Original Research Paper

Education

Creativity of Mathematical Gifted Students in Relation to Their Problem Solving Ability

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ABSTRACT This paper intends to compare high and low creative mathematically gifted higher secondary school students with reference to their problem solving ability. For this purpose, a sample of 80 mathematically gifted students(40 boys,40 girls) studying in 11th class of higher secondary school of Jabalpur was collected by random sample technique and analysed by using statistical techniques.viz. Mean, SD, t-test. In order to assess the creativity, Verbal Test of Creative Thinking by Baquer Mehdi was used. Problem solving ability test develop by L.N.Dubey was used to measure the problem solving ability of mathematical gifted higher secondary school students. Ages of the students were approximate 14 to 16 years. The result indicates that there is a strong and positive correlation between problem solving ability and creativity of mathematical gifted students.

KEYWORDS : mathematical gifted, Creativity, Problem Solving Ability

Mathematics is a very useful subject for most vocations and higher specialized courses of learning. At the higher secondary and university stages, most of the physical and social sciences require the applications of mathematics. No other subject can be a substitute for mathematics. Problem solving has a special importance in the study of mathematics. Problem solving ability is highly correlated with intelligence, reasoning ability and mathematical ability. It is the ability to think and reason on given level of complexity. It has been observed that students who have learned effective problem solving techniques are able to solve complex problems, a higher level of complexity than more intelligent student, who has not such trainings.

Creativity is an asset to human beings. Of all the abilities that man has, which distinguish him from the rest of animal life, creativity is undoubtedly the unique. About five or six decades back creativity was attributed towards divine source and was termed as "spark of genius". A mathematically gifted students or child were identified by their ability of learning and understanding of mathematical ideas quickly; working systematically and accurately; high level of analytical skills; logical thinking; quick identifying ability and application of self knowledge to new or unfamiliar .

Ganandevan (2006), found out that the problem solving ability of higher secondary students is low. The male and female students and the students residing at rural and urban area differ significantly in their problem solving ability. Bharaj, Meenakshi. (2013), found in his study that gifted girls and gifted boys show no differences in their creative thinking. Maria Kattou,Katerina Kontoyianni,Demetra Pitta-Pantazi & Constantinos Christou.(2011), found that both gifted and non-gifted students were able to provide more than one correct solutions. Gupta, Shalika. (2012), found out that there are significant sex differences in problem solving among high school students. Girls are having high academic achievement than boys. Godara, Sunita. (2015), studied creativity of senior secondary students in relation to their intelligence and gender and found that there is significant and positive correlation between creativity of senior secondary students in relation to their intelligence and gender does not affect creativity in students.

Need of study:
The creative and the mathematically gifted minority is one of the chief resources of development and there is a dire need to identify, develop and encourage such talents at the early stage. How mathematically gifted talents are related to creativity and problem solving ability? Do the mathematically gifted students are creative in nature? Is there any relationship between creativity &problem solving ability? The presents study aims at answering these questions.

Objectives of the study:
1. To find whether significant difference exist in problem solving ability of high and low creative mathematical gifted students of higher secondary school.
2. To find whether significant gender difference exist in problem solving ability of high creative mathematical gifted students of higher secondary school.
3. To find whether significant gender difference exist in problem solving ability of low creative mathematical gifted students of higher secondary school.
4. To find whether significant relationship exist between problem solving ability and creativity of mathematical gifted students of higher secondary school.

Hypotheses of the study;
1. There is no significant difference between problems solving ability of high and low creative mathematical gifted students of higher secondary school.
2. There is no significant gender difference in problem solving ability of high creative mathematical gifted students of higher secondary school.
3. There is no significant gender difference in problem solving ability of low creative mathematical gifted students of higher secondary school.
4. There is no significant relationship exist between problem solving ability and creativity of mathematical gifted students of higher secondary school.

Methodology;
Descriptive survey method was used to conduct the study. The sample consisted of 80 mathematical gifted students of eleventh class studying in higher secondary school of Jabalpur. Final sample of mathematical gifted students were identified on the basis of total CGPA and GRADE of class tenth.

Following tools were used to collect data-
1. Criteria of more than 9.5 CGPA + 'A' grade in mathematics in class 10th Board examination.
2. Verbal Test of Creative Thinking (AGE 13+) H/E prepared by Baquer Mehdi.
3. Problem solving ability test developed by L.N.Dubey.

