EFFECT OF INTELLIGENCE ON ACADEMIC ACHIEVEMENT IN MATHEMATICS OF 8TH GRADE STUDENTS

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Abstract

The purpose of the study to ascertain the effect of intelligence on academic achievement of 8th grade students in Mathematics. The research study followed descriptive survey method of research and correlation techniques. A sample of 50 students of 8th grade standard was taken from a government secondary school of Puri district, Odisha. The investigator used Mixed Group Test of Intelligence developed by Dr.P.N.Mehrotra and collected intelligence score from the students and the achievement scores in mathematics are collected from previous summative test result. The result of the study shows a significant difference between the intelligence and academic achievement of students of 8th grade. It also shows that the intelligence of the students does not affect by their gender and locality.

Keywords: *Effect, Intelligence, Academic Achievement, Mathematics.*

Backdrop

Educational systems have been varying from time to time and country in accordance with the environment and the stage of human experience obtaining of a particular time and space. The aim of education is not only acquisition of information but also the development of that best of mind and attitude which will make us responsible citizens. Educationalist and psychologists concerned with educational setting are often confronted with the students who have above average scholastic aptitude but are very poor in their studies. An important question which often confuse many of us that why some students succeed in their studies, while others don't. This question sometimes considered to be closely related to learning than teaching.

Achievement of pupil in school may be affected by various factors like intelligence, study-habits, aptitude, interest, attitude towards school, different personality traits, socio-economic status etc. Academic Achievement (AA) can be defined as the excellence in all disciplines, in class as well as in extracurricular skills, punctuality, assertiveness, arts, culture etc. Academic Achievement (AA) plays a vital role in one's life because his fate is decided in the present competitive world. It helps the individual to attain high status in the society and improves the personality of the students. It had been rightly mentioned that in our society academic achievement more specifically Mathematical Achievement is considered as a key criterion to judge one's total potentialities and capacities. Hence, Mathematical academic achievement occupies a very important place in education as well as in the learning process.

Mathematics is a universal subject, so much a part of life that anyone who is participating member of society must know basic mathematics. The main goal of mathematics education in schools is the mathematisation of the child's thinking. Clarity of thought and pursuing assumptions to logical conclusions is central to the mathematical enterprise. There are many ways of thinking, and the kind of thinking one learns in mathematics is an ability to handle abstractions, and an approach to problem solving. All students must learn to think mathematically, and they must think mathematically to learn (Kilpatrick, Swafford, and Findel, 2001).

It is a fact that the teaching of mathematics in the present condition is not up to a satisfactory level. Everybody complains that the teaching method used for mathematics is not so well. The modern mathematics teachers are struggling to get their students' attendance in the class. Some students feel mathematics difficult, boring and to some extent useless. Actually, Mathematics is an art like music. It should be taught by teachers who love it. Instead of this we ask our children to learn Mathematics from teachers, who are bored, tired-and even afraid of it. (Anice James 2005, Clawson, 2004). The world today expects more from mathematics. The world of tomorrow may make more demands from Mathematics. Although mathematics is a subject having practical value but students cannot identify it and they feel it as impractical and dull. The interdisciplinary programs in mathematics make the subject more attractive and meaningful (George and Thomaskutty, 2007). Math achievement is one of the most studied phenomena in the context of the relationship between academic performance and intelligence. Academic performance measures are based on teachers' grades for different school subjects. In Odisha there are 35928 Primary and 20427 Upper Primary schools to provide education at elementary level. More 491 New Primary and 490 New Upper Primary schools opened under SSA to provide schooling in rural and urban areas as well. In context of Odisha standard 8th is considered as the get way between elementary and secondary education. As in secondary stage mathematics is more abstract than elementary level so it required basic strong foundation of mathematics in elementary level. A student is expected to know real numbers, rational numbers, and approximation of irrational numbers to rational number, four basic properties of numbers – the commutative, associative, closure, and the distributive, basic algebra, expressions and equations, division and multiplication of expressions, exponents, square roots and cube roots, data handling, and analysis, and visualizing the 3-D objects.

Rational of the Study

Mathematics introduces children to concepts, skills and thinking strategies that are essential in everyday life. It helps children make sense of the numbers, patterns and shapes they see in the world around them, offers ways of handling data in an increasingly digital world and makes a crucial contribution to their development as successful learners. Hence it is quite essential to introduce Mathematics in elementary stage so that it could help children to meet the demand of everyday life. So, it is essential to know the influence of other factors like intelligence on achievement of mathematics.

