EMPERICAL STUDY OF CORRELATION BETWEEN MATHEMATICS KITS AND MATHEMATICS ACHIEVEMENT OF STUDENTS WITH VISUAL IMPAIRMENT

By

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Abstract

This study examined an empirical relationship between mathematics kits and mathematics achievement of learners with visual impairment. Survey/experimental research design was used in the study. The population of this study was Pre-NCE students with visual impairment in Oyo Federal College of Education (Special), Oyo. A sample of twenty (20) Pre-NCE visually impaired students was randomly selected for the study. Researchers' self-designed mathematics achievement test and mathematics kits rating scale were used to test the mathematics achievement of the students and availability and usability of kits respectively. The two proposed hypotheses were tested using Pearson product moment correlation coefficient. Findings of the study revealed that, there exists a very high positive correlation between mathematics kits and mathematics achievement of students with visual impairment. Therefore, mathematics kits and computer for teaching mathematical concepts to persons with visual impairment play a vital role. It was also found that, mathematics kits and computer (when properly used) can boost the mathematics education of persons with visual impairment. It was recommended among other things that government should embrace supply of mathematics laboratory kits to special schools to bridge the existing mathematics gaps between sighted and visually impaired students.

1.0   Introduction

1.1   Background of the study

Education was derived from a Latin Word "educare" meaning "to bring up"," to lead out" or "to raise up". To educate means acting in order to bring out fully all the potentialities of an individual. To educate means the process of helping the society to which he has been to live, work and die (Jekayinfa and Kolawole, 2008). Education is the total efforts of a community to raise its social, economic and political standard of life. It can be said to be whole process of the development of an independent and integrated personality. It entails training and acquisition of special skill, knowledge, attitude and values needed by an individual to be responsible and which would enable him to contribute his own quota to the growth of the society of which he is a member.

Globally, education is viewed as an essential pathway to making a total child. As noted by Wolfenson (2000), Yara and Otieno (2010), it is a fundamental human right. Furthermore, Okeke (2007) points out that through education, individuals acquire knowledge, skills and attitude that are necessary for effective living. However, quality education cannot be achieved without educational resources which play an important role in the achievement of educational goals and objectives. The main purpose of education is to develop the individual so that he can be useful to himself, his family and the society at large.

According to Adeogun and Ofisila (2008), educational resources can be categorized into four groups that is human, material, physical and financial resources. Instructional materials serve as a channel between the teacher and the students in delivering instructions. They may serve as the motivation on the teaching-learning process. It is used to get the attention of the student and eliminate boredom. It is endorsed that academic achievement of student is related to individual differences between students, socio-economic features in which they grow up and educational

resources of students' current school. The relationship between socio-economic features and academic achievement of learners (including students with visual impairment) has been extremely studied within national and international context in recent years (Tomul and Savasci, 2012). However, there is a dearth of the studies about the relationship between mathematics kits of school and mathematics achievement of students with visual impairment.

Adeogun and Osifila (2008) found that there are positive relationship between academic achievement of students and physical, financial and materials resources. In PISA (Ministry of National Education, 2003) report, it is shown that the lack of physical resources has a negative effect on students and it hinders learning in students. Obe (2014) stated that, visual Impairment is the consequence of a functional loss of vision rather that the eye disorder itself. Eye disorder which can lead to visual impairments can include retinal degeneration, albinism, cataracts, glaucoma, muscular problem that result it in visual disturbance. Cornea disorder, diabetic, retinopathy congenital disorders and infection. Eniola (2003) defines the visual impairment as total blindness is the inability to tell light from dark, or the total inability to see.

Therefore, the visually impaired students manipulate real objects in learning the skill. The students could touch, move, holds the object and feel it tactually for the effectiveness of the concept taught.

