and thereof problem solving ability and they can handle difficult situation, can make better decision and succeed in this competitive world.

OBJECTIVE OF THE STUDY

1. To study the significant relationship between self-efficacy and problem solving ability among secondary school students.
2. To study the significant difference of self efficacy among secondary school students in relation to their gender.
3. To study the significant difference of problem-solving ability among secondary school students in relation to their gender.
4. To study the significant difference of self efficacy among secondary school students in relation to their residential background.
5. To study the significant difference of problem-solving ability among secondary school students in relation to their residential background.

HYPOTHESES OF THE STUDY

1. There exists no significant relationship between self-efficacy and problem solving ability among secondary school students.
2. There is no significant difference of self efficacy among secondary school students in relation to their gender.
3. There is no significant difference of problem solving ability among secondary school students in relation to their gender.

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4. There is no significant difference of self efficacy among secondary school students in relation to their residential background.
5. There is no significant difference of problem solving ability among secondary school students in relation to their residential background.

RESEARCH METHOD USED

Researcher used descriptive survey method for the present study.

POPULATION AND SAMPLE:

All the secondary school Students studying in class IX of district Yamuna Nagar of Haryana (India) were selected as population in the present study. From this population 120 students of class IX were selected by random sampling technique.

TOOLS USED:

1. Self efficacy scale developed and standardized by Dr. G.B. Mathur & R. K. Bhatnagar.
2. Problem-Solving Ability Test developed and standardized by N. Dubey

STATISTICAL TECHNIQUES USED:

For analysis of any data researcher used different methods and techniques here:

1. To analysis the data the descriptive statistical techniques was used by researcher.
2. Pearson's coefficient of correlation was used.
3. t-test was used by researcher for making the comparison.

ANALYSIS OF DATA

TABLE 4.1

"CORELATION BETWEEN SELF EFFICACY AND PROBLEM SOLVING ABILITY AMONG SECONDARY SCHOOL STUDENTS"

Variables	DF	Coefficient of relation 'r'	Level of significant
PSAM	118	0.291	Significant at 0.01
Self Efficacy			

***significant at 0.05 level of significance with df/118**

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Table 4.1 indicates that the obtained value 0.291 is higher than the table value at 0.01 level of significance. This showed that the obtained value (0.291) of 'r' of Problem solving ability in mathematics is positively and significantly related with self efficacy of secondary school students. Hence, the *null hypothesis No.1 which is stated earlier that there exists no significant relationship between self-efficacy and Problem solving ability in mathematics among secondary school students* is not retained.

Table 4.2

SIGNIFICANCE DIFFERENCE OF SELF EFFICACY AMONG SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR GENDER

Gender	N	Mean	S.D	t-ratio	Significant Level
Male	54	68.09	6.61	0.682	Not significant at 0.05
Female	66	68.59	6.63		

****Not Significant at 0.05 level of significance with df/ 118**

Table 4.2 reveal that the mean score of the male & female secondary school students are 68.09 & 68.59 and S.D. scores are 6.61 & 6.63 respectively. The calculated t-ratio of male & female of SES is 0.682. The table value at 0.05 level is 1.98. It shows that the calculated value of t-test is less than the table value and there is no significant difference between the mean scores of male and female SES. *Hence, the hypothesis 2 which is stated earlier that there exists no significant difference of self efficacy among secondary school students in relation to their gender is retained.*

