



## Techno Science Africana Journal

Journal homepage: [www.technoscienceafricana.com](http://www.technoscienceafricana.com)



### RELATIONSHIP BETWEEN ABILITY AND ACHIEVEMENT IN MATHEMATICS AMONG SENIOR SECONDARY SCHOOLS STUDENTS IN WUDIL LGA. KANO STATE NIGERIA

Isa, S.G. , Mamman M.A. and Idris, A.Z.

Department of Computing and Mathematics Education, Kano University of Science And Technology, Wudil, Kano-Nigeria.

#### ARTICLE INFO

#### ABSTRACT

##### Keywords:

*Stylistics, Foregrounding, Deviation, Syntax, Extraposition and fronting*

*\* Corresponding Author:*

*This study investigated the relationship between Mathematics ability and achievement in five selected Senior Secondary Schools in Wudil Local Government Area of Kano State. Correlation method of research was used and Pearson Product Moment Correlation Coefficient (PPMR) was used to analyze the data collected. A sample of 206 senior secondary school class two was selected from a total population of 4,322 students. Mathematics Ability Test (MAT) designed by the researchers and validated by two Mathematics Education Specialists was used. The reliability coefficient of the instrument ( $r = 0.79$ ) was obtained using the split - half method. A major finding of the study was a positive correlation ( $r = 0.199, P \leq 0.05$ ) between the students with high ability and their achievement in Mathematics. It was recommended that school owners should provide the enabling environment that will develop as well as sustain students' Mathematics ability. Keywords: Mathematics ability, Mathematics achievement, Relationship Students.*

#### INTRODUCTION

It is a fact that without mathematics there is no science and subsequently without science no nation can develop technologically (Sunday, Akanmu & Fajemidagba, 2013). Ali (2014) regarded mathematics as the queen of science. Hassan (2004) is of the opinion that mathematics as a subject is now universally accepted as indispensable to sustainable development of any country.

The important role mathematics play is essentially derived from the cultural, utilitarian as well as the interdisciplinary role the subject attempts to inculcate in students. Hassan (2004) believed that mathematics as a subject is without argument now University accepted as an indispensable tool for self-reliance and

sustainable development of countries worldwide. Yakubu et al, (2017) asserted that any country wishing to develop in science and technology must pay due attention to the teaching and learning of mathematics.

Despite the huge importance of mathematics to nation buildings the subject continues to be seen as fearful and involves massive use of symbols and proofs . This might account for the high failure rate in the subject in public examination (Isa, 2016). The high rate of failure in the subject may be attributed to some factors such as students home background (Alika and Edosa, 2012), the way instructions are presented to the students (Nizoman,2013) and students mathematics ability level (Omiwale,2011).

**Statement of the Problem**

This study was designed to determine the relationship between ability and achievement in mathematics among Senior Secondary School Students in Wudil LGA of Kano State, Nigeria.

**Objectives of the Study**

The following are the objectives of the study:

- i. To determine the relationship between students with high mathematics ability and their mathematics achievements
- ii. To determine the relationship between students with medium ability and their mathematics achievement.
- iii. To determine the relationship between students with low ability and their mathematics achievements.

**Research Questions**

This study aims at answering the following questions:

- i. Is there a relationship in the mean scores of students with high mathematics ability and their mathematics achievement?
- ii. Is there a relationship in the mean scores of students with medium ability and their mathematics achievement?
- iii. Is there a relationship in the mean scores of students with low ability and their mathematics achievements:

**Hypotheses**

In this study, the following hypotheses were raised and tested;

- i. There is no significant relationship between the mean scores of students

with high ability and their mathematics achievement.

- ii. There is no significant relationship between the mean scores of students with medium ability and their mathematics achievement
- iii. There is no significant relationship between the mean scores of students with low ability and their mathematics achievement.

**METHODOLOGY**

**Research Design**

The research design used for this study is correlation survey research design. Adeyemi (2008) described a correlation survey as a collection of data from member of a population in order to determine the status of the population with regards to one or more variable. This design will help to determine what relationship exists between ability and achievement in mathematics.

**Population of the Study**

The population of the study was made up of all senior secondary students in Wudil L.G.A. It therefore comprises of 96 senior secondary school students selected from a total population of 4,322 students (Kano State Diary, 2017)

**Sample and Sampling Procedure**

Random sampling technique was used to select five public schools as the type of schools to be used for this study. From this sample, five intact classes were selected from five schools out of the 19 public secondary schools. The sample consists of 121 males and 85 females with an average of 16.7 years.

