GASPRO INTERNATIONAL JOURNAL OF EMINENT SCHOLARS, VOL. 12 NO 1 FEBRUARY 2025, GERMANY. ISSN: 2630-7200 (Hardcopy), 2659-1057 (Online)

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IMPACT OF HOME RESOURCES ON ACHIEVEMENT IN FRACTION CONCEPT AMONG SECONDARY SCHOOL STUDENTS IN MKPAT ENIN LOCAL GOVERNMENT AREA, AKWA IBOM STATE.

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ABSTRACT

The study investigated the use of home resources as instructional resource on junior secondary students' academic achievement in fractions in Mkpat Enin Local Government Area of Akwa Ibom State. Three research questions and corresponding research hypotheses guided the study. A quasi-experimental research design specifically, pre-test post-test non-randomised control group design was used. The population of the study consists of 2076 junior secondary school two (JS2) mathematics students in all Government owned co- educational secondary schools in Mkpat Enin Local Government Area in Akwa Ibom State during the 2023/2024 academic session. The study sample size of 114 (Male,? And Female,?) Junior Secondary School class Two (JSS2) Students were selected using criterion sampling technique. The instrument used for data collection was a researcher – developed 50- item 4-optioned multiple choice test tagged: Mathematics Achievement Test (MAT) with a reliability index of 0.79, determined using test-retest method. The data collected were analyzed using mean, standard deviation to answer research questions and Analysis of Covariance (ANCOVA) to test hypothesis at 0.05 level of significance. The results showed a significant difference in the academic achievement of students taught fractions using home resources and those not exposed to home resources. It can be concluded from the findings that students taught mathematics using home resources achieved better and retained significantly better when compared with their counterparts taught using charts. Also, gender was found not to be a significant factor affecting students' achievement in the study. As such, the recommendation made was that mathematics teachers should make effective use of home resources in teaching the concept of fractions.

Keywords: Home Resources, Achievement, Fraction.

INTRODUCTION

The ministry of education is not just trying to punish students by making mathematics a compulsory subject in our educational system. Mathematics is essential for our daily tasks. One cannot just make it through a successful day without using some sort of basic mathematical skills. We use mathematics every day if we must successfully perform real-life skills like grocery shopping, cooking, measurements of all sorts and tracking our finances. What makes mathematics special is that it's a universal language, that is, a powerful tool with the same meaning across the

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globe. Though languages divide our world, numbers unite us. Mathematics allow us to work together towards new innovations and ideas (Crowe, 2022).

Despite these numerous benefits of mathematics, many students experience roadblocks and hurdles in the study of mathematics. Some mathematics difficulties experienced by students include increasing level of complexity, Fear of failure, anxiety, abstractness, understanding of concepts, principles and mathematical relationships with other subjects, memorizing of formulae, interpretation of symbols, and many other difficulties (Crowe, 2022), Nisbet, 2019, Radiamoda, 2024).

The issue of academic achievement in mathematics has become a focus of many educators. The alarming issue in mathematics could be discussed from the social aspect and each individual point of view (Murugan and Rajoo, 2013). The social aspect includes learning environment which seems to affirm the consistency of relationship between learning environment and students' cognitive as well as effective outcomes (Ashby and McNary, 2011).

The issue of academic achievement in mathematics has been of great concern to many educators. Barowski and Carter (2021) defined academic achievement as the amount of academic content a student learns in a specific period. This can be in any way a student has achieved his or her short- term or long-term academic goals within an academic setting. They went ahead to state that academic achievement must be measurable, which is the reason distinct goals are used as a defining characteristic. There is a time parameter that measures the amount of the academic success a student has garnered. Testing and assessments are usually performed to gauge students' academic achievement. Drew (2023) explained the meaning of academic achievement as the level of success or achievement attained by an individual in an academic setting. It encompasses a broad range of factors including grades, test scores, research outcomes and overall academic performance. Academic achievement is valued by both educational institutions and employers. /blog/training-the-difference-methods)

The teaching and learning of Mathematics has always been a challenge for educators and students alike. Traditional methods often rely heavily on abstract concepts and pencil-and-paper exercises, which can make it difficult for students to grasp mathematical concepts and see their real-world applications. However, recent educational research has highlighted the importance of hands-on, experiential learning approaches that engage students and connect mathematics to their everyday lives. One key advantage of using home resources in mathematics instruction is their ability to provide real-world context (Wright and Rowland, 2017). Research has shown that students often struggle to connect abstract mathematical concepts with real-life applications. By incorporating home resources, such as kitchen scales, measuring cups, or thermometers, into mathematical tasks, educators can bridge the gap between theory and practice. Studies have indicated that this integration of real-world context enhances student engagement and promotes a deeper understanding of mathematical principles (Johnson, 2017).

