

IMPACT OF STUDY HABITS MEDIATION ON SENIOR SECONDARY SCHOOL STUDENT'S PERFORMANCE IN GEOMETRY IN ZARIA EDUCATION ZONE, KADUNA STATE IN NIGERIA

¹Dr. U. A. Ginga; ²Dr. M. Tsoho & ³Zaharaddeen Aliyu

^{1,2,3} Department of Science

Education, Faculty of

Education Ahmadu Bello

University, Zaria- Nigeria.

Abstract

This study investigated the Impact of Study Habits Mediation on Senior Secondary School Student's Performance in Geometry in Zaria Education Zone, Kaduna State in Nigeria. The population of this study was three thousand two hundred and one (3,201) SS II Students. Two hundred and five (205) students were sampled for the study. Simple random sampling technique was used to select two coeducational secondary schools in the study area. One of the schools was randomly selected as the experimental group, while the other as the control group. Same method was employed to select intact classes. The experimental group was taught Geometry using Study Habits Mediation Lesson Plan (SHMLP) while the control group was taught using Conventional Lecture Method (CLM). Quasi-experimental research method was employed using pretest, posttest design. Geometry Performance Test (GPT), with $r = 0.85$ was used to collect data. Data collected were analyzed using descriptive statistics and t -test at $\alpha=0.05$ level of significance. Results revealed that students exposed to SHMLP performed better than their counterparts who were taught using CLM. The study concluded that student's Study Habits enhanced performance of students in learning Geometry concepts. It was recommended among others that teachers should assist their students to cultivate good Study Habits in order to improve their performance in Geometry.

Key words: Study Habits, Performance, Mediation & Geometry

Introduction

The Nigerian educational system is broadly categorized into three different levels i.e. Basic level, the senior secondary and tertiary levels. The secondary level of education serves as an intermediary level between the Basic and the tertiary level of education. The secondary level thus serves, as a link between the lower level and the tertiary. Mathematics is one of the core subjects taught at all levels of education in Nigeria; this is because of its importance as a subject that touches all human endeavors.

Elaine (2013) defined Mathematics as the science that deals with the logic of shape, quantity and arrangement. Elaine further explained that Mathematics is all around us, in everything we do; as it is the building block for everything in the daily lives of

mankind, including mobile devices, architecture (ancient or modern), art, money, engineering and even sports. Due to the importance of Mathematics to the society, its teaching was made compulsory from the Basic levels through secondary school levels in Nigeria as reflected in the National Policy on Education, (FRN, 2013). Some concepts of Mathematics taught at all levels of education in Nigeria include; - Algebra, Geometry, Number and Numeration, and Statistics. Zakariyya (2014) opined that Mathematics provides the structure and methodology of the study of virtually all the important modern disciplines, and also provides an important key to understanding of the world mankind live.

Geometry is one of the branches of Mathematics that involves the study of spatial relationship (position, shape and size). The environment we live in is full of geometrical figures. Geometry has also, helped man to think and find out the value of image produced and how to combine two or three –dimensional shapes to create new ones in the environment. For example pyramids, squares and cylinders are joined together in artistic work, architectural textile design and other aspects of socio-cultural surroundings. One of the main reasons for teaching Geometry is that it enables the interpretation of the environment.

Despite the importance of Mathematics in the life of the learner as well as a requirement for admission into all tertiary institutions of learning in Nigeria the results from the final SSCE of students continue to be on the low side. Study habits are variables that play an important role in the academic performance of students. According to Akpan and Emeya (2015), study habits are those techniques such as summarizing, note taking outlining or locating materials which the learners employ to assist themselves in the efficient learning of materials at hand.

The general performance of students in Mathematics and Geometry in particular has been very low. Research reports revealed that students manifest poor performance in both internal and external examinations. Akinsola (2013) and Popoola (2013) observed that, this low; under achievement in Mathematics in external examinations still exist. The Chief Examiner's report (2022), on the conduct of Senior Secondary School Certificate Examination of the West African Examination Council (WAEC) in Mathematics stated that there was no significant improvement in the performance of candidates when compared with those of previous years. This is a case for worry.

Factors identified by scholars as responsible for the persistent failure in Mathematics at SS level includes: poor methods of teaching, poor study habits, high students-teacher ratio, poor and nonconducive environment among others. Study Habit have been described by Ebele and Olofo (2017) as one of the factors whose effect could be damaging to students as their performance could be negatively affected if not given proper attention by educational stakeholders.

Most of the studies carried out to improve students' academic performance in Mathematics at the secondary schools level centered on teaching methods, instructional materials, use of laboratories, class size and so on. However, few studies focus on Study Habits. It is on this foundation that the researchers sought to conduct this research.

