

Relationship between Creativity, Intelligence and Academic Achievement among School Going Children

Manisha Arya¹ and Suman Prasad Maurya²

*Department of Human Development and Family Studies, College of Home Science,
G.B. Pant University of Agriculture and Technology, Pantnagar 263145, Uttarakhand, India
E-mail: paran.arya@gmail.com*

KEYWORDS Academic Achievement. Children. Creativity. Intelligence

ABSTRACT The present study has been conducted in G.B. Pant University campus, Pantnagar Udham Singh Nagar district of Uttarakhand on Creativity and Academic Achievement among School going children. The purpose of the study was to assess association between creativity, intelligence and academic achievement of children. A sample of 300 students was collected in the age group of 12-16 years (100 students each from class VII, IX and X) by simple random sampling technique. The data was collected through survey method using self constructed questionnaire schedule to elicit information on general information of the respondents, their family income, information related to their study behavior. The test of non-verbal test of creative thinking by Baquer Mehdi (1985) and Indian adaptation of Wechsler Adult Intelligence Scale by Ramalingaswamy (1972) were conducted. Data was analyzed in terms of frequency and percentage. It was found that there is no significant association between creativity, intelligence and academic achievement.

INTRODUCTION

Education is deeply rooted within society and it cannot be desolated in any way. Knowledge, awareness, skills, values, interest, aptitude, creativity, intelligence and attitudes acquired through education enhances the desired quality of life. This quality could be increased with the quality of education with the development of the psychological variables such as the intelligence, creativity, self concept and others. It is the creativity that has enhanced the quality of life and every aspect of life. The most important aspect of creativity is the ability to think or imagine in a different way (Dalal and Rani 2013). Creativity is an act of two parts, the first part consists of getting an idea and the second part involves articulating, that is putting each idea into form. In the present study the sum of fluency, flexibility and the originality in an individual is called creativity. Creativity draws a distinction between convergent and divergent production (commonly renamed convergent and divergent thinking). Convergent thinking involves aiming for a single, correct solution to a problem

whereas divergent thinking is creative generation of multiple answers to a set of problems (Jha 2012).

Academic achievement is generally a desired goal of all parents for their children. Academic achievement is the quantitative indication that results from the behavior sought to be ideal for all children. Academic achievement is a standard, however reliable, in an individual grade or even in a grade point average, which is accessible for all children in our country (Nami et al. 2014). There are many factors in the life of today's children that operate against their developing a positive, substantive, and internal sense of the importance of achievement. The level of academic skills necessary for successful entry into today's job market, with or without a college education, has risen to the point that a focus on achieving academic success is necessary for all students throughout each and every year of schooling from pre kindergarten to 12th grade (Anees 2013). This critical condition underscores the importance of developing, or re-developing, a culture of achievement. In such a culture, learning, progressing academically, and working steadily and purposefully in school is seen as the standard pattern of behavior for students in elementary and secondary school and beyond (Fredrickson 2001).

Wechsler (1939) considered it as the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal ef-

Address for correspondence:

Manisha Arya
Subject Matter Specialist (Home Science)
Krishi Vigyan Kendra (ICAR-VPKAS),
Chinyalisaur, Uttarkashi,
Uttarakhand 249 196, India
Mobile: 9412102711

fectively with environment. It is the ability or skill to solve problems or to fashion products that are valued within one or more cultural settings. In the present study, the verbal and non-verbal ability of the individual with respect to their verbal, spatial, numerical, word fluency, reasoning, perception and general ability is called intelligence. Marjoribanks (2007) collected data from 400, 12-year-old English school children to examine relations between measures of intelligence and academic achievement. The surface showed that the traditional threshold hypothesis, beyond a certain level of intelligence ceases to be related strongly to intelligence, and was not supported. For some areas of academic performance the results suggest an alternate proposition of academic achievement after a threshold level of intelligence was reached.

