

# DOES CREATIVITY IMPACT SCIENTIFIC APTITUDE OF SCHOOL CHILDREN ?

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## ABSTRACT

*Of all the equalities man possesses, creative thinking has been the most important for his well being and advancement. Creativity means to make, to bring into being, to originate or to invent something. Scientific aptitude is considered to be a unique or unusual potential or ability of an individual to acquire general knowledge and skill in scientific fields. This era is witnessing a great importance of creativity and imagination in our every day lives. Development of science has conquered almost all spheres of life. The issue of developing creativity and scientific aptitude in school children is challenging to teachers, and the investigator is interested to find the correlation between creativity and scientific aptitude. Research on creativity has mainly focused on the contributions of terms of creativity and co relational studies of creativity with self concept, intelligence, personality and achievement. There are several aspects of creativity and scientific aptitude on which clear cut answers are yet to be found by sustained research. The study was designed to investigate the correlation between creativity and scientific aptitude in standard VIII students. The sample taken was 251 and random sampling technique was done on the basis of sex, nature of the school, locality of residence, locality of school, type of school, parental education and parental occupation. Creativity tool by Baquer Medhi (1985) and a self constructed tool for scientific aptitude were used. Collected data were analyzed using statistical techniques such as t-test, analysis of variance and Pearson's product moment correlation. Correlation analysis revealed that there is no significant relation between creativity and scientific aptitude with respect to background variables. In this study the investigator draws the conclusion that students who are highly creative may not have scientific aptitude up to the mark. Students who are interested in science and thereby developing their skills and abilities may not always be creative in nature.*

*Keywords: Creativity, Scientific Aptitude, School Children.*

## INTRODUCTION

This century witnesses a great importance of creativity and imagination in our every day lives and domains of knowledge. The issue of the development of creativity and scientific aptitude among school children is challenging to teachers, schools and educational administrators.

Research on creativity has mainly focused on the contribution of tests of creativity and correlation studies of creativity with self concept (Pagona, B., Anastasia, M., & Kostas, M., 2009) intelligence (Simson, 1999; Batasini, 2001), personality (Fryner & Collings, 1991) and achievement (Dharsana & Sharma, 2003; Alwaris, 2000).

Do urban and rural children differ in creativity and scientific aptitude? Do the parental education and occupation influence the level of scientific aptitude and creativity? Is there any positive correlation between creativity and scientific aptitude of students? There are several such aspects of creativity and scientific aptitude on which clear cut answers are yet to be found by sustained research. Creativity is the unique gift of nature, a highly valued human quality which has been known for a long time to have its influence on scientific, technological and artistic spheres of human activity (World Education Report '98, UNESCO, 1998, p.16). Solving problem is necessary for survival and for achieving an abundant life.

It is possible by creative thinking. Creativity can also help us to understand how the individual can reach higher levels of productivity (Barlet, 1958).

Scientific aptitude is considered as a special ability distinct from the general intellectual ability to master a specific series of skills. It is the measure of the probable rate of learning which results in interest and satisfaction and is relatively specific and narrow. Scientific aptitude includes ability to detect fallacies and inconsistencies to reason logically and originally and to draw correct inductions and deduction (Kochar, 1996).

### Objectives of the study

The objectives of the present study are:

- To find out the significant difference, if any, in early adolescents' creativity with regard to the background variables.
- To find out the significant difference, if any, in early adolescents' scientific aptitude with regard to the background variables.
- To find out the correlation, if any, between creativity and scientific aptitude of early adolescents' with regard to the background variables.

The selected background variables are (i) personal variables (sex, locality of residence), (ii) familial variables (parental education and parental occupation), and (iii) Institutional variables (nature of school, locality of school, type of school).

### Population and Sample

The population of this study includes 251 early adolescents studying in Standard VIII of state board and matriculation schools in Tirunelveli district, Tamil Nadu, India. The sample was selected by stratified sampling technique. The various stratification factors taken into account were sex, nature of the school, locality of residence, locality of school, type of school, parental education and parental occupation.