Statistical techniques used:
Mean, Standard Deviation, t-test, Pearson product moment correlation

Result and discussion:
Table 01: Analysis of problem solving ability of high and low creative mathematical gifted students

Variable	Group	N	Mean	SD	t-value	Level of significance
Problem solving ability	High creative	20	13.60	1.39	4.255	0.01*
	Low creative	20	11.80	1.28		
df= 38				*Extremely significant at 0.01 level		

Table -01 given above shows the mean score, standard deviation and t-value of problem solving ability of high creative and low creative mathematical gifted higher secondary students. The mean score of problem solving ability of higher group i.e. mathematical gifted students with high creativity score is found to be 13.60 and standard deviation as 1.39 and mean score of problem solving ability of lower group i.e. mathematical gifted students with low creativity score is found to be 11.80 and standard deviation as 1.28. To test the difference between the mean score of two group, t-value is calculated which is found to be 4.225. Table value of t at 38 degree of freedom is at 0.01 level of significance is 2.71. Hence calculated value (t=4.255) exceeds the tabulated value (t=2.71) at given level of degree of freedom. Hence, it is interpreted that there will be extremely significant difference exist between the problem solving ability of high creative and low creative mathematical gifted higher secondary students. The students belongs to high creative group have higher problem solving ability than lower creative group. Therefore the hypothesis 01 that there is no significant difference between problems solving ability of high and low creative mathematical gifted students of higher secondary school is rejected.

Table-02: Analysis of problem solving ability of high creative mathematical gifted boys' students and mathematical gifted girls' students

Variable	Group	N	Mean	SD	t-value	Level of significance
Problem solving ability	High creative Boys	10	12.60	0.92	5.6349	0.01*
	Low creative Girls	10	14.90	0.74		

df= 18   *Extremely significant at 0.01 level

Table -02 given above shows the mean score, standard deviation and t-value of problem solving ability of high creative mathematical gifted boys and mathematical gifted girls higher secondary students. The mean score of problem solving ability of high creative mathematical gifted boys of higher secondary school is 12.60 is the Mean for High creative boys and standard deviation is 0.92 and mean score of problem solving ability of high creative mathematical gifted girls is 14.90 and standard deviation is 0.74. Table value of t at 18 degree of freedom is at 0.01 level of significance is 2.88. Hence calculated value (t=5.634) exceeds the tabulated value (t=2.88) at given level of degree of freedom. Hence, it is interpreted that there will be extremely significant difference exist between the problem solving ability of high creative mathematical gifted boys and mathematical gifted girls' higher secondary students. Hence hypothesis -02 that there is no significant gender difference in problem solving ability of high creative mathematical gifted students of higher secondary school is rejected.

Table-03: Analysis of problem solving ability of low creative mathematical gifted boys' students and mathematical gifted girls' students

Variable	Group	N	Mean	SD	t-value	Level of significance
Problem solving ability	Low creative boys	10	10.80	0.79	2.88	0.01*
	Low creative girls	10	12.60	0.70		

df= 18   *Extremely significant at 0.01 level

Table-03 given above shows the mean score, standard deviation and t-value of problem solving ability of low creative mathematical gifted boys and mathematical gifted girls' higher secondary students. The mean score of problem solving ability of low creative mathematical gifted boys of higher secondary school is 10.80 and standard deviation is 0.79 and mean score of problem solving ability of low creative mathematical gifted girls is 12.60 and standard deviation is 0.70. Table value of t at 18 degree of freedom is at 0.01 level of significance is 2.88. Hence calculated value (t=5.4) exceeds the tabulated value (t=2.88) at given level of degree of freedom. Hence, it is interpreted that there will be extremely significant difference exist between the

problem solving ability of low creative mathematical gifted boys and mathematical gifted girls' higher secondary students. Hence hypothesis -03 that there is no significant gender difference in problem solving ability of low creative mathematical gifted students of higher secondary school is rejected.

Table-04: Relationship between problem solving ability and creativity

Variable	N	Correlation (r)
Problem solving ability	80	0.347
Creativity	80	

Table -04 given above shows the correlation between problem solving ability and creativity of mathematical gifted students of higher secondary school. The calculated of value of coefficient of correlation r is 0.347 which is significant. This shows a positive correlation between problem solving ability and creativity of mathematical gifted students of higher secondary school. Hence the hypothesis that there is no significant relationship between problem solving ability and creativity of mathematical gifted students of higher secondary school is rejected.

Major findings:
Major finding of the present investigation are:-
1. There is significant difference between problems solving ability of high and low creative mathematical gifted students of higher secondary school.
2. There is significant gender difference in problem solving ability of high creative mathematical gifted students of higher secondary school.
3. There is significant gender difference in problem solving ability of low creative mathematical gifted students of higher secondary school.
4. There is significant and positive relationship between problem solving ability and creativity of mathematical gifted students of higher secondary school.

Education implication of the study:
Problem solving ability is highly correlated with intelligence and giftedness. Problem solving ability is correlated with creativity, reasoning ability and mathematical ability. The present study denotes the importance of problem solving ability creativity among the mathematical gifted students. These two factors play an important role in the field of education as well as in their future too. Therefore, it is necessary that we should develop problem solving ability and creativity through proper education and training of our young boys and girls. Awareness is to be brought about creativity and problem solving ability among the higher secondary school students by the administrators, teachers and the parents

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