In current years, several researchers have shown interest in the relationship between intelligence and academic achievement. Researchers mentioned that there are empirical evidence or a strong association between general cognitive ability and academic achievement, which is still anywhere from 51 percent to 75 percent of the variance in academic achievement that is unaccounted for by measures of general cognitive ability alone (Rohde and Thompson 2007).

Research on creativity documents a so-called "fourth grade slump" across cultures. Briefly, these data indicate that when children begin school, their level of creativity is evident and often flourishing. By the time they reach the fourth grade, however, they have become more conforming, less likely to take risks, and less playful or spontaneous than in earlier years. These trends continue throughout the school years and into adulthood. Hence, the risk of diminishing creativity faced by children needs to be addressed by adults, if humans are to attain their creative potential. Today's children must be given the chance to develop their creativity to the fullest extent possible; not only for the benefit of their own future but also for the communities we all inhabit (Ishaq 2008). The mission of some of the Institutes like International Child Art Foundation (ICAF) is to prepare children for a creative and cooperative future. Creativity can be encouraged in a variety of ways, and arts is a dynamic channel to foster a child's creativity.

According to (UNESCO 2004) "the encouragement of creativity from an early age is one of the best guarantees of growth in a healthy environ-

ment of self-esteem and mutual respect-critical ingredients for building a culture of peace." Traditional schooling and parenting do not generally foster a child's creativity. Limits are placed on children's creativity by educational systems that encourage conformity and imitation in learning rather than spontaneity and creative imagination. Moreover, standardized testing captures only the ability of students to provide "correct" answers to questions, without rectifying the thinking process that results in "incorrect" answers or accepting ambiguous but equally valid answers. Even those teachers and parents, who do recognize the importance of creativity, often lack the tools and training to encourage a child's imagination and discovery. Creativity and intelligence are related but in what way and to what extent is not exactly known. The studies conducted so far do not present a wholesome picture on creativity of the school aged children correlated with their intelligence and academic achievement (Naderi et al. 2009).

Therefore, substantial efforts are needed to conduct need based researches with a view to understand the creative expressions in children for their successful school performance for personality development in the preschool for this generation. Creativity is 'exogenous' or purely innate and not everyone need to be creative. Even in the industrial age, the focus is on productivity, not creativity. However, in the economy of the future, creativity must be diffused and every individual must learn how to enhance his or her creativity (Chandrasekaran 2013). It is not surprising that today the importance of creativity is increasingly emphasized by studies in disciplines ranging from anthropology to organizational theory and management.

Therefore, considering the above facts and constraints, the present study was undertaken to find out the level and relationship of creativity, academic achievement and intelligence among school going children and to know the study behaviour and environment of the children.

METHODOLOGY

A total of 300 children belonging to age group 12-16 yrs of age (100 children) each from class VII, IX and XI drawn by simple random sampling were studied from Campus school of Pantnagar University Uttarakhand in year 2008.

Self-constructed Questionnaire was developed to find out the study behavior of children. A self-constructed questionnaire to elicit information on personal information namely name, age, ordinal position, siblings, family monthly income, education and occupation of their parents and information on study behavior of children in terms of their subject, help and support taken to study was constructed.

The Non-Verbal Test of Creative Thinking by S Bacquers Mehdi a standardized test, was used to examine the creativity among children, as it is intended to measure the individual's ability to deal with figural content in a creative manner. Three types of activity was used for this purpose, picture construction, picture completion, and triangles and ellipses. The total time required for administering the test was 35 minutes, the battery is meant to identify creative talent at all stages of education except pre-primary and primary.