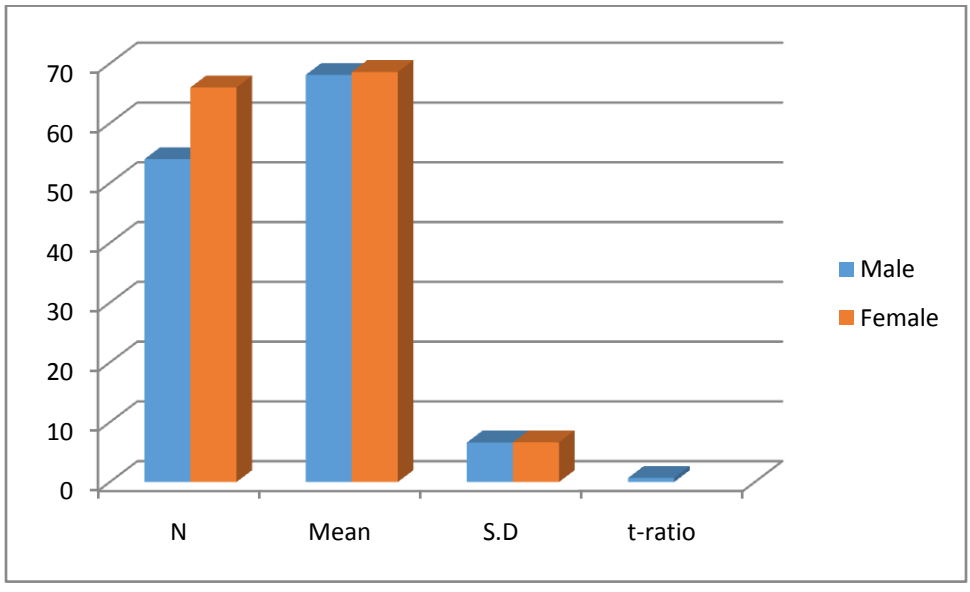

Table 4.3

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SIGNIFICANCE DIFFERENCE OF PROBLEM SOLVING ABILITY IN MATHEMATICS AMONG SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR GENDER

Gender	**N**	**Mean**	**S.D**	t-ratio	Significant Level
Male	54	8.66	3.25	0.019	Not significant at 0.05
Female	66	10.27	4.04		

****Not Significant at 0.01 level of significance with df/ 118**

Table 4.3 reveal that the mean scores of the male & female secondary school students are 8.66, 10.27 and S.D. scores are 3.25 & 4.04 respectively. The calculated t-ratio of male & female students is 0.019. The table value level at 0.05 level is 1.98. The obtained‘t’ value is less than the table value at 0.05 level of significance and null hypothesis is accepted. So the *null hypothesis No.3 which is stated earlier that there exists no significant difference of problem solving ability in mathematics among secondary school students in relation to their gender is retained.*

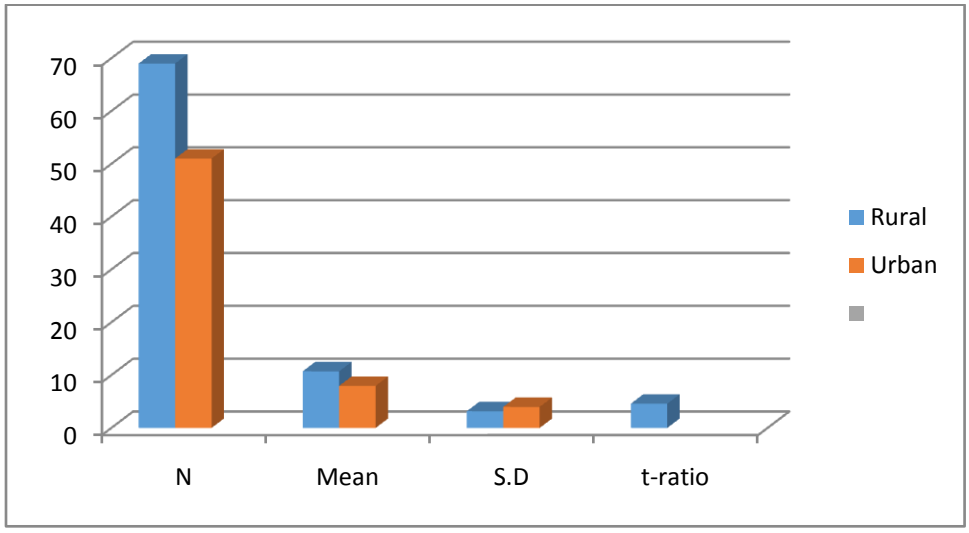

Table4.4

SIGNIFICANCE DIFFERENCE OF SELF EFFICACY AMONG SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR RESIDENTIAL BACKGROUND