### Tools

The tools used in the present study were (i) Creativity Test by Baquer Mehdi (1985) and (ii) Scientific Aptitude Test developed by the investigators.

### *Creative Test by Baquer Mehdi (1985)*

The verbal test of creativity includes four subtests, mainly, consequences test, unusual test, similarity test and product improvement test.

The consequences test contains three hypothetical situations. The time allotted for the three situations is four minutes each. The test encourages free play of imagination and originality.

The unusual test presents the subject with the names of three common objects. This test measures the subjects' ability to retrieve items of information from his personal information of storage. The time allotted for three tasks is five minutes each.

Similarity test presents the subject with three pairs of words. The test provides an opportunity for the free play of imagination and reality. The time allotted for three pair of words is five minutes.

In product improvement test the subject is asked to think of a simple wooden toy horse and suggest addition of new things to it to make it more interesting for the children to play. The time allotted is six minutes.

### *Scientific Aptitude Test by the investigators*

Competent persons in the field of education and science analyzed the drafted tool and found that the items were relevant and valid enough to study the scientific aptitude of Standard VIII students. Based on the suggestions of the panel some of the items in the tool were removed and some were modified. A try out was made to find out the weakness and workability of the items. A sample of 76 students was randomly selected from the population of students from standard VIII for administering the preliminary draft. The students were instructed to select the test option for each item by marking a tick in the relevant column provided in the scoring sheet. Items were analyzed qualitatively and quantitatively in terms of statistical properties. 20 items were selected out of 45 items in the preliminary draft. The reliability was determined using Spearman Brown Prophecy formula, and was found to be 0.87.

### Data Analysis

Statistical techniques employed in the present study were

arithmetic mean, 't'- test, ANOVA, and Pearson Product Moment Correlation.

There is significant difference in creativity of the students with regard to locality of residence and locality of school. This may be due to the infrastructural facilities, adequate instructional materials, high quality of teaching and a stimulating school environment provided by urban schools. Students in urban area enjoy more opportunities to understand things and situations, and act accordingly to his/her desire.

There is no significant difference in creativity of the students with regard to sex and type of school (Table 1). Creativity is an inborn ability which is to be motivated and nurtured by the environment the student is, and has nothing to do with sex and type of school.

There is no significant difference in creativity of the students with regard to nature of the school, parental education and occupation (Table 2). It is the school environment that provides opportunities to develop creativity, rather than the education of parents and their occupation.

Background variable		Number	Mean	S.D	t-value
Sex	Male	144	51.41	8.23	1.83 (ns)
	Female	107	48.95	11.91	
Locality of residence	Rural	135	48.57	8.26	2.34 (s)
	Urban	116	51.56	11.56	
Type of school	State board	128	48.85	7.61	1.84 (ns)
	Matriculation	123	51.19	11.95	
Locality of School	Rural	121	48.51	8.36	2.32 (s)
	Urban	130	51.39	11.21	

**Table 1. Difference in Creativity with Respect to Sex, Locality of Residence, Type and Locality of School.**

Variable	Source of Variance	Sum of Squares	df	F-value
Nature of school	Between	348.17	2	1.74(ns)
	Within	24753.90	248	
Parental Education	Between	707.44	2	1.83(ns)
	Within	24394.64	248	
Parental Occupation	Between	306.45	2	1.53(ns)
	Within	24795.62	248	

**Table 2. Difference in Creativity with Respect to Nature of School, Parental Education and Parental Occupation.**

There is significant difference in the scientific aptitude of students with regard to sex. Boys excel in scientific aptitude when compared to girls. The freedom to explore, to experiment, to be independent, and to interact with others may be high in boys (Table 3).

There is no significant relation in the scientific aptitude of students with regard to locality of residence, type of school and location of school. Aptitude towards science in school level mainly depends on the methods of teaching and the resources provided to explore and experiment.

