Indian Streams Research Journal
Vol.2,Issue.IV/May; 12pp.1-4
Dr. Neetu Sethi
ISSN:-2230-7850

Research Papers

A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO CREATIVITY OF HIGH SCHOOL STUDENTS

Dr. Neetu Sethi
Associate professor
Doraha College of Education
Doraha (Ludhiana,
Punjab)

ABSTRACT

The present study was conducted with the objective to find the relationship of creativity with academic achievement in mathematics. In this study, it was found that high creative students scored higher mean scores as compared to low creative students. A sample of 700 students (both males and females) studying in different government and private schools were selected from different districts of Punjab state. The study revealed that female students were more creative as compared to the male students. It was also found that students of private schools were higher on creativity scores as compared to the students of government schools.

The origin of mathematics is hidden in the evolution of nature. Creation of nature and mathematics is closely related. Mathematics is an exact science and involves high cognitive abilities and powers. The accuracy and exactness of a science is determined to a major extent by the amount of mathematics utilized in it. According to Chamber's Twentieth Century Dictionary (1987) says, "Mathematics is the science of magnitude and number and of all their relations." Mathematics runs in the veins of natural sciences like physics and astronomy and is inextricably incorporated in the natural phenomena. It is fascinating because of its opportunities for creation and discovery as well as for its utility. It is basic to the understanding of every science. National Policy on Education (1986) has considered the importance of mathematics in general education and suggested that, "Mathematics should be visualised as the vehicle to train a child to think, reason, analyse and to articulate logically. Apart from being a specific subject, it should be treated as concomitant to any subject involving analysis and reasoning". Mathematics is fascinating because of its opportunities for creation and discovery as well as for its utility. It enters every walk of life. Krishnamurthy (1990) while discussing the importance of mathematics says that the mathematical form of today has more and more new applications for day-to-day life and the rapid growth of desired application helps to develop more and more new fields of mathematics. Therefore, in schools much impetus is given to the study of mathematics. Academic achievement in mathematics most likely seems to be one of the predictors of people's success in their career in particular. The term "achievement" refers to the degree of level of success attained in some general and specified areas. Achievement is an end product of learning and its level and performance are affected by many factors from which creativity is most important. The analysis shown earlier indicates that bulk of studies deals with achievement in general, though some stray attempt have been made with reference to a particular subject of study. In view of this, in the present study only achievement in mathematics was taken. The choice of the subject was because Mathematics achievement of the students at each developmental stage is likely to be influenced.

Please cite this Article as : Dr. Neetu Sethi , A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO CREATIVITY OF HIGH SCHOOL STUDENTS : Indian Streams Research Journal (MAY ; 2012)

The Almighty God, the creator of the universe, is the supreme mind who possesses the finest abilities of creativity. He has created all of usand all that is revealed in nature. Creativity has been defined in many ways. According to Chambers 21st century Dictionary, Creativity means being inventive or imaginative. In the present study creativity has been operationally defined as " the process of sensing gaps or missing elements, forming ideas or hypotheses concerning theory, testing these hypotheses and communicating the results, possibly modifying and retesting the hypotheses" Torrance, (1966). Its measure is the total scores on fluency, flexibility and originality as measured by Verbal Test of Creative Thinking (Mehdi), Fluency is the ability to call up relevant ideas where the quantity and not the quality, is emphasized. It is the total numbers of relevant responses i.e. the total number of responses given by the subject minus the number of duplicate and irrelevant responses. Flexibility is the ability to produce diversity of idea and with a number of shifts. Originality is the statistical infrequency of responses or the extent to which the responses deviate from the obvious and the common. Creative children are assets to the society. Development and progress in various fields depend on these children. We must try to develop creativity in all children so that they may excel in their fields of interest and can lead the nation ahead. So the present study intends to discover the levels of creativity of high school students in relation to academic achievement in mathematics.