Locality	**N**	**Mean**	**S.D**	**t-ratio**	**Significant Level**
Rural	69	70.18	7.25	0.328	Not significant at 0.05
Urban	51	65.90	4.62		

***Significant at 0.05 level of significance with df/ 118**

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Table 4.4 reveal that the mean scores rural & urban secondary school students are 70.18 & 65.90 and SD scores are 7.25& 4.62 respectively. The calculated t-value of rural & urban among secondary school students is 0.328. The table value level at 0.05 level is 1.98. The obtained‘t’’ value is less than the table value at 0.05 level of significance and null hypothesis is accepted. So, the *hypothesis 4 which is stated earlier that there exists no significant difference of self efficacy among secondary school students in relation to their residential background* is retained.

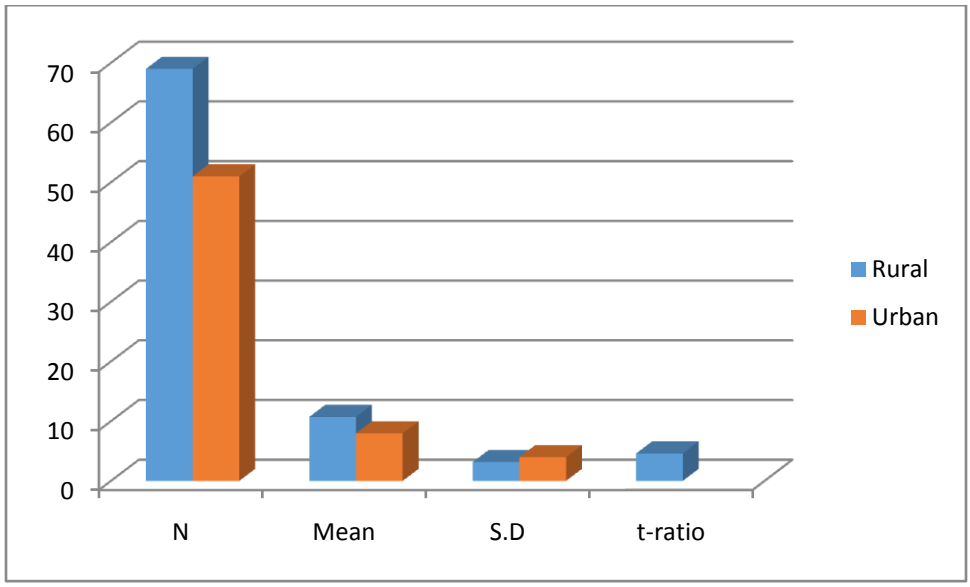

Table 4.5
SIGNIFICANCE DIFFERENCE OF SELF EFFICACY AMONG SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR RESIDENTIAL BACKGROUND

Locality	N	Mean	S.D	t-ratio	Significant Level
Rural	69	10.72	3.16	4.59	Not significant at 0.05
Urban	51	7.96	3.98		

****Not Significant 0.01 level of significance with df/118**

Table 4.5 reveal that the mean scores rural & urban secondary school students are 10.72 &7.96 and scores S.D. scores are 3.16 & 3.98 respectively. The calculated t-ratio of rural & urban secondary school students is 0.780. The table value level at 0.05 level is 1.98. The obtained‘t’’ value is less than the table value at 0.05 level of significance and null hypothesis is accepted. So, the *hypothesis 5 which is stated earlier that there exists no significant difference of Problem solving ability in mathematics among secondary school students in relation to their residential background is retained*.