Objectives of the Study

The main objective of this research was to analyze the Impact of Study Habits Mediation on

Performance in Geometry among Senior Secondary School II Students in Zaria Education Zone, Kaduna State, Nigeria. The specific objectives are to: -

1. verify the impact of Study Habits Mediation on the mean performance scores of Senior Secondary School II Students in Geometry and their counterparts exposed to the Conventional Lecture Method.
2. find out the impact of Study Habits Mediation on the mean performance scores of male and female Secondary School II students exposed to Study Habits Mediation in Geometry.

Research Questions

The following research questions were asked to guide the study.

1. What is the difference between the mean performance scores of Secondary School II students taught Geometry using Study Habits Mediation and their counterparts taught using the Conventional Lecture Method?
2. Is there any difference between the mean performance scores of male and female Secondary School II students taught Geometry using Study Habits Mediation?

Research Hypotheses

The following null hypotheses were formulated based on the research questions and tested at $P \leq 0.05$ level of significance.

- H₀₁: There is no significant difference between the mean performance scores of Senior Secondary School II Students taught Geometry concept using Study Habits Mediation and those taught using the Conventional Lecture Method.
- H₀₂: There is no significant difference between the mean performance scores of male and female Senior Secondary School II Students taught Geometry concept using Study Habits Mediation.

Methodology

This research employed the pretest and posttest quasi-experimental control design. Quasiexperimental design was adopted because the researchers have no total control over the subjects. The population of the study was made up of three thousand two

hundred and one (3,201) out of the 15 co-educational public Senior Secondary School II Students (consisting of 1,121 females and 2,080 males) in the study area with an average age of seventeen (17) years. The study involved two groups; experimental group and control group. The sample of the study consists of two hundred and five (205) SS II students comprising 56 females and 149 males. Simple random sampling was used to select the sample for the study. Two schools were selected out of the 15 schools for the study. Hence, one intact class was selected from each of the schools. The two schools with their intact classes were sorted and randomly assigned to experimental and control groups respectively. The experimental group was taught Geometry using Study Habits Mediation and the control group was taught the same concept using the Conventional Lecture Method.

The treatment was conducted within six weeks. At the end of the treatment exercise, a posttest was administered to all the two groups of the students in order to determine the effectiveness of the treatment. The instrument used for data collection was Geometry Performance Test (GPT). It consists of two sections: Section A and B, Section A was for student's bio data while section B consists of 50 items multiple choice questions adopted from WAEC past question papers. The instrument was validated by three experts from Science Education Department, Ahmadu Bello University, Zaria. The reliability coefficient of GPT was computed to be 0.85 using test retest method.

Prior to the treatment GPT was administered as a pretest to both groups to ascertain their comparative equivalence. After the pretest, the experimental group was taught Geometry using Study Habits Mediation for 6 weeks and the control group was taught same concept for the same period using Conventional Lecture Method. At the end of the treatment exercise, GPT was readministered to both experimental and control groups as posttest to determine the effect of the treatment. Scores of the posttest were collated and recorded for analysis after marking using descriptive statistics of mean and standard deviation to answer the research questions and independent t-test to test the corresponding null hypotheses at $p \leq 0.05$ level of significance as presented in the results.

Results

The results of this study are here presented based on the research questions raised and their corresponding null hypotheses.

Research Question One:

What is the difference between the mean performance scores of the Secondary School II students taught Geometry using Study Habits Mediation and their counterparts taught using the Conventional Lecture Method?

To answer research question one the mean performance scores and standard deviations from the posttest scores were computed for both the experimental and control groups. Summary of the findings is shown in Table 1

Table 1: Descriptive Statistics for Students' Performance in Experimental and Control Groups

| Group | N | Mean | STD | Mean difference |
|--------------|-----|-------|------|-----------------|
| Experimental | 108 | 33.76 | 2.43 | 11.66 |
| Control | 97 | 22.10 | 4.73 | |

Table 1. Shows that the mean score for the experimental group is 33.76 with a standard deviation of 2.43. The control group recorded a mean score of 22.10 with a standard deviation of 4.73. The mean difference is 11.66. Therefore, a considerable mean difference exists between the mean performance scores of the students taught Geometry using Study Habits Mediation and their counterparts taught same concept using Conventional Lecture Method.

However, the corresponding null hypothesis one was tested to ascertain whether the difference in mean was statistically significant or not.

Null Hypothesis One:

There is no significant difference between the mean performance scores of Senior Secondary School II Students taught Geometry using Study Habits Mediation and those taught using the Conventional Lecture Method.