The present study has great significance, relevance, importance and utility for both parents and teachers because this will encourage them to come forward to understand their children's creativity. It will be helpful to school authorities including teachers and principals to know and understand the effect of creativity on their academic achievement in mathematics.

REVIEW OF RELATED STUDIES

Prasad (2002) in his study, "Intellective and Non-intellective factors associated with mathematical creativity at the elementary school stage", on a sample of 540 students studying in VII class in the state of Himachal Pradesh found significant positive correlation between the variable of mathematical achievement and mathematical creativity at 0.01 level. He further found that there exists significant difference in mathematical creativity of children studying in public and traditional schools.

Singh (2006) in his study concluded that academic achievement of students were significantly related to creativity. He found that high creative students' achievement was higher as compared to low creative students. He also concluded that originality measure of verbal creativity has significant relationship with academic achievement of the students in fine arts.

S.V.Bhaskar Reddy (2008) in his study concluded that male and female student teachers do not differ significantly with regard to verbal, non-verbal and in their composite creativity.

Md. Mahmood Alam (2009) in his correlational study found significant positive correlation between academic achievement and creativity. This positive correlation indicated that creativity and academic achievement are directly proportional to each other. He further compared boys and girls with regard to creativity and found that there is a significant difference at 0.01 level between boys and girls on the measure of creativity.

EMERGENCE OF THE PROBLEM

All scientific education is based on mathematics. Its neglect means to remain ignorant about all other sciences. We should not forget that right from morning till evening, all our activities and engagements are controlled and fashioned by mathematics. Mathematics helps us to develop our intellectual powers like power of imagination, memorization, logical thinking and reasoning. Study of mathematics is helpful in learning most of the school subjects. In today's world creativity is important for our personal, social, economic and cultural well-being. In our educational system, creativity in the student is mostly neglected. Teachers in the schools are so busy in their academic routine that they find little time to think of creativity and the means to foster it. So it is high time that schools should find ways and means to foster creativity in children otherwise we fail to educate them as whole and complete individuals.

OBJECTIVES OF THE PROBLEM

Present study was conducted with the following objectives:

1. To know the relationship between creativity and achievement in mathematics.
2. To know difference in the achievement in mathematics due to high and low levels of creativity.
3. To know the difference in creativity of male and female students.
4. To know the difference in creativity of government and private school students.

Please cite this Article as : Dr. Neetu Sethi , A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO CREATIVITY OF HIGH SCHOOL STUDENTS : Indian Streams Research Journal (MAY ; 2012)

HYPOTHESES

The following hypotheses were framed in the present investigation:

1. There will be no significant relationship between creativity and achievement of students in mathematics.
2. There will be no significant difference in the achievement of students in mathematics due to high and low level of creativity.
3. There will be no significant difference in the creativity of male and female students.
4. There will be no significant difference in the creativity of government and private school students.

DESIGN OF THE STUDY

For the collection of data, descriptive survey method of investigation was employed. The purpose of the present study was to know the relationship of creativity with academic achievement in Mathematics of 9th class students. There is one independent variable i.e. creativity and one dependent variable i.e. academic achievement in mathematics. To find the relationship of independent variable creativity with the dependent variable of academic achievement in mathematics, technique of Pearson's Product Moment coefficient of correlation was employed. Difference in achievement due to different groups was found with the help of t-ratio technique.

SAMPLE

Sample for present study was selected from schools located in different districts of Punjab state. For this students of 9th class studying in different government and private schools were selected. Sample comprised of both male and female students (total 700 subjects). Subjects were selected with the help of multistage random sampling technique.

TOOLS USED

1. Verbal Test of Creative Thinking (By Baqer Mehdi, 1985)
2. Mathematics Achievement Test For 9th Class (This was developed by the investigator herself).