In the Non-Verbal Test of Creative thinking by Mehdi (1985) pictures were scored for elaboration and originality. The subjects were also asked to give an interesting and unusual title to each picture which was scored for both verbal elaboration and originality. The scores of non verbal creativity test was given according to the individuality of the picture they have portrayed by subject. As in the case of scoring for elaboration and originality non-verbal scores represented by a person's ability to produce ideas which differ in approach or thought trend were considered. All ideas which differ in approach or thought trend are treated. Since the norms given in the test include only the scores of Activity I and Activity II, it has been recommended that the researcher when preparing their own norms should add elaboration scores of Activities III also. Therefore, the score obtained from the three activities was added. To categorize, range method with class interval of 36 was used. Accordingly, the students were classified as high (more than 200 scores on creativity), average (164 to 200 scores) and low (less than 164 scores) in creativity, which has been operationally defined.

School Report Card

In order to gather the brief knowledge of the academic achievement of students of seventh, ninth and eleventh standards, previous year re-

port card was taken from their respective class teachers and aggregated marks and the percentage were noted as their academic achievements. The students from VII, IX and XI standards were selected, as this is an age where students are expected to be serious with their academic achievement. The school report cards of the students selected for the study was collected from the class teacher and the information recorded in percentage of marks obtained.

Indian Adaptation of Wechsler Adult Intelligence Scale by Ramalingaswamy (1972) was used. A standardized test was selected to know the intelligent quotient of the student in the study. Wechsler Adult Intelligence Scale assesses intelligence in terms of performances on Picture completion, digit symbol, block design, picture arrangement and object assembly.

For Intelligence Quotient (IQ), the raw scores obtained from the subtest were converted into IQ as per the instruction given in the manual. The classification suggested for interpreting IQ of the subjects in the manual of WAPIS was used which is as follows:

The scores of intelligent quotient from 80 to 89 were taken to be dull normal intelligent quotient. The scores of intelligent quotient between 90 to 109 were taken to be average normal intelligent quotient. The scores of intelligent quotient from 110 to 119 were taken to be bright normal intelligent quotient. The scores of intelligent quotient between 120 to 129 were taken to be superior intelligent quotient. The data was analyzed in terms of frequency percentage and Chi-square (χ^2) test.

RESULTS AND DISCUSSION

Table 1 reveals that irrespective of standard, majority of children were high in creativity (64%) followed by average creativity (29%) and low creativity (7%). The majority of students in VII standard class were belonging to high (56%), average (34%) and low (10%) creativity based on t scores. Similar pattern was found in among the IX standard class students with majority of the students scoring high (55%), average (35%) and low (1%) creativity. Interestingly in XI standard class though majority of the students had high creativity (81%), more children had low creativity (21%) on t scores than average creativity (18%).

Table 1: Creativity of school going children standard wise

Standard	Creativity <i>t</i> scores		
	High No. (%) of student	Average No. (%) of student	Low No. (%) of student
VII (N=100)	56	34	10
IX (N=100)	55	35	1
XI(N=100)	81	18	21
Total (N=300)	192 (64)	87 (29)	21(7)

Irrespective of the standard, it was found that majority of student performed average in academic achievement (42.33%), followed by low (36.67%). About one fourth of the children (21%) were high in academic achievement. Standard wise, it was revealed that in VII standard class, majority of students (39%) had low academic achievement, followed by average (37%) academic achievement and 24 percent had high academic achievement (Table 2). The majority students (39%), in IX standard class, had low academic achievement while 37 percent had average, and 24 percent high academic achievement. Among students in XI standard class, almost half of the students (53%) were average in academic achievement, 32 percent were low and 15 percent were high in academic achievement.