There is significant difference in scientific aptitude of students with regard to nature of the school but not regard to parental education and parental occupation. Difference in scientific aptitude may be because, students of unisex schools take part in activities inside and outside the school without any inhibition, while students of co-education schools undergo certain restrictions due to sociocultural influences (Table 4).

There is no significant correlation between creativity and scientific aptitude with respect to background variables.

Background variable		No.	Mean	S.D	t-value
Sex	Male	144	46.88	9.76	2.49 (s)
	Female	107	43.87	9.27	
Locality of Residence	Rural	135	44.84	9.02	1.34 (ns)
	Urban	116	46.48	10.31	
Type of School	State Board	128	46.52	9.82	1.54 (ns)
	Matriculation	123	44.64	9.42	
Location of School	Rural	121	44.87	9.02	1.16 (ns)
	Urban	130	46.28	10.19	

**Table 3. Difference in Scientific Aptitude of the Students with Respect to Sex, Locality of Residence, Type and Locality of School**

Variable	Source of Variance	Sum of squares	df	Mean of square of variance	F-value
Nature of the school	Between	781.25	2	390.63	4.30(s)
	Within	22517.10	248	90.79	
Parental Education	Between	164.17	2	82.08	0.88(ns)
	Within	23134.19	248	93.28	
Parental Occupation	Between	63.22	2	31.61	0.34(ns)
	Within	23235.14	248	93.69	

**Table 4. Difference in Scientific Aptitude of Students with Respect to Nature of School, Parental Education and Parental Occupation**

Students are highly creative may not have a high level of scientific aptitude and vice versa (Table 5).

## Interpretations and Discussion

The study reveals that students in urban schools had a higher degree of creativity when compared to rural schools. A similar trend was showed by the investigation of James (2001) stating that there is significant difference in creative thinking between urban and rural students. This may be due to infrastructural facilities, adequate instructional materials, a high quality of teaching and a stimulating school environment provided by urban schools (Sarsani, 2006). Special attention is given in urban schools to tap the creative potentials of the students, and to develop their creative thinking. In this research it is revealed that the students residing in urban area had a higher level of creativity than those residing in rural area. The results of the present investigation are in line with the study of Narayanappa (2007) stating that there is significant difference in the scientific aptitude of postgraduate boys and girls students of natural sciences and social sciences. Students in urban area enjoy more opportunities to understand things, and situations, and act accordingly to their desire.

aptitude between boys and girls irrespective of the type and nature of the school. It is in line with the study done by Shrivastava (1988). Regarding girls, their interaction with the school activities, participation in out-of-school activities and liberty in doing some type of tasks are restricted. Girls are often dependent, lack self confidence and interest in doing science activities and are loaded with bookish knowledge. Girls need more motivation from teachers and parents to boost their confidence, to trust their abilities and thereby raising their efficacy of goals in science. Girls lack encouragement to take part in classroom activities and are often denied opportunities to explore challenging activities. Girls should not be discouraged in developing science skills simply based on the gender. On the other hand, freedom to explore, to experiment, to be independent, to interact with others, opportunities to manipulate things and to develop their scientific interest paves way to boys in enhancing their scientific aptitude. Boys are given more freedom than girls to participate in competitive activities and are more socialized for independence. Boys are enthusiastic to participate in challenging activities, to gather concrete information rather than depending on books for knowledge. In co-education schools, teachers should