RESULTS AND DISCUSSION

TABLE 1

The value of coefficient of correlation between independent variable of creativity and dependent variable of Achievement in Mathematics

S.No.	Measures of independent variable Creativity	The values of coefficient of correlation with dependent variable of Achievement in Mathematics
1	Fluency	.210**
2	Flexibility	.245**
3	Originality	.329**
4	Total Verbal Creativity	.264**

** Significant at 0.01 level

Table 1 revealed that correlation of achievement in mathematics with different measures of creativity i.e. fluency, flexibility and originality were positive and significant at .01 level (r = .210, .245, .329 respectively).

In other words, these significant correlations have established that fluency, flexibility and originality measures of creativity have significant relationship with achievement of the students in mathematics. It means that students higher on fluency, flexibility and originality measures of creativity tend to achieve high in the subject of mathematics.

The reasons for the significant correlation of fluency, flexibility and originality measure of

Please cite this Article as : Dr. Neetu Sethi , A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO CREATIVITY OF HIGH SCHOOL STUDENTS : Indian Streams Research Journal (MAY ; 2012)

creativity may be due to the fact that these measures are directly or indirectly related to speed, relevancy and flow of innovative and unrepeated ideas. All these factors are important in mathematics. Secondly, for the solution of mathematical problems, thinking ability is very much involved. The students with high level of these three factors have the mental curiosity about the mathematical problems, which boost the original thoughts in their minds. Clearly all these things are needed in order to get proficiency in mathematics.

Therefore, hypothesis 1 that there will be no significant relationship between creativity and achievement of students in mathematics was not accepted.

TABLE 2
Values of mean, standard deviation and t-ratio to locate difference in the achievement of students in mathematics due to the level of creativity

Vr. No.	Name of Variable	Group	N	M	SD	t-ratio	Level of significance
5(b)	Creativity	Low creativity High creativity	114 114	13.32 16.78	5.36 5.55	4.794	0.01**

Results of table 2 revealed significant difference on the variable of achievement of students in mathematics due to low and high level of creativity, as t- value was significant at .01 level (t = 4.794). when mean scores of both the groups were compared, it was found that high creative students scored higher mean scores (mean = 16.78) as compared to low creative students (mean = 13.32).

Above results may be explained on the basis of thinking ability involved in the creative process as well as in the solution of mathematical problems.

Therefore, hypothesis 2 that there will be no significant difference in the achievement of students in mathematics due to high and low level of creativity was not retained in the present study.

TABLE 3
Values of mean, standard deviation and t-ratio to locate difference in emotional intelligence due to sex differences

Name of Variable	Group	N	M	SD	df	t-ratio	Level of significance
Creativity	Male Female	337 363	85.09 101.05	30.39 37.35	698	6.172	0.01**

As per the results of the table 3, significant difference was found in the creativity of male and female students due to significant t- value at .01 level (t = 6.172). It was also found that female students scored higher on creativity (mean = 101.05) as compared to the male students (mean = 85.09). In other words, as per the findings of the present study female students were more creative as compared to male students.

Above results may be due to the fact that females have natural instinct of indulging in artistic and aesthetic activities. These keep them busy in creative activities like rangoli, embroidery etc. Moreover, due to natural calmness in females, they are more interested in creative activities. Thirdly, females by nature are more resourceful as they can use limited resources to accomplish their task.

Therefore, hypothesis 3 that there will be no significant difference in the creativity of male and female students was not accepted in the present study.

Please cite this Article as : Dr. Neetu Sethi , A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO CREATIVITY OF HIGH SCHOOL STUDENTS : Indian Streams Research Journal (MAY ; 2012)

TABLE 4
Values of mean, standard deviation and t-ratio to locate difference in creativity due to category of schools

Name of Variable	Group	N	M	SD	df	t-ratio	Level of significance
Creativity	Private Government	387 313	95.81 90.35	37.34 31.85	698	2.052	0.05*

Significant difference was obtained in the creativity of the students belonging to private and government schools due to significant t-value at .05 level (t = 2.052), as per the result of table 4. In other words, students belonging to private schools have more creative talents as compared to the students belonging to government schools. After comparing their mean scores, it was found that students of private schools scored more (mean = 95.81) as compared to the students of government schools (mean = 90.35) on the variable of creativity.