Table 1: Shows a sampling techniques on how five public schools were used for this study.

|         | <b>School A</b><br><b>GSSS</b><br><b>Wudil</b> | <b>School B</b><br><b>GSSS</b><br><b>Darki</b> | <b>School C</b><br><b>GSSS</b><br><b>Wudil</b> | <b>School D</b><br><b>GSSS</b><br><b>Darki</b> | <b>School E</b><br><b>GDSS</b><br><b>Wudil</b> |
|---------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| Males   | 43                                             | 40                                             | -                                              | -                                              | 38                                             |
| Females | -                                              | -                                              | 45                                             | 40                                             | -                                              |

**DATA COLLECTION**

**Instrument for the Study**

The data used in the study came primarily from two (2) sources namely:

- a) 2017 Senior Secondary School two qualifying examination results.

Qualifying examination prepared by the state Ministry of Education.

- b) Researcher designed Mathematics Achievement Test (MAT)

**Validity and Reliability of the Instruments**

Students qualifying examinations were prepared, conducted and marked by the State Ministry of Education. The content and face validity were assured. Mathematics teachers/lecturers are asked to validate such examination papers and results.

The Mathematics achievement test (MAT) was taken to mathematics Education Specialists for validation. To determine the reliability of the instrument (MAT) two schools not used in the main study were used for pilot trial. The results obtained were analyzed using Pearson Product Moment Correlation. A reliability coefficient index of 0.79 was obtained.

**DATA ANALYSIS AND PRESENTATION**

**Data Analysis Technique**

A t- test for independent sample was used to analyse the data obtained

**Method of Data Analysis**

The data generated for the study was analyzed using the statistical package for social science (SPSS) version 22. The hypotheses were tested at 0.05 level of

significance using multiple correlations. Multiple correlation method was used to find out the value of the relationship among high medium and low mathematical ability and students mathematics achievement.

Decision rule was taken in testing the null hypothesis based on comparing significant value and the critical value obtained at 0.05 level of significance. If the P - value is greater than the critical value at 0.05 level of significance, the null hypothesis will be accepted and concluded that there is no significant relationship between the variables. But if the P – value is less than the critical value at 0.05 level of significance, the null hypothesis will be rejected, with the decision that there is a significant relationship between the two variables.

**DATA PRESENTATION**

**Hypothesis Testing**

Null Hypothesis 1: There is no significant relationship between the mean scores of students with high mathematical ability and their achievement.

Table 2: Summary of Pearson Product - Moment Correlation between students with high mathematical ability and their achievement.

| Group | N   | Mean    | SD      | DF  | R     | P     |
|-------|-----|---------|---------|-----|-------|-------|
|       | 206 | 14.9130 | 1.09067 | 204 | 0.199 | 0.363 |
|       | 206 | 11.087  | 2.2343  |     |       |       |

The results presented in the table above indicated a positive significant correlation between the mean scores of students possessing high mathematical ability and their achievement in mathematics. N = 23, r = 0.199; P<0.05. Therefore, the null hypothesis on the correlation between students with high

mathematical ability and achievement is not significant.

Null Hypothesis 2: There is no significant correlation between the mean scores of students with medium mathematical ability and their achievement.

Table 3: Summary of Pearson product moment correlation between students with medium mathematical ability test and achievement.

| Group | N   | Mean   | SD     | DF  | r     | P     |
|-------|-----|--------|--------|-----|-------|-------|
|       | 206 | 11.530 | 1.0970 | 204 | 0.523 | 0.009 |
|       | 206 | 9.349  | 2.2439 |     |       |       |

The results presented in table above indicated a positive correlation between the mean scores of students with medium mathematical ability and their achievement. N =83, r = 0.286; p<0.05. Therefore, the null hypothesis on the

relationship between student with medium mathematical ability and their achievement in mathematics was rejected at 0.05 level of significance.

The answer to research question 2 is that, there is positive correlation between students with medium mathematical ability and their achievement.

Hypothesis 3: there is no significant relationship between the mean scores of students with low mathematical ability and their achievement.

Table 4: Summary of Pearson product - moment correlation between students with low mathematical ability test and achievement.

| Group | N   | Mean  | SD     | DF  | r     | P     |
|-------|-----|-------|--------|-----|-------|-------|
|       | 206 | 7.020 | 1.7580 | 204 | 0.675 | 0.000 |
|       | 206 | 6.060 | 1.9060 |     |       |       |

The results presented in table above indicated positive correlation between the mean scores of students with low mathematical ability and their achievement.  $N = 206, r = 0.675; P \leq 0.05$ . Therefore, the null hypothesis on the relationship between students with low

mathematical ability and their achievements in mathematics was rejected at 0.05 level of significance. The answer to the research question 3 is that, there is a positive correlation between students with low mathematical ability and their achievement.