Significant difference is observed in the level of scientific

Background variable	No.	$\Sigma X$	$\Sigma X^2$	$\Sigma X$	$\Sigma X^2$	$\Sigma XY$	$r$	
Gender	Male	144	7053.67	357910.1	6751	330129	330831.4	0.011(ns)
	Female	107	5496.57	294716	4694	215034	242460.9	0.125(ns)
Locality of residence	Rural	135	6556.28	327547.1	6053	282307	293836.6	0.013(ns)
	Urban	116	5993.96	325078.9	5392	262856	279455.7	0.061(ns)
Locality of school	Rural	121	5869.82	293128.6	5429	253359	263029.5	0.037(ns)
	Urban	130	6680.42	359497.4	6016	291804	310262.9	0.076(ns)
Type of school	State Board	128	6253.33	312847.8	5954	289212	290087.2	0.083(ns)
	Matric.	123	6296.91	339778.2	5491	255951	283205.2	0.153(ns)
Nature of the school	Boys	64	3114.48	154904.1	3111	157525	150666.8	0.158(ns)
	Girls	64	3138.85	157943.7	2843	131687	139420.4	0.003(ns)
	Co-edn.	123	6296.91	339778.2	5491	255951	283205.2	0.153(ns)
Parental education	Illiterate	12	631.39	35215.66	590	30078	30594.77	0.307(ns)
	School Education	113	5442.89	268434.5	5147	244685	248591.6	0.084(ns)
	College Education	126	6475.96	348975.9	5708	270400	294106	0.053(ns)
Parental occupation	Farmer	19	880.29	41771.49	892	43114	41036.58	0.163(ns)
	Private Sector	132	6598.76	340743.8	5966	281052	298553	0.028(ns)
	Govt. Sector	100	5071.19	270110.8	4587	220997	233702.7	0.093(ns)

ns - not Significant

Table 5. Correlation Between Creativity and Scientific Aptitude with Respect to Background Variables

persuade interactions between boys and girls, providing opportunities to work together and thereby developing scientific aptitude in girls.

There is no significant difference in creativity of the students with regard to type and nature of the school, parental education and occupation. This reveals that creativity being an inborn latent ability has to be nurtured and developed in students, by the teachers and parents providing opportunities. This depicts that locality of residence and school, type of school, parental education and occupation do not influence scientific aptitude of students. This is because the scientific aptitude of school students mainly depend on the methods of teaching science, conducting classroom activities and providing resources to explore and experiment.

The present study reveals that there is no significant correlation between creativity and scientific aptitude of students with regard to all the background variables.

### Implications

Creativity is a rare and unique talent possessed by almost all individuals, but its dimension varies from individual to individual. Its development depends upon how teachers identify and foster it. Teachers' interest in it seems to be important (Sarsani, 2006). It was found in this investigation that creativity of students vary with respect to the locality of their residence and locality of school. It is necessary that the teachers working in rural schools be more alert to provide facilities for the students so that they can foster their creativity. The students' verbal power can be improved by conducting elocution programmes, quiz debates etc. The formal school programmes should always be accompanied by opportunities for creative efforts. This should be considered while planning and preparing the curriculum. Parents should shoulder the responsibility to stimulate the children to develop habits of reading, writing, speaking, thinking and problem solving so that creativity of them can be fostered.

Scientific aptitude is considered as a special ability or specific capacity distinct from the general intellectual ability to master a specific series of skills. It is observed that the scientific aptitude of boys is better than that of girls.

Most of the programmes in schools are heavily planned towards information content. Teachers should organize science club in schools, there by conducting science seminars and science exhibitions. Teachers should make use of the laboratory and study materials to impart a concrete knowledge in students. Teachers should encourage the active participation of girl students also in experimental work and make them participate in science programmes within and out of the school (Sidney & Dianne, 2006).

### Conclusion

According to Taylor (1964) and Fisher (1990) development and progress in various fields of national life depends on creative children. Students with creative abilities should be identified early, and their talents have to be nourished and cultivated. Educational administrators should also inculcate attitude towards creativity among the teachers to give training to the children in the development of their creativity. Parental motivation is necessary to develop creativity through guiding, directing, stimulating and encouraging their children. The effects of the environment influence the scientific aptitude of the students to a greater extent. Every father and mother should be alert to notice the child's scientific aptitude and give him / her proper encouragement, guidance and assistance.

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