To test null hypothesis one, the posttest mean performance scores of the students taught Geometry using SHM were computed and compared to the posttest mean performance scores of those taught using CLM. Independent sample t – test was used at $p < 0.05$ and the summary was presented in

Table 2: Summary of Independent Sample t-test for Posttest Performance of Experimental and Control Groups.

| Group | N | Mean | STD | Mean Diff. | Df | T comp. | t crit. | P-value |
|--------------|-----|-------|------|------------|-----|---------|---------|---------|
| Experimental | 108 | 33.76 | 2.43 | 11.66 | 203 | 22.53 | 1.96 | 0.000 |
| Control | 97 | 22.10 | 4.73 | | | | | |

$p \leq 0.05$

Table 2 shows a p-value of 0.000 observed at degree of freedom of 203. This p-value is less than the 0.05 alpha level of significance, indicating that there is a significant difference between the mean performance scores of students taught Geometry using Study Habits Mediation and their counterparts taught the same concept using Conventional Lecture Method. The difference so observed is in favor of the experimental group, which was exposed to Study Habits Mediation, implying that Study Habits Mediation significantly enhances secondary school II students' academic performance in Geometry concept than Conventional Lecture Method. Therefore, null hypothesis one which states that: There is no significant difference between the mean performance scores of Senior Secondary School II Students taught Geometry using Study Habits Mediation and those taught same concept using Conventional Lecture Method, is hereby rejected.

Research Question Two:

Is there any difference between the mean performance scores of male and female students exposed to Geometry using Study Habits Mediation?
 To answer research question two, posttest mean performance scores and standard deviation of male and female students taught Geometry in the experimental group after treatment were computed. Summary of the findings is presented in Table 3.

Table 3: Descriptive Statistics for Posttest mean Performance between Male and Female Students in Experimental Group

| GENDER | N | Mean | STD | Mean difference |
|--------|----|-------|------|-----------------|
| Male | 78 | 33.96 | 2.38 | |
| | | | | 0.73 |
| Female | 30 | 33.23 | 2.51 | |

Results of the descriptive statistics in Table 3 showed that the mean score of male students in the experimental group is 33.96 with a standard deviation of 2.38, and the female students have a mean score of 33.23 with a standard deviation of 2.51. The mean difference is 0.73. This shows that both male and female students have almost the same mean performance scores when taught Geometry using Study Habits Mediation. However, further analysis was conducted to ascertain whether the difference in mean was statistically significant and this led to the analysis of hypothesis two as presented in Table 4.

Null Hypothesis Two:

There is no significant difference between the mean performance scores of male and female Senior Secondary School Students taught Geometry using Study Habits Mediation.

To test null hypothesis two, the posttest mean performance scores of male and female students in the experimental group were analyzed using independent sample t – test statistics and the results were presented in Table 4

Table4: Independent Sample t-test for Posttest mean Performance between Male and Female Students in Experimental Group.

| GENDER | N | Mean | Std.D | Mean diff. | Df | t comp. | t crit. | P- value |
|--------|----|-------|-------|------------|-----|---------|---------|----------|
| Male | 78 | 33.96 | 2.38 | | | | | |
| | | | | 0.73 | 106 | 1.40 | 1.96 | 0.163 |
| Female | 30 | 33.23 | 2.51 | | | | | |

P > 0.05, t-computed < 1.96 at DF 106

Result of the independent t-test statistics in Table 4 shows a p-value of 0.163 observed at degree of freedom of 106. This p-value is greater than the 0.05 level of significance indicating that there is no significant difference between the mean performance scores of male and female students taught Geometry using Study Habits Mediation in the experimental group. Hence, the null hypothesis two which states that there is no significant difference between the mean performance scores of male and female SSII students taught Geometry using Study Habits Mediation is hereby accepted and retained.

Discussions

The data collected based on the research questions were computed using simple statistics of mean and standard deviation. The collected data based on hypotheses were analyzed using t-test statistics. The findings were discussed as follows:

The results presented in Table 2 showed that students in the experimental group had a higher mean performance score than those in the control group. The difference was significant as indicated in the table. This signifies that students taught Geometry using Study Habits Mediation had a significantly higher mean performance scores than those taught using Conventional Lecture Method. By implication, the Study Habits Mediation was able to foster a significantly better performance than the Conventional Lecture Method. The significant difference implies rejection of the null hypothesis that states there is no significant difference in mean performance of SS II students taught Geometry using Study Habits Mediation and their counter parts taught same Geometry concept using Conventional Lecture Method is hereby rejected.