Table 5: Correlation Analysis of High, Medium and Low ability Test and Mathematics Achievement.

| Group       | N   | X      | SD    | DF  | r      | P     |
|-------------|-----|--------|-------|-----|--------|-------|
| Mathematics | 216 | 7.946  | 2.818 |     | 1      | 0.000 |
| High MAT    | 23  | 14.913 | 1.040 | 204 | 0.119  | 0.588 |
| Medium MAT  | 83  | 11.530 | 1.096 |     | -0.329 | 0.002 |
| Low MAT     | 100 | 7.020  | 1.757 |     | -0.171 | 0.089 |

Table 5 above showed the correlation among high, medium, and low ability students and their achievement in mathematics as calculated using multiple correlation. There was a positive and significant correlation between the mean scores of students with high ability while there is negative/no significant correlation between the scores of students with medium and low ability and their achievement in mathematics. This hypothesis was rejected at  $P \leq 0.05$ .

**DISCUSSION**

Based on the results presented, the study found a positive correlation between students mathematics ability and achievement. This buttresses the finding of Omotade and Adeniyi (2013): Adesoji (2008) who claimed that numerical manipulations have practical applications in physics laws. It is also in support of Anyakoha (2008) findings. The result of the study also found a positive

correlation between students with medium and low mathematical ability and their achievement. This buttresses the findings of Omiwale (2011) who stated that learners are qualitatively different in their ability levels, cognitive structures and learning problems hence, the difference in the performances of the learners.

Hence, revealed that there was a positive correlation for students with high mathematical ability and their achievements. Therefore, the null hypothesis was rejected. This implied that there was a significant correlation between mathematical ability and achievement which buttresses the finding of Omotade and Adeniyi (2013).

**CONCLUSION**

The following conclusions can be drawn on the findings of this study. The study suggested that there is a positive correlation in the mean scores of students possessing high mathematics ability and their achievement.

Similarly positive correlation was equally observed among students with medium mathematics ability. In short there was a positive and significant correlation between the scores of students with medium and low ability and their achievement in mathematics.

### RECOMMENDATION

The following recommendations have been made based on the findings and conclusion made from this study:

1. Adequate mathematics education should be given to prospective student?
2. Individual differences in students ability, background and attitude should be taken into consideration by teachers.
3. School proprietors should provide schools with facilities that will develop and sustain students mathematical ability as it is a good predictor of students achievement.

### REFERENCES

- Adesoji (2008) managing studies attitude towards science the problem solving instructional retrieved from KrePublishers.com. Adeyerni (2000). Teachers teaching experience and students learning outcomes secondary schools in Ondo state, Nigeria *Asian Journal of Information Technology* Vol.7, Pp 201-209
- Ali, H.O. (2014). How to generate critical mass women in mathematical science in Africa. *Journal of mathematical sciences education* vol.3, No.1, pp 381-396.
- Alika H. I. &Edosa O.S. (2012). Relationship between broken homes and academic achievement of secondary school students in Orelu Local Government area of Edo State Nigeria *college student journal* V42, No 2 pp256-263
- Anyakoha, E.U &Ukiwe, U.C(2008). Towards incorporating environment education into Nigeria college of education (NCE) *Home economics curriculum journal* at home economics research association of Nigeria. HERA V9 pp53-59.
- Hassan, o, (2014). An investigation into factors affecting science secondary school students. *Journal of research in science teaching* 1 (3), Pp 255,-261
- Isa, S.G, (2016). Effect of Hausa language in the teaching and learning of mathematics in secondary schools in Kano state. *Techno science Africana journal*. V ol.13,No.2. Pp 103-106.
- Kano state diary (2017). A publication of Kano State government.
- Omiwale J.B, (2011), Relationship between problem-solving ability and achievement in physics among senior secondary school students in Osun state Nigeria. *Journal of African education research*. 11(1),6 Pp. 323-342.
- Omotade, A,A, A&Adeniyi, o,o, (2013). mathematics skills as predictors of physics students performance in senior secondary school. *International Journal of Science and Research (IJSR)*, 4,2
- Sunday, Y., Akanmi M.A &Fajemidagba, M,O (2016 ), Fostering in education; The impact of mathematics labor tory approach. *Jouirnal of Mathematical Sciences Education*. Vol4, NQ,1 Pp 601-608,
- Yakubu, et, al (2017). Relationship between mathematics ability and achievement in physics in senior secondary school in Wudil, L.G,A, Kano state, Nigeria, unpublished undergraduate thesis, Department t of science education, KUST ,Wudil Kano State, Nigeria,