Home resources can facilitate mathematical communication by providing concrete objects that students can manipulate and discuss. For instance, collaborative activities involving resources, can encourage students to explain their reasoning, justify their solutions, and engage in mathematical discourse. Studies have demonstrated that the use of home resources as tools for communication can enhance students' ability to articulate mathematical ideas, develop precise language, and engage in mathematical discussions (Kaiser and Dick, 2023).

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The use of home resources in mathematics instruction can contribute to equity and accessibility in education. Many students have prior knowledge and experience with home resources, making them familiar and relatable tools for mathematical learning. By leveraging this familiarity, educators can create inclusive learning environments that cater to students' diverse backgrounds and experiences. Moreover, home appliances are often readily available and affordable, reducing barriers to access and ensuring that all students can participate in hands-on mathematical activities (Sàiz and Espinel, 2013).

Resources in the home that can be used to teach fractions are : cups, pails, juice bottles, window frames, measuring scales, spoons, among others.

A fraction shows part of a whole. This whole can be a region or a collection. The word fraction is derived from the Latin word 'fractio' which means 'to break'. The Egyptians, being the earliest civilization to study fractions, used fractions to resolve their mathematical problems, which included the division of food, supplies, and the absence of a bullion currency. In Ancient Rome, fractions were only written using words to describe a part of the whole. In India, the fractions were first written with one number above another (numerator and denominator), but without a line known as the fraction bar. It was the Arabs, who added the line which is used to separate the numerator and the denominator. Fractions represent the parts of a whole or collection of objects. A fraction has two parts. The number on the top of the line is called the numerator. It tells how many equal parts of the whole or collection are taken. The number below the line is called the denominator. It shows the total number of equal parts the whole is divided into or the total number of the same objects in a collection (Nisbet, 2022).

In mathematics, a fraction refers to a part or portion of a whole thing or a collection of things. It is usually written as a ratio of two integers separated by a solidus(/) or a vinculum. It shows how many parts or portions are given to the first person (example, Susan = 1/8) and how many parts or portions are given to the second person (example, Tom = 2/8).The number on top of the solidus/vinculum is called the Numerator and the number under the solidus/vinculum is called the Denominator (Crowe, 2019).

STATEMENT OF THE PROBLEM

Mathematics have been evidently giving tough time to learners in our educational system. Many learners have difficulty in mathematics when transiting from primary to secondary school with a serious decline in motivation, interest and achievement. Many of the learners even have preconceived ideas of abstractness. Teachers inadequate use of instructional materials worsens matters in making mathematics look like a useless adventure (Petterson and Xenophontos, 2023). Hence, this research work, intending to use home resources to teach mathematics to junior secondary school students, in a bit to reduce the abstractness and thereby increasing the achievement of students in Mkpat Enin Local Government Area, Nigeria.

OBJECTIVES OF THE STUDY

The aim of this study was to assess the use of home resources in teaching mathematics, on the achievement of junior secondary students using the concept of fraction.

Specifically, the study sought to:

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i.   determine the achievement of students taught mathematics using home resources and those taught using charts;
ii. determine the achievement of male and female students taught mathematics using home resources and those exposed to charts

RESEARCH QUESTIONS

The following research questions were posed to guide the study:

i.   What is the mean achievement scores of students taught mathematics using home resources and those taught using charts?
ii. What is the mean achievement scores of male and female students taught mathematics using home resources and those exposed to charts?

RESEARCH HYPOTHESES

i.   There is no significant difference between the mean achievement scores of students taught mathematics using home resources and those taught using charts;
ii. There is no significant difference between the mean achievement scores of male and female students taught mathematics using home resources and those exposed to charts.

METHODOLOGY

Design of the Study

The Design for this study is quasi-experimental research design using the pretest posttest non-randomized control group design. This is because intact classes where used. Also, the administrative setup in the school is such that students were already organized in classes and the administrators would not allow the classes to be disorganized for the purpose of the Study.

Area of Study

Mkpat-Enin is a town and a Local Government Area (LGA) in Akwa Ibom State in Nigeria's south-central region. It is around 185 m (607 feet) above sea level. Mkpat Enin LGA has an area of 322 square kilometres (124 sq mi) and it's the second largest local government area in Akwa Ibom state. The LGA is located within the industrial belt extending from Eastern Obolo, Etinan, Oruk Anam, Onna, to Ikot Abasi. The people are traditionally Ibibio speakers. The population was about 178,000 in 2006. The area is rich in oil and natural gas; oil was discovered in Ikot Akpa/Ekop as early as 1953. Forest reserves in the local government area include timber and palm produce.