Narula (2007) was investigated on "study of academic achievement in mathematics in relation emotional intelligence in high school level" in Punjab. The samples were selected in multistage random sampling. The study found that students having high emotional intelligence achieved more than low emotional intelligence. Similarly, Chandra and Azimmudin (2007) of Lucknow studied upon the influence of intelligence and Gender on Academic Achievement of Secondary School Students of Lucknow City. They found that, there was no influence of gender on academic achievement but students having high IQ had better academic achievement than students of average IQ. Dandagal and Yarriswami (2017) investigated in the district of Karnatak and found that the students of secondary schools of Belgaum south had similar intelligence in terms of gender and locality. Intelligence directly influences the academic achievement. Sumathi (2018) conducted a study in Tamilnadu on the topic "study of intelligence and academic achievement in mathematics of secondary school students in Erode educational district". The investigator found a positive correlation between intelligence and academic achievement in mathematics of secondary school students.

Moenikia and Babelan (2010) conducted a study in Iran on the topic "A study of simple and multiple relations between mathematics attitude, academic motivation and intelligence quotient with mathematics achievement" and the results showed positive correlation between Mathematics attitude, academic motivation, and intelligence quotient with mathematics achievement. Sakia (2016) his study in Laxmipur district of Assam and concluded that intelligence of the students has positive effect on the academic achievement of the students. Kandeel (2016) topic of investigation was "Multiple Intelligences Patterns of Students at King Saud University and Its Relationship with Mathematics' Achievement" The purpose of this study was to determine the multiple intelligences patterns of students at King Saud University and its relationship with academic achievement for the courses of Mathematics.The result showed that there is impact of visual intelligence, bodily, logical, and sometimes social, musical and natural on the mathematics' achievement. Seemaichamy (2017) revealed a positive low correlation emotional intelligence and performance of mathematics of students at secondary level. Whereas, Pal (2017) studied that intelligence, source of income, number of family members (Family Type), occupation and house category were the main common predictors of Students achievement in Mathematics. Katoch (2017) studied on the topic "Academic achievement and intelligence among school students" in the district of Himanchal Pradesh and found that rural and urban students don't differ significantly on the variable of academic achievement and intelligence. Hence in the present study, an effort has been made to determine some effect of intelligence on achievement in mathematics of 8th grade students which could further help to know the interrelationship between various factors like intelligence

quotient, locality and gender with achievement in mathematics. Further the research has confined to urban and rural government schools of Puri district only.

Objectives of the Study

The study was undertaken with the following objectives:

1. To study the effect of intelligence on mathematics learning achievement of 8th grade students so as to classify the students.

2. To examine the relationship between level of intelligence and level of learning achievement in mathematics of 8th grade students.

3. To find out the differences between learning achievement in mathematics and intelligence with respect to gender and locality of 8th grade students.

Hypotheses

H1: There exists significant effect of intelligence on mathematics learning achievement of 8th grade students.

H2: There exists a significant relationship between the Mean mathematics learning achievement scores of 8th grade students with respect to different levels of Intelligence.

H01: There exists no significant differences between learning achievement in mathematics and intelligence of 8th grade students with respect to gender and locality.

Methodology

The present study followed descriptive survey method of research and correlation technique used to find out the relationship between Achievement in Mathematics and Intelligence. The population included all the 8th standard both male and female students of government schools situated in puri district. The sample for the present study consisted of 50 students of 8th standard from both urban and rural area consist of both male and female. Out of 50 ,25 students are taken from urban area and another 25 students are taken from rural area. Random sampling technique was used to select the sample for the study.

Data Collection

For collecting data, from the sample the investigator used Mixed Group Test of Intelligence developed by Dr.P.N.Mehrotra. The researcher collected intelligence score from the students and the achievement scores in mathematics are collected from previous summative test result.

Table 1: The sampling distribution

	MALE	FEMALE	TOTAL
URBAN	13	12	25
RURAL	13	12	25
TOTAL	26	24	50

Scoring: The intelligence of students is classified into seven levels with the corresponding scores from low to high i.e., very inferior, inferior, dull average, average, bright average, superior and very superior.

LEVELS OF INTELLIGENCE	SCORE
Very Superior	75+
Superior	64-75
Bright Average	54-64

Average	34-54
Dull Average	24-34
Inferior	13-24
Very Inferior	0-13

Data Analysis and Interpretation:

After successful completion of data collection, the gathered data was analysed by using the statistical method as the technique such as

- ❖ Mean
- ❖ Standard deviation
- ❖ T –test
- ❖ Pearson correlation

H1: There exists significant effect of intelligence on mathematics learning achievement of Class-VIII students.

Table 2

Level of intelligence	Levels of mathematics achievement					
	Low		Average		High	
	Students	%	Students	%	Students	%
Superior	0	0	2	4	6	12
Bright average	0	0	5	10	4	8
Average	5	10	17	34	0	0
Dull average	5	10	1	2	0	0
Inferior	4	8	1	2	0	0
Total	14	28	26	52	10	20

It is found that the mean (or average) intelligence for total students is and 44.8 the standard deviation is 14.92. The mean intelligence score shows that the students as a whole have obtained average level of intelligence and the value of standard deviation shows that the deviation of scores among the students is high.