Table 2: Academic achievement of school going children-standard wise

Standard	Academic achievement		
	High No. (%) of student	Average No. (%) of student	Low No. (%) of student
VII (N=100)	24	37	39
IX (N=100)	24	37	39
XI(N=100)	15	53	32
Total (N=300)	63 (21)	127 (42.33)	110 (36.67)

As revealed in Table 3 majority of the students (46.33%) had average intelligence, while 33.33 percent were bright normal, 10.33 percent were dull normal. A few (10%) were superior in

Table 3: Intelligence quotient of school going children-standard wise

Standard	Intelligence quotient of children			
	Superior No. (%) of student	Bright normal No. (%) of student	Average No. (%) of student	Dull normal No. (%) of student
VII (N=100)	11	33	45	11
IX (N=100)	11	33	45	11
XI (N=100)	8	34	49	9
Total (N=300)	30 (10)	100 (33.33)	139 (46.33)	31 (10.33)

Intelligence Quotient (IQ). Standard wise, the majority of students belonging to average IQ were 45 percent followed by Bright normal (33%), 11 percent each were either dull normal or superior in intelligence in VII standard class; while among students in IX standard class, majority of students (45%) were found to have average IQ, 33 percent were bright normal, 11 percent each were either dull normal or superior in intelligence. The percentage of students in XI standard class was average (49%), Bright normal (34%), dull normal (9%) and (8%) superior were belonging to intelligence quotient respectively.

Relationship between Creativity, Intelligence and Academic Achievement

The association between creativity and academic achievement and with intelligence of the students drawn to test the hypothesis is put forth in the following tables and relationship between the different variables is presented in the correlation matrices.

Creativity and Academic Achievement

Creativity and academic achievement among school going children and its calculated χ^2 value is presented in Table 4. Chi-square value was tabulated to test the null hypothesis that there is no significant association between creativity and academic achievement.

The table revealed that majority of the children (27%) were average in academic achievement but had high creativity followed by children having high creativity and low academic achievement (24%), high academic achievement and high creativity (13%). Some children had average academic achievement and average creativity (12.67%), average creativity and low academic achievement (9.67%). A few were high in academics and average in creativity (6.66%), low in creativity and academic achievement (3%), average in academics and

Table 4: Creativity and academic achievement among school going children

Creativity	Academic achievement				Calculated χ^2 value
	Low	Average	High	Total	
Low	9 (3)	8 (2.67)	4 (1.33)	21	0.89
Average	29 (9.67)	38 (12.67)	20 (6.66)	87	
High	72 (24)	81 (27)	39 (13)	192	
Total	110	127	63	300	

Table value of ± 2 at 5 percent level of significance = 9.49
 1 percent level of significance = 13.3

low in creativity (2.67%) and academically high but low in creativity (1.33%).

With respect to hypothesis that there is no significant association between creativity and academic achievement, the calculated value of χ^2 (0.89) was less than the table values (9.49), at 5 percent LS (df=4) thus accepting the hypothesis. Thus there was no significant association found between creativity and academic achievement at 5 percent LS. This is in contrast with the finding of study conducted by Vijayalakshmi (1980) on 425 students who were administered the Kerala University Test of Creative Thinking, the results of critical analysis indicated a positive relation between creative ability and academic achievement and between creativity and socio-economic status.

Table 5 elucidates the creativity and intelligence among school going children. The Chi-square value calculated to test the hypothesis that there is no significant association between creativity and intelligent quotient of school going children is also presented in the table.

As revealed in the table, majority of the children had average creativity and intelligence (21.33%) followed by (16%) have average creativity but bright normal and 15.33 percent had high creativity but average intelligence. Inter-

estingly it was found that a few children had high creativity but dull normal in intelligence (2%), and low creativity with superior intelligent (1.66%).

Since the calculated value (116.58) was greater than table value (16.8) at 6 degree of freedom at 1 percent LS, the hypothesis was rejected, thus, can be said that Bowers (2008) studied that there was weak support for the existence of an IQ threshold, but the creativity increased rather than decreased with higher IQ.