Population of the Study

The population of this study comprised all Junior Secondary two (JS2) mathematics students in all Government owned co-educational secondary schools in Mkpat Enin Local Government Area. There were 2076 Junior secondary two (JS2) mathematics students in Mkpat Enin Local Government Area for 2023/2024 session. (Local Education Committee, Mkpat Enin Local Government Area 2022).

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Sample and Sampling Technique

The sample of 114 JS2 students in two co-educational secondary schools in the study area were selected for the study using criterion sampling technique. The criteria used were: the school must be co-educational, must have presented candidates for Basic Education Certificate Examination (BECE) examination for not less than ten years and must have qualified Mathematics teachers with more than five years of teaching experience. Simple random sampling technique was used to select one intact class from the two secondary schools, among others, that met the criteria for the study. The selected schools were randomly assigned as experimental group and control group.

Instrumentation

The research instrument is a researcher made test titled "Mathematics Achievement Test" (MAT). It consisted of two sections, A and B. Section A elicits background information relating to the students such as name of school and gender while section B comprised 50 multiple choice objectives test items. Each item has options A, B, C and D with only one correct answer and three distracters. The questions were selected from a pool of multi- choice questions from WAEC past questions on the concept of Fractions. The Test was used to elicit the scores for pretest and posttest of students on the concept of fractions when taught using home facilities.

Validation of Instrument

The instrument: Mathematics Achievement Test (MAT) was submitted for validation to two lecturers in the Department of Science education, University of Uyo, and two selected secondary schools' teachers for face validation while the content validation was done using table of specification. Their scrutiny bordered on the usability of the instrument by the test takers, and the appropriateness of the instrument. All the corrections and comments made up the final research instrument which was then submitted to the researcher's supervisor

Reliability of Instrument

To Further strengthen the Research Instrument, the twenty (20) multiple choice test item were administered to a trial group of fifty (50) JS3 student of the same population who do not form part of the main sample for the study. The test-retest method was used to determine the reliability. The test was administered to the mathematics students on the permission of their principal and an assistance of the mathematics teacher. After two weeks the same test (but reshuffled) was administered again to the same students and the result recorded. The two result will subjected to Pearson Product correlation coefficient and a reliability index of .79 was obtained.

Method of Data Collection

The researcher personally visited the Principal and Mathematics teachers of the two selected public secondary schools with an introductory letter to obtain permission to use their schools for the study and also to seek for the cooperation of the mathematics teachers of the selected class (JS3) to assist in carrying out the study. One (JS 3) mathematics teacher in each school served as research assistants. The study lasted for four weeks; the first week was for visitation and training of the research assistance on the modalities of the research work, while the

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second week was for administering pretest and introducing the concept of Calculus to the student. The third and fourth week was for teaching the concept and administering of posttest.

Method of Data Analysis

Mean and standard deviation were used to answer research questions and Analysis of Covariance (ANCOVA) to test the hypotheses at 0.05 level of significance.

Presentation of Results

Research Question one

i.   What is the mean achievement scores of students taught mathematics using home resources and those taught using charts?

Table 1:

Mean and Standard Deviation of Students' Posttest Scores using pretest as covariate for students taught Using home resources and charts.

Method	N	X	SD
Home Resources	60	13.95	2.76
Charts	54	10.81	1.18

Source: Field work (2023/2024)

As shown in Table 1, the mean achievement score of students taught mathematics using resources is 13.95 while those taught using chart is 10.81. It can be inferred from the mean scores that, students taught using home resources had a higher mean score when compared to those taught using charts.

Research Question Two

i.   What is the mean achievement scores of male and female students taught mathematics using home resources and those exposed to charts?

Table 2:

Mean and Standard Deviation of Students' Posttest Scores using pretest as covariate for male and female students taught using home resources.

Gender	N	X	SD
Male	51	13.04	2.76
Female	63	15.35	13.96

Source: Field work(2023/2024)

As shown in Table2, the mean achievement score of male students taught mathematics through the use of home resources is 13.04 while their female counterparts had a mean score of 15.35. It can be inferred from the mean scores that female students taught using home resources achieved better than their male counterparts when taught using home resources.

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Hypothesis One

There is no significant difference between the mean achievement score of students taught mathematics using home resources and those taught using charts.