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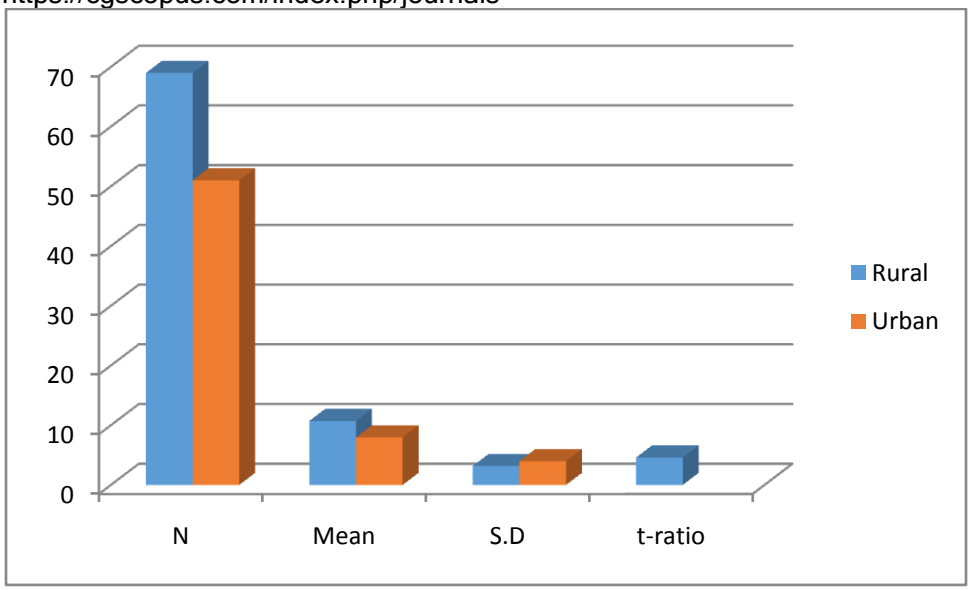

MAIN FINDING OF THE STUDY

- A positive and significant relationship of self efficacy and problem solving ability in mathematics was found among was found among secondary school students.
- No significant difference of mean scores of self efficacy among male and female secondary school students was found. Hence gender does not influence self efficacy of secondary school students.
- No significant difference of mean scores of problem solving ability in mathematics among male and female secondary school students was found. Hence gender does not influence self efficacy of secondary school students.
- No significant difference of mean scores of self efficacy among rural and urban secondary school students was found. Hence residential background does not influence self efficacy of secondary school students.
- No significant difference of mean scores of problem solving ability in mathematics among rural and urban secondary school students was found. Hence residential background does not influence self efficacy of secondary school students.

5.2 EDUCATIONAL IMPLICATIONS-:

Based on the study it can be said that self efficacy is positively and significantly related with problem solving ability in mathematics among secondary school students. When students have high self efficacy, they will be able to achieve their goals and get new ways to achieve their goals. When they encounter any problems in this process, they can solve these problems effectively. People with high problem solving ability and self-efficacy capacity also exhibit resilience. Individuals with these characteristics are more perseverant to face problems in mathematics and their day to day life.

This study will help the teachers to foster the self efficacy and problem solving ability among the secondary school students. Individuals who are faced with problems gradually find the opportunity to improve their self-efficacy by solving increasingly complex problems. Solving of problems will build confidence among students. Students with a strong sense of self- efficacy are generally challenging the difficult task due to instinct motivation. The following strategies can be used for foster self efficacy among the students. A teacher should make some peer groups as defined by gender, ethnicity, social circles, interests, achievement level, clothing, or age. A teacher should provide proper feedback to the students on any completing any task related to their learning. When giving feedback on student performance, compare to past performances by the same student, don't make comparisons between students. So teacher should give them consistent, credible and specific encouragement. Teachers with a high sense of efficacy easily motivate their students and develop cognitive abilities among them. Therefore, to develop the problem solving ability among the students there should be provided a variety of study strategies, and monitoring exercises so that students' effective learning & achievements can be ensured. Moreover, SSCS teaching model i.e. Search, Solve, Create and Share should be utilized to provide opportunities for students to enhance their problem-solving ability and self-efficacy.

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