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INFLUENCE OF STUDENTS' ABILITY IN MATHEMATICS ON THEIR ACHIEVEMENT IN SECONDARY SCHOOLS OF KATSINA LOCAL GOVERNMENT AREA, KATSINA STATE

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Abstract
This research aimed to find the influence of student's ability on their overall achievement in secondary schools examinations. The research sampled five secondary schools using stratified random sampling techniques in Katsina local government area for fairness. Two research instruments were raised for the study. The instruments were the students September 2018 JSS results and a mathematics achievement test (MAT) developed by the researcher. Simple linear correlation was used to analyze the data collected. The result showed that there is a positive correlation of 0.7 between mathematics ability and achievement in other subjects.As a result of this finding, it is recommended that government should enrich our schools with adequate staff and facilities to improve student's mathematical abilities as a predictor for their overall achievement.

Keywords: Mathematics, Achievement, Academic Ability, Junior Secondary Schools, Correlation Coefficient.

Introduction

Mathematics is a subject that affects all aspects of human life. It is seen as a society's foundation for all scientific and technological knowledge. It is simply a vital tool for the socio-economic development of any nation. Eraikhuemen (2003) posited that a disciplined and ordered pattern of life can only be achieved through the culture of mathematics. Eguawon (2002) also opined that mathematics is a model for thinking, developing scientific situations, drawing conclusions as well as for solving problems. For Hornby (1985) achievement is the act of achieving or doing something successfully especially with efforts and skills.

Purpose of the study

The purpose of this research is to find how ability in mathematics influences overall student's academy achievement.

Review of related literature

Mathematics is usually a subject that students find very difficult in our secondary schools. This is despite the fact that it has wide applications in many areas of human endeavors. Many researchers have taken the pain to find out whether students who show good prospect in mathematics display the same in other subjects. Oyekanmi (2008) in his work on mathematical ability and gender as correlates of student's achievement found that there is no significant interaction effect of gender and numerical ability on student's achievement. Trembly, Garner

and Heipel (2000), in one of their studies found that mathematical ability contribute to the prediction of achievement in mathematics. Their findings were earlier suggested by Harlaw, Burhholder and Morrow (2002).

Research question

Based on the above problem this study intends to answer the following question
The contribution of ability in mathematics is not significant.

1. What is the relationship between mathematical ability and achievement in junior secondary schools?

Definition of terms used

The terms following terms are hereby defined as used in the research.

1. Achievement in mathematics: This will be a score of 70 and above from the mathematics achievement test (MAT) designed by the researcher.
2. Achievement: this will be defined as obtaining five credits and above in JSS III examination of the years 2018.

Research methodology

Population:

The population of this study was made up of all JSS III students of Katsina local government area of Katsina state.

Sample

A sample of five JSS schools out of the nine JSS schools in the local government area was selected. The numbers of Junior Secondary Schools were selected using random sampling without replacement.

However the number of students selected from each school was done using stratified sampling technique to take care of the significant variations in the population of the schools. With this sampling technique each schools was fairly represented. A class of forty (40) students was finally chosen consisting up of students from the five selected schools. These students also include both male and female.

Research instruments

Two instrument were used for this study

1. The JSS III final year results from the sampled schools of all subjects written in September 2018.
2. A mathematics achievement test (MAT) developed by the researcher covering topics in the JSS syllabus such as number and numeration, algebra, geometry, measurement, statistics, probability e.t.c. The test requires 40minutes of testing time and approximately 15minutes for administration. The test contained forty (40) objective questions covering the contents of the JSS mathematics syllabus. In this study achievement in mathematics is measured and taken for a student who scored 70% and above in the Mathematics achievement test (MAT) after administering the test. The questions were then marked. It was found that 22 of the students obtained 70% and above and they were therefore considered achievers in mathematics. The results of all the students were then juxtaposed with their JSS III results and analyzed.

Instrument validation

The mathematics achievement test (MAT) was given to forty (40) students in one of the schools in order to validate the instrument for investigation. The subjects used for this pilot study were however not included in the main study. Similarly the tests was administered to a chosen class of two of the sampled schools. After an interval of two weeks, the test was re-administered in order to calculate it's co-efficient of reliability using person's product moment correlation. The reliability coefficient was found to be 0.75 in the first school, while it was found to be 0.70 in the second school. These values were deemed adequate for operational purpose.

Data collection procedure

All the sampled schools in the local government were personally visited by the researcher. This was to enable the researcher understand the schools and prepare ground for the administration of the instrument for the research. Two days were used in the schools for the administration of the instrument. The research sought the assistance of a staff in one of the schools to administer and mark the mathematics achievement test (MAT).

The 2018 JSS III results of all the sampled students were similarly collected for the purpose of analysis.

A total of forty (40) students were involved

Data analysis procedure

The results were analyzed using spearman's rank correlation coefficient. The formula used for the analysis is follows:

$$\rho = 1 - \frac{6\sum (x-y)^2}{n(n^2-1)}$$

Results

Table I

Distribution of students by mathematics achievement

Total no. students	No of students who scored 70% and above	No of students who scored below 70%	Percentage of students who scored above 70%	Percentage of students who below 70%
40	22	18	55%	45%

Discussions: From the table above it could be seen that 55% of the students scored more than 70% in the mathematics achievement test and they are deemed high achievers while 45% scored less than 70%.

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Table II
Distribution of students by JSS III examination results

Total no. students	No of students with 5 credits and above	No of students with less than5 credits	Percentage of students with 5 credits and above	Percentage of student with less than 5 credits
40	32	08	80%	20%

Discussion: From the table above it could be seen that from the results collected 80% of the students have more than five credits while 20% have less than 5 credits.

Table III
Distribution of students who obtain 5 credits and above and those who scored 70% and above in MAT

	School A	School B	School C	School D	School E
Students who have 5 credit and above	8	9	6	7	10
Students who scored 70% and above in MAT	5	7	5	6	9

Table IV
Correlation between students who scored 70 and above students who scored 5 credits and above.

X	Rank x	y	Rank y	x-y	$(x-y)^2$
8	3	5	5	2	4
9	2	7	2	0	0
6	5	5	4	1	1
7	4	6	3	1	1
10	1	9	1	0	0
N=5					$\Sigma(x-y)^2=6$

$$\rho = 1 - \frac{6\sum(x-y)^2}{n(n^2-1)}$$

$$1 - \frac{6(6)}{5(24)}$$

$$1 - 0.3$$

$$0.7$$

Discussion
The above table shows that mathematics ability is very influential in the overall achievement of students since it has a direct correlation with the overall achievement of students. The direct correlation of 0.7 indicate that students who are high achievers in mathematics are likely going to perform well in other subjects.

Conclusion

Based on the findings of this write-up, it could be seen that ability in mathematics is likely playing a great role in the performance of students in other subjects. This is not surprising since mathematics is widely applied in many subject areas. A good knowledge of this subject can go a long in enhancing student's performance.

Recommendations

As a result of the findings of this research, the following recommendations are offered:

1. School authorities should endeavor to develop the student's mathematics ability since this will go a long way in improving students overall performances.
2. Even though mathematics is a compulsory subject in our schools, there is need to make obtaining a credit in it necessary for gaining admission into all courses and all tertiary institutions of the federation.
3. The teaching/learning of the subject should be improved by provision of adequate learning materials and professionally trained teachers.

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