Above results may be due to the fact that in private schools, students get more chances to bring forth their hidden talents as they get numerous chances for co-curricular activities along with academic growth. Secondly, private schools have more infrastructure like up-to-date electronic gadgets such as multi-media or audio-visual aids. Moreover, in private schools, there are so many activities for the students, like mathematical quiz; debates; declamations etc. All these activities inspire students to bring forth their curiousness; sense of initiativeness and persistency. Thirdly, in private schools, their needs and hidden characteristics are satisfied which boost to the creative talents, interests and achievements of students in a particular field. Fourthly, private schools are financially much stronger than the government schools. So, they can spend a huge amount of money on innovative and novel techniques.

Therefore, hypothesis 4 that there will be no significant difference in the creativity of government and private school students was not accepted in the present study.

EDUCATIONAL IMPLICATIONS

Creativity influences the achievement of students in mathematics. It has positive correlation with mathematical achievement of the students. Therefore, parents and teachers should provide congenial and free home and school environment to their children so that they can produce some original solutions to the mathematical problems. In this way, they may be able to device some new innovative techniques to solve mathematical problems in a simple way. Parents and teachers should also try to provide maximum facilities with the help of which children can create something new in the field of mathematics. Teacher should try to make the classroom environment as stimulating, encouraging and provide other facilities in order to channelise the potentialities and talents in right direction instead of blocking its way. Teachers should also try to teach the children with the help of problem solving method.

REFERENCES

Best, J.W. (2001), "Research In Education." (6th Ed.), New Delhi, Prentice Hall Of India.

Bloom, B.S.(1956), "Taxonomy of Educational Objectives." Handbook I, Cognitive Domain, New York: David Mckay.

Chamber, P. (1987), "Chambers' Twentieth Century Dictionary." Allied Publishers, Madras, p. 1098.
Courant, R. and Robbins, H. (1941), "What is Mathematics." Oxford University Press, p. 15.

Good, V.C. (1973), "Dictionary of Education." New York: McGraw Hill Book Company.

Koul, L. (2001), "Methodology of Educational Research." (3rd Ed.), Vikas Publishing House Pvt. Ltd.,

Please cite this Article as : Dr. Neetu Sethi , A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO CREATIVITY OF HIGH SCHOOL STUDENTS : Indian Streams Research Journal (MAY ; 2012)

pp. 187-206.

Krishnamurthy V. (1990), " Larger issues involved in mathematics teaching." The Hindu, 17th April.

Md. Mahmood Alam (2009), "Academic Achievement in Relation to Creativity and Achievement Motivation A Correlational Study." Edu Tracks, A monthly scanner of Trends in Education, Volume 8, No. 9, p.32,

Mehdi, B. (1977), "Creativity, Intelligence and Achievement- A Co relational Study." Psychological Studies, Vol.22 (1).

National Policy on Education (1986), "Ministry of Human Resource Development." Government of India, New Delhi.

Prasad, D. (2002), "Intellective and Non- Intellective Factors Associated with Mathematical Creativity at the Elementary School Stage." Ph.D. Education, Thesis, Panjab University, Chandigarh.

Singh, B. (2006), "Academic Achievement of College Students in Fine Arts in relation to Emotional Intelligence, Creativity, Learning and Thinking Styles." Ph.D. Thesis, P.U. Chandigarh.

S.V. Bhaskar Reddy (2008), "Creativity of Student Teachers of College of Education." Edu Tracks, A monthly scanner of Trends in Education, vol.7, No.12, p.40,41.

Torrance, E.P. (1966), "Torrance Test of Creative Thinking Directions, Manual and Scoring Guide (Verbal Test Booklet)." A Research Edu. N.J.Personal Press Inc.

Please cite this Article as : Dr. Neetu Sethi , A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO CREATIVITY OF HIGH SCHOOL STUDENTS : Indian Streams Research Journal (MAY ; 2012)