Since educational resources are important in students learning, we can hypothesize that the poor performance could be partly due to shortage of or non-utilization of mathematics kits while teaching visually impaired students. The problem of poor performance in mathematics as a subject is global and it is a serious concern to parents and education stakeholders (Valverde and Schmidt, 1997; Mudulia, 2012). This problem is made worse in developing countries by the existing digital devices, poverty and other problems unique to the third world especially Nigeria. Despite the importance placed on mathematics, researchers (Amazigo, 2000; Agwagah, 2001; Betiku, 2001; Obioma, 2005; Maduabum and Odili, 2006; Okereke, 2006; Okigbo and Osuafor, 2008) had observed that students lack interest in the subject and perform poorly in it.

1.2   Statement of the problem

There in a general impression that science education is not achieving the desired objective especially with high incidence of student poor performance in mathematics and other science subjects. Looking into the past SSCE results most student failed mathematics which made them unqualified to write to unified tertiary matriculation examination (UTME) therefore settling for Pre-NCE and can be seen as result /consequence of inadequacy and unavailability of mathematics kits. Performances of visually impaired students in mathematics at Pre-NCE and NCE levels over the years poses great concern to the special College of education, special educators and society at large.

1.3   Purpose of the study

The broad objective of this study is to find out the relationship that exists between mathematics kits and mathematics performance among Pre-NCE students with visual impairment in Federal College of Education (special), Oyo. Specifically this study looked into;
1. The empirical relationship between availability of computer and academic performance of visually impaired students in mathematics.
2. The empirical relationship between availability of mathematics kits and visually impaired students' academic performance in mathematics

1.4   Research Hypotheses

The following hypotheses were tested using Pearson Product Moment Correlation Coefficient:

❖ There is no significant relationship between availability of computer (with high audibility) and mathematics achievement of visually impaired students in mathematics.
❖ There is no significant relationship between availability of mathematics kits and academic performance of visually impaired students in mathematics.

1.6   Scope of the Study
The researcher intends to cover twenty Pre-NCE students who offer mathematics in Federal College of Education (special), Oyo, Oyo state.

1.7   Significance of the Study
This study will help the government and school management to known the importance of mathematics kits and resources in mathematics laboratory to the mathematics education of student with visual impairment and provide adequate resources for better performance of this seemingly neglected group of persons in mathematics.

2.0 METHODOLOGY
2.1   Research Design
This study adopts survey/experimental research design.. This research design is adopted in order to see the relationship that exists between the mathematics kits and mathematics performance of visually impaired of Pre- NCE students in Federal College of Education (Special), Oyo.

2.2   Variables in the Study
The independent variables in the study are mathematics kits and computer while the dependent variable is the visually impaired students' academic performance.

2.3   Population
The target population of this study comprised of all visually impaired Pre-NCE students in the Federal College of Education (Special), Oyo, Oyo State.

2.4   Sample and sampling techniques
The expected respondents for this study were 20 visually impaired Pre-NCE students offering mathematics. The research made use of purposive sampling technique in selecting sample for the study.

2.5   Instrumentation
The instruments used for this research were:
a. **Mathematics achievement test:** This is meant to measure the visually impaired Pre-NCE students' academic performance in mathematics.

b. **Mathematics Kits Rating Scale:** A self designed rating scale is used to measure the availability of mathematics kits and computer. The rating on the checklist is as follow:
   ➢ Not Available   0
   ➢ Available   1
   ➢ Available and Adequate   2
   ➢ Available and Sufficiently Adequate   3

> ➤ Available, Sufficiently Adequate but not well-utilized   4
> ➤ Available, Sufficiently Adequate and well-utilized   5

2.6   Validity of Instrument

The instruments were given to experts in the field of measurement and evaluation for face and content validity, in order to assess the degree at which the instrument measures what it supposed to measure.

2.7   Reliability of Instrument

In order to test for the trustworthiness of the instruments, a test-retest reliability method was used, in which the research instrument was administered to the different group of people at a time interval and the scores obtained was correlated. Spearman rank correlation coefficient of the two scores was found to 0.929. It implies that the instrument is 92.9% reliable.

2.8   Procedure for Administration

The researcher personally distributed the mathematics achievement test (MAT) and the checklist that contains the teaching/learning resources rating scale to the students. The research instruments were collected the same day, so as to avoid missing of research instrument.