This finding is in agreement with Jimoh (2012) who also discovered that study habits have influence on the academic performance of Senior Secondary School Students. The finding of this study is also in support of the studies of Osa-Edoh, Alutu (2012), Joseph (2013), Odiri (2015) and Musa (2021). These researches revealed that students exhibited significance improvement in performance as a result of the treatment with Study Habits compared to the Conventional Lecture Method. This is why Ebele (2017) suggested that students cannot perform and improve their academic performance without developing their Study Habits. Study Habits was able to foster performance of more subjects because it encouraged active participation, and meaningful learning among students in the process of instructions.

From the findings in Tables 4 it was revealed that there was no significant difference in the mean performance of male and female students when exposed to Study Habits Mediation. This showed that male and female students in the experimental group have approximately equal means. This showed that Study Habits Mediation is gender friendly in terms performance. This finding is not consistent with the findings of Joseph (2013) whose study revealed that female students performed better than their male counterparts in the experimental group. Therefore, the null hypothesis which states that there is no significance difference between the mean performance of male and female students exposed to Study Habits Mediation is hereby rejected. The Study Habits Mediation in this study equally improved the performance of male and female students probably because it aids deeper understanding of learnt concepts, and reduces gender disparity.

Conclusion

Based on the findings of this study, the following conclusions were made:
Academic performance in Geometry will be enhanced by the use of Study Habits Mediation. Study Habits Mediation promotes meaningful and concrete learning. The use of Study Habits Mediation is gender- friendly as it boost academic performance of both male and female students.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Mathematics teachers and school guidance counselors should collectively guide students to develop good Study Habits.
2. Secondary school Mathematics teachers should frequently employ the Study Habits Mediation in teaching difficult and abstract Mathematics concepts like Geometry.
3. For an improved performance, there is the need for the students to develop good reading and study habits. Study habits are one of the factors that largely influence students' performance

References

- Akinsola, M. O. (2013). Helping Teacher time underachievement in Mathematics the Attitude Dimension. Paper presented at the Honoring Ceremony of Fellows of Man (FMAN) Oyo State MAN.17 (2), 24 - 30
- Akpan, A.R., & Emeye, H.R.N. (2015) "Anxiety in Academic Achievement Situations". *Journal of Abnorm. Soc. Psychol.*, 6(1), 207-215.
- Ebele, U. F., & Olofu, P. A. (2017). Study habit and its impact on secondary students' academic performance in Biology in Federal Capital Territory, Abuja. *Educational Reviews*, 12(10), 583588, <https://doi.org/10.5897/ERR2016,3117>
- Elaine, J.H. (2013). What is Mathematics? <http://m.livescience.c0./38936-mathematics.htm>.
accessed 11/12/2016
- Federal Republic of Nigeria (2013). National Policy on Education. 6th Edition, Printed by NERDC Press, Yaba, Lagos.
- Jimoh, S. (2012) Study Habits and Academic Performance of Secondary School Students in Rivers-West Senatorial District of Rivers State Nigeria. *European Journal of Training and Development Studies*. 5(3), 8-18.
- Joseph. O. A. (2013). Effect of Study Habits Mediation Package on Senior Secondary Chemistry Students' Achievement and Retention of Electrolysis in Giwa Education Zone, Kaduna State, Nigeria. Unpublished PhD. Dissertation, Department of Science Education, Ahmadu Bello University, Zaria Kaduna State, Nigeria.
- Musa, H. (2021). Effects of an Intervening Package on Academic performance and Attitude of students in chemistry of non-metals in Colleges of Education in Kano State, Nigeria. Unpublished MEd Thesis, Faculty of Education, Ahmadu Bello University, Zaria.
- Odiri, O. E. (2015). Relationship of study habits with mathematics achievement. *Journal of Education and Practice*, 6(10), 168-170. Retrieved from <http://bit.ly/2GAAr3I>.
- Osa-Edoh, G. I. & Alutu, A. N. G. (2012). A survey of students study habits in selected secondary schools: Implication for Counselling. *Current Research Journal of Social Sciences*, 4(3), 23- 28. Retrieved from <http://bit.ly/2UVSg.JA>.

Popoola, G.A (2013). Study behavior, Study Habits, Achievement Motivations of University Students and Study Advisory Services. *Literacy Information and Computer Education Journal*. 4, (1), 130 - 150.

WAEC (2022): *The West African Examination Council: Chief Examiners Report on Senior School Certificate Examination*, Lagos, Nigeria.

Zakariyya, K. (2014). Effect of Metal Cognitive skill on achievement and attitude of senior secondary students: A Discuss. *Journal of Mathematical Association of Nigeria*, 39(6), 64-7.