Table 4:

Analysis Of Covariance Of Students' Post Achievement Scores taught using Home Resources and Charts Using Pretest Scores as Covariate.

Source of Variation	SS	Df	MS	F_{cal}	P-value$_{cal}$
Pretest	240.65	1	240.65	93.94	.00
Teaching Aids(Home resource)	295.94	1	295.94	115.53	.00
Residual	284.35	111	2.56		
Total	820.94	113	7.26		

*=Significant at .05 level of significance

As shown in Table 4, the calculated F-value, 115.5 of teaching aids(home resources and charts) was found significant at 0.05 level. Therefore the null hypotheses stating that there is no significant difference between the mean achievement score of the students taught mathematics using home resources and those taught using charts, is rejected. This implies that there exist a significant difference between the mean achievement scores of students taught mathematics using home resources and charts.

Hypothesis Two

There is no significant difference between the mean achievement score of male and female students taught mathematics using home resources.

Table 5:

Analysis Of Covariance Of Students' Post Achievement Scores given their gender taught using Home Resources and Charts Using Pretest Scores as Covariate .

Source of Variation	SS	Df	MS	F_{cal}	P-value$_{cal}$
Pretest	384.39	1	384.39	3.53	.06
Gender	205.74	1	205.74	1.89	.17
Residual	12083.85	111	108.86		
Total	12673.98	113	112.16		

*=Significant at .05 level of significance

As shown in Table 5, the calculated F-value, 1.89 of teaching aids(home resources and charts) was found significant at 0.05 level. Therefore the null hypotheses stating that there is no significant difference between the mean achievement score of the students taught mathematics using home resourves and those taught using charts, is retained. This implies that there exist a significant difference between the mean achievement scores of students taught mathematics using home resources and charts.

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DISCUSSION OF FINDINGS

The findings on the difference between the mean achievement score of students taught mathematics using home resources and those taught using charts indicated a significant difference. Students taught mathematics using home resources achieved significantly better than those taught using charts. The findings could be attributed to the fact that home resources are great motivational tool as students' interest increased when taught using it. The findings corroborates the findings of Ogan and Ibibio, (2022) which found out that students taught mathematics using home resources showed improvement. The findings of the study are in line with that of Udofia and Uko(2023) who found out that home resources enhanced more and improved significantly the achievement of students in mathematics than charts in Akwa Ibom State.. The findings of this study are also in consonance with the work of Rohani, (2020) who found out that there was a significant difference in mathematical achievement between the home resources group and charts.

The findings on the difference between the mean achievement score of male and female students taught mathematics using home resources and charts indicated a non-significant difference. The findings could be as a result of the fact that both male and female students' interest was stimulated by the use of home resources. It appealed to both male and female students thereby boosting their achievements. The findings of the study corroborates the study of Emaikwu, Iji and Abari, (2023) whose study revealed that both male and female students in experimental group achieved the same and also showed similar interest in statistics when determining the effect of home resources on Junior Secondary school students' interest and achievement in mathematics.

The findings on the difference between the mean retention scores of students taught mathematics using home resources and those taught using charts indicated a significant difference. Students taught mathematics using home resources retained significantly better than those taught using charts. The findings could be attributed to the fact that home resources is a tool capable of capturing and maintaining the interest of students. The findings is in line with the findings of Abari, Gimba, Hassan and Jiya(2023) whose study revealed that students taught mathematics using home resources instructional package retained higher mean scores than those taught using charts while determining the effect of home resources instructional package on secondary school students' retention in mathematics in Markurdi metropolis of Benue state. Similarly, finding revealed that the finding is in conformity with the study of Olojede, Bolaji and Musa (2017) whose findings revealed that the use of ICT in teaching the concept of Geometry contributes towards raising the students' retention ability in Geometry.

CONCLUSION

It can be concluded from the findings that students taught mathematics using home resources achieved better and retained significantly better when compared with their counterparts taught using charts. Also, gender was found not to be a significant factor affecting students' achievement in the study.

RECOMMENDATIONS

Based on the findings and the conclusions reached, the following recommendations were made:

i)   Teachers of mathematics should embrace and adopt the use of home resources in teaching mathematics.

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ii)   Educational policy makers such as National Education Research Deveelopment Council (NERDC), Curriculum planners and Ministry of Education should incorporate the use of home resources in the curriculum

iii)   Mathematical organizations such as Mathematical Association of Nigeria (MAN) and Science Teachers Association of Nigeria (STAN) should organize training programs, workshops and seminars on the use of home resources in the classroom for teachers.

ACKNOWLEDGEMENT

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