The correlation matrix revealed that creativity was significant at 1 percent level of significance with grade or standard of the children. This implies that children of higher grade were having better creativity (Table 6). Further, the creativity and academic achievement of the children were negatively correlated to income group they belonged. The negative correlation between creativity and income group was significant at 5 percent level of significance. It indicated that the children from lower income group had better creativity. Thus, curricular and co-curricular activities should provide the children with higher income group environmental support to improve their creativity while creative children may be given opportunities to use the talent in the in-

Table 5: Creativity and intelligence quotient among school going children

Creativity	Intelligence quotient				Total	Calculated χ^2 value
	Dull normal	Average	Bright normal	Superior		
Low	3 (1)	12 (4)	5 (1.67)	1 (0.33)	21	5.40
Average	9 (3)	37 (12.33)	35 (11.67)	6 (2)	87	
High	19 (6.33)	90 (30)	60 (20)	23 (7.66)	192	
Total	31	139	100	30	300	

Table value of ± 2 at 5 percent level of significance = 12.6,
 1 percent level of significance = 16.8

Table 6: Correlation matrix of different variables

	<i>Gender</i>	<i>Grade</i>	<i>Income group</i>	<i>IQ</i>	<i>AA</i>	<i>Creativity</i>
Gender	1.000					
Grade	0.00	1.000				
Income group	0.067	-0.146**	1.000			
IQ	0.076	-0.010	0.024	1.000		
AA	0.084	-0.011	-0.094	-0.066	1.000	
Creativity	-0.049	0.224**	-0.106*	0.063	-0.010	1.000

terest of the society and personal growth (Trivedi and Bhargava 2010).

Academic achievement was positively correlated to gender of the children but was not significant at 5 percent level of significance. This implies that academic achievement was better in boys than in girls. Olatoye et al. (2010) also found that boys were more academically achievers as compared to girl. This calls for attention of the parents and the school teachers and authorities to make efforts in guiding and helping the girl students of the school.

For the same level of education, it seems student creativity varies from country to country. For example, Palaniappan (2009) compared creativity levels of Malaysian and American students. He reported that American students are significantly superior to their Malaysian counterparts in general creativity as well as in its components, namely fluency, flexibility, originality and elaboration. However, there was no significant relationship between creativity and academic achievement.

There existed a negative correlation between gender and creativity which was not significant. This implied that the girls had better creativity than boys. Naderi et al. (2009) reported that neither intelligence nor creativity is a significant predictor of academic achievement among undergraduate students in Iran using CGPA scores as measures of student achievement. Gender difference in academic achievement seems to vary depending on the school subject or course being considered. For example, Deary et al. (2007) found that there was gender difference in educational attainment. Girls performed better than boys on overall academics subjects (courses). There was also significant gender difference in all academic subjects (courses) scores, except physics; girls performed better in every topic except physics. Olatoye (2008) reported there is no significant difference between male and female achievement in science. Table 6 also re-

vealed the existence of negative correlation between academic achievement and IQ of the children, but was not significant. It indicates that children of the school having better IQ showed low academic achievement. Thus, some children seem to have better intelligence while others needed further environmental support to perform to their optimal level.

CONCLUSION

The negative relationship between creativity, intelligence and academic achievement is surprising. This points to an anomaly in our school curriculum and/or the method of course delivery. Such a situation negates the objectives of the Polytechnic system which is expected to produce technological and entrepreneurial education. Creativity is required for academic achievement which the present polytechnic system probably does not measure or emphasise.

RECOMMENDATIONS

School days are important for the synergistic overall development of the child. The integrated development focusses on the young children and has begun to direct its attention towards the development needs of the school age children. Development of creativity and academic achievement, especially this age (12 to 16 years) group children, needs conscious effort as found in the study. The following are the recommendations emerging out from the study:

1. Sensitize parents and teacher of the abilities of their children so that appropriate opportunities can be provided for their development.
2. Experiment and research upon educational strategies for utilizing creative abilities of children in their academic achievement.
3. Launch such type of programmes that will promote creativity development in children.

4. Plan and execute curricular and co-curricular activities that should provide the children with environmental support to improve their creativity while creative children may be given opportunities to use their talent in the interest of the society and personal growth.