H2: There exists a significant relationship between the mean mathematics learning achievement scores of Class-VIII students with respect to different levels of Intelligence

Table 3

Variables	No of students	R	Levels of significance
Academic achievement	50		
Intelligence	50	0.72	0.01

It is observed that the correlation coefficient between overall intelligence and the academic achievement in mathematics of the students is 0.72 which is positive and also significant at 0.01 level. It indicates that there exists a significant relationship between intelligence and academic achievement. Hence it is concluded that intelligence of the students has a positive

impact upon mathematics academic achievement.

H01: There exists no significant differences between learning achievement in mathematics and intelligence of Class-VIII students with respect to gender and locality

Table 4 :(Summary of Mean, Standard deviation, t value of the scores of intelligences on the basis of gender)

Gender	N	Mean	Mean difference	Standard deviation	t value	Significance
Male	26	44.57	0.47	15.49	0.91	Not significant
Female	24	45.04		14.62		

The mean (or average) intelligence score of the male students is 44.57 and standard deviation of scores is 15.49. The mean (or average) intelligence score of the female students is 45.04 and standard deviation of scores is 14.62. The mean difference of the male and female students is 0.47. It is observed that the calculated "t" value (t=0.91) is smaller than the tabulated value (t= 1.96) at 0.05 level of significance. Hence the null hypothesis, there is no significant difference in levels of intelligence of the students on the basis of gender is accepted.

Table 5:(Summary of of Mean, Standard deviation, t value of the scores of intelligences on the basis of Locality)

Locality	N	Mean	Mean difference	Standard deviation	t value	significance
Urban	25	46.04	2.48	15.46	0.56	Not significant
Rural	25	43.56		14.58		

The mean (or average) intelligence score of the urban students is 46.04 and standard deviation of scores is 15.46. The mean (or average) intelligence score of the rural students is 43.56 and standard deviation of scores is 14.58. The mean difference of the urban and rural students is 2.48. It is observed that the calculated "t" value (t=0.56) is smaller than the tabulated value (t= 1.96) at 0.05 level of significance. Hence the null hypothesis, there is no significant difference in levels of intelligence of the students on the basis of location is accepted.

Major Findings of The Study

❖ There exists significant effect of intelligence on academic achievement of mathematics of 8th grade students.

❖ There exists significant correlation between mathematics learning achievement and intelligence 8th grade students.

❖ There is no significant difference found between mathematics learning achievement of the 8th grade students in relation to their gender.

❖ There exists no significant difference in mathematics learning achievement of 8th grade students in relation to their locality.

❖ There exists no significant difference in intelligence of class viii students in relation to their gender.

Educational Implication of the Study

The implications of the study are -

❖ In schools' teachers should try to know the level of intelligence of students and should care them accordingly. The students with high level of intelligence should be care such that they can get interest from regular classes and for that teachers should provide extra stimulated work for them. For the students who have low level of intelligence, the teachers should arrange the class in such way that they can easily understand the lesson and can attain their level of academic achievement.

❖ Teachers should allow considerable elements of student's choice when designing activities and tasks for the intelligence because students perform well in the tasks which attract their interest.

❖ As mathematics helps to understand the world and provides an effective way of building mental discipline focus must be laid upon enhancing students' problem-solving attitude by enhancing their intelligence.

❖ The school teacher should give special attention to students with high intelligence to enhance mathematics performance. They should be oriented to take care of student's characteristics' especially with regard to mathematics learning achievement in order to make teaching learning process more interesting and effective. Students with low level of intelligence have low level of mathematics academic achievement. In order to enhance the academic achievement of students' teachers should give due importance to increase intelligence level of students by using suitable strategies.

Delimitation of the Study

❖ The study was only confined to 8th grade students.

❖ The location of the study was Puri district of Odisha.

❖ The study was conducted over 50 samples of 8th grade students only.

Conclusion

Based on the results it can be concluded that the predictor variable intelligence has an impact on mathematics learning achievement. It is found that the mean (or average) mark for total students is 49.14 and the standard deviation is 10.60. The mean mark shows that the students as a whole have obtained average level of academic achievement and the value of standard deviation shows that the deviation of marks among the students is high. In case of intelligence mean total students is and 44.8 the standard deviation is 14.92 The mean intelligence score shows that the students as a whole have obtained average level of intelligence and the value of standard deviation shows that the deviation of scores among the students is high. Hence student having high intelligence acquired high mathematics learning achievement as compared to average intelligence level students, the investigation also showed that no significant difference found between academic achievement and intelligence in relation to students' gender and locality

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