2.9   Method of Data Analysis

The research hypotheses were tested using Spearman Ranking Correlation Coefficient, so as to test for the relationship that exists between the variables under study.

3.0 RESULT AND DISCUSSION
3.1 HYPOTHESES TESTING
3.1.1 HYPOTHESIS ONE

H_{01}:   There is no significant relationship between availability of computer (with high audibility) and mathematics achievement of visually impaired students in mathematics.

3.1.2 Decision Table

	X(Computer)	Y(Math's Score)	R_{xy}	Decision
N	20	20		High positive correlation exits between x and y. Reject hypothesis One.
Sum	104	140	0.955	

Table above shows that, there exists a very high positive correlation between computer and mathematics achievement of students with visual impairment. The value 0.955 is almost1.0 an indication that, a close and positive correlation exits between the two variables.

3.1.3 HYPOTHESIS TWO

H02: There is no significant relationship between availability of mathematics kits and mathematics acievement of visually impaired students in mathematics.

3.1.4 Decision Table

	X(Maths Kits)	Y(Math's Score)	R_{xy}	Decision
N	20	20		High positive correlation exits between x and y. Reject hypothesis Two.
Sum	124	140	0.956	

Table above clearly shows a high positive correlation of 0.956 between availability/ utilization of mathematics Kits and mathematics achievement of students with visual impairment. We therefore reject the null hypothesis two that, there is no significant relationship between availability of mathematics kits and mathematics achievement of visually impaired students in mathematics.

4.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1 SUMMARY

The study aimed at finding out the following:

I. The relationship between mathematics kits and mathematics education of students with visual impairment.
II. Effect of computer in teaching mathematical concepts to students with visual impairment.

The study was done in Federal College of Education (Special), Oyo, Oyo State.

The Instruments used to gather the data were Mathematics Achievement Test and Mathematics Kits rating Scale. A simple random sampling technique was used to select the respondents.

Findings in research revealed that mathematics kits are important in lesson delivery to students with visual impairment. It was also established that, computers (audible sound) play vital roles in mathematics education of children with visual impairment in which the tools add to their knowledge of what has been learned theoretically without voice notes.

The following facts were found as findings to this study:

- Most of the students with visual impairment have no access mathematics kits as some were touching the kits for first time during the study.
- Teachers of students with visual impairment do not bother to use computer voice note as teaching aid in mathematics.
- Available little computers sets and mathematics kits were not been utilized optimally for students with visual impairment.

4.2 CONCLUSION

Mathematical concepts and the components included in mathematics for children with visual impairment are to be practiced continually to gain mastery over the subject. Unlike other subjects, mathematics warrants enormous amount of attentiveness, reasoning ability, problem solving skills, practical works.

Further, from the study it was found out that most teachers have considered that mathematics as a field beyond the capacity of the visually impaired to master, because its content is rich with visually presented concepts and information. Hence, mathematics teachers and the children with visual impairment need to be aware of novel ideas and technological advancements in the field of mathematics. Adoption of suitable teaching methodologies, proficiency in mathematical Braille Codes and skill in using mathematical devices, knowledge of adaptation technique with relevant instructional strategies supplemented by right teaching-learning materials etc. will certainly transform the teaching-learning.

4.3 RECOMMENDATIONS

The following recommendations based on the findings of this study were made:

- There should be frequent in-service training for mathematics teachers in the use of mathematics kits to manage the children with visual impairment.

- The supply and use of mathematics kits and computer sets in special schools must be taken with all seriousness be government.
- Instruction practices should be coupled with real-life activities that will encourage active and purposeful learning
- There should be frequent screening of the children in the school to determine their visual activity.
- More visual impaired students should be encouraged to study mathematics beyond junior secondary school.
- Much time should be given to the visually impaired to execute his or her mathematics instructions both in examination, exercises and in demonstration lessons.

4.4   SUGGESTIONS FOR FURTHER RESEARCH

Mathematics has been a problem for the visually impaired persons, thereby making them to think that, mathematics is a death trap.

In the light of this, it would be expedient to research into the perception of the visually impaired towards studying mathematics beyond the level of the Junior secondary school.

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