ACKNOWLEDGMENT

This paper forms a part of the Master's Thesis of the first author submitted to the G.B. Pant University of Agriculture and Technology, Pantnagar. The reviews and other introductory matter were collected from the library of Pantnagar University, National Institute of Public Cooperation and Child Development, Delhi and NCERT, Delhi.

REFERENCES

- Anees A 2013. Study of academic achievement in relation to intelligence of class VII students. *Excellence International Journal of Education and Research (Multi-subject Journal)*, 3: 239-245.
- Bowers JE 2008. Interactive effects of creativity and IQ on ninth grade achievement. *Creativity Research Journal*, 31: 327-335.
- Candrasedkaran S 2013. Creativity and academic achievement of Higher Secondary School students in Tamil Nadu. *International Journal of Humanities and Social Science Invention*, 8: 32-36.
- Dalal S, Rani G 2013. Relationship of creativity and intelligence of senior secondary students. *International Journal of Humanities and Social Science Invention*, 7: 70-74.
- Fredrickson BL 2001. The role of positive emotions in positive psychology: The broaden and build theory of positive emotions. *American Psychologist*, 56: 218-226.
- Ishaq A 2008. International child art foundation on the importance of creativity: A study on creative thinking with reference to intelligence, age, sex, communities and income groups. *Indian Psychological Review*, 12: 36-40.
- Jha Avdhesh S 2012. A Study of creativity of the high school students in relation to certain variables. *Creative and Relative Factors*, 2: 1-5.
- Marjoribanks K 2007. Academic achievement, intelligence, and creativity: A regression surface analysis. *Multivariate Behavioral Research*, 38(1): 105-118.
- Mehdi B 1985. *Manual Non Verbal Test of Creative Thinking*. Agra, UP: National Psychological Corporation Distributors.
- Naderi H, Abdullah R, Tengku-Aizan H, Sharir J, Kumar V 2009. Intelligence, creativity and gender as predictors of achievement among undergraduate students. *Journal of American Science*, 5: 8-19.
- Naderi H, Abdullah R, Tengku AH, Sharir J 2010. Intelligence and academic achievement: an investigation of gender differences. *Life Science Journal*, 7: 83-87.
- Olatoye RA 2008. Self-concept and science achievement in co-educational and single-sex junior secondary school in Ogun State Nigeria. *Review of Higher Education and Self-Learning*, 1: 69-74.
- Olatoye JO, Akintunde SO, Ogunsanya EA 2010. Relationship between creativity and academic achievement of business administration students in South Western Polytechnics, Nigeria. *An International Multi- Disciplinary Journal, Ethiopia*, 4(3a): 134-149.
- Palaniappan AK 2009. *Influence of Intelligence on the Relationship between Creativity and Academic Achievement*. Wilayah Persekutuan, Malaysia: Department of Educational Psychology and Counseling, University of Malaya, Kuala Lumpur.
- Ramalingaswamy P 1972. *Indian Adaptation of Wechsler Adult Intelligence Scale*. New Delhi: Manasayan.
- Rohde TE, Thompson LA 2007. Predicting academic achievement with cognitive ability. *Intelligence*, 35(1): 257-298.
- Trivedi K, Bhargava R 2010. Relation of creativity and educational achievement in adolescence. *Journal of Psychology*, 1(2): 85-89.
- UNESCO 2004. *Education for All Assessment- Statistical Document*, UNESCO, Paris, P. 213.
- Vijayalakshmi J 1980. Academic achievement and socio-economic status as predictors of creative talent. *Journal of Psychological Researches*, 24(2): 43-47.
- Wechsler D 1939. *The Measurement of Adult Intelligence*. Baltimore: Williams & Wilkins.
- Yaghoob N, Hossein M, Maral A 2014. The relationship between creativity and academic achievement. *Procedia – Social and Behavioural Sciences*, 114: 36-39.

Paper received for publication November 2016

Paper accepted for publication December 2016