

# Effect of Improvised Instructional Materials on Academic Performance of Pupils In Mathematics In Ilorin South L G A, Kwara State

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**Abstract:** *This study examined how students' academic success in mathematics in the Ilorin South Local Government Area of Kwara State was impacted by improvised teaching materials. Pre-test and post-test control group quasi-experimental research design was used in the study. A simple random selection strategy was used to choose the sample from all primary one students in the two public and private schools in Ilorin South Local Government Area of Kwara State. Data were gathered using the study tool known as the Pupils Mathematics Achievement Test (PMT). Using Pearson Product Moment Correlation, the reliability index of PMT ( $r = 0.86$ ) was calculated (PPMC). Using inferential statistics from the Analysis of Covariance, the study's seven research hypotheses were created and evaluated at a significance level of 0.05. (ANCOVA). The study's findings demonstrated that students' academic performance was significantly impacted when given access to improvised educational resources when learning mathematics. The academic performance of kids in mathematics was not significantly impacted by gender, despite the fact that school types had a major impact on that performance. Suggestions were made based on the study's findings.*

## Introduction

Everybody uses mathematics one way or the other to solve life problems, mathematics is the bedrock and an indispensable tool for scientific, technological and economic advancement of any nation (Unameh, 2011). Mathematics is a subject that has direct relationship with other subjects who is intimately connected to daily life and everybody's life-long planning, therefore mathematics is a subject that education and human life cannot function effectively without (Unameh, 2011). The federal republic of Nigeria made mathematics a core (obligatory) subject in the national policy on Education (NPE) for all students in primary and secondary schools in Nigeria due to the significance of mathematics in national development (FGN, 2004).

Mathematics concepts are taught in abstract, this may be because some of the mathematics teachers think that mathematics instructional materials for teaching concepts are not in existence even when they are available, there is this complain of lack of money by the mathematics teacher, this maybe one of the reasons for students continuous failure in public mathematics examination in Nigeria (Agwagah2001).

Teaching and learning are expected to be made possible through didactic materials, as outlined by Obanya (2001). As a result, learners participate better in class activities; children are also equipped with problem solving skills that are important for daily living (Waigera, 2013). Kochhar (2012) also opined that educational resources are important tools for learning and teaching. To broaden concepts and pique students' interests in the subject, he proposed that teachers discover the required tools for education to supplement what textbooks supply. According to (Abolade, 2009), the benefits of instructional materials include being inexpensive to develop, helpful for teaching a big class of students at once, and motivating pupils to pay attention and increase their interest.

Akinleye (2010) attested that practical actions and the use of instructional materials by the teacher are necessary for effective teaching and learning in order to make learning more vivid, rational, realistic, and pragmatic. (Umoren, 2004) agreed that effective teaching and learning activities require the use of instructional materials. Teaching aids are usually helpful in supporting the sense organs, according to (Ekpo, 2004). Although instructional materials are crucial resources that can facilitate learning practically and information acquisition, they are not always easily available in Nigerian schools, which results in learners performing poorly in government 3 tests (AbduRaheem, 2014). According to Josua (2007), educational resources include anything that is used to support, enable, influence, or promote the acquisition of knowledge, competencies, and skills. According to Riveire (2006), improvisation is a useful teaching tool.

Abdu-Raheem(2014) encouraged teachers to make their own teaching materials because they greatly improve students' full engagement in the lesson and allow for student and teacher debate and clarification of ideas and issues. Due to insufficiency or teachers' attitudes regarding the use of instructional materials, instructional materials appear to be neglected in the teaching and

learning process despite their relevance. In many schools in Nigeria, there is a severe lack of basic instructional resources. While money is an issue, there are other factors at play that must be considered in order to produce and distribute suitable teaching materials for Nigerian schools. In 2006 the West African School Certificate results show that out of all pupils who took the test, 23% had answers between A1 and C6, while 73% had answers between D7 and F9.

Dada (2006) asserts that improvising educational materials entails the act of creating and utilizing substitute resources designed to facilitate instruction. According to Ikwuas and Onwiodike (2006), improvising materials entails the choice and application of pertinent instructional components of the teaching and learning process in the absence or scarcity of standard teaching and learning materials for the purpose of effectively realizing specified educational goals and objectives. The use of improvised materials in the mathematics classroom, according to Abimbade (2004), aids in the proper introduction of new skills, the development of comprehension, and the demonstration of the right method to accomplish things.

However, It's been noticed that different researchers may have carried out projects on attitudes, interest, factors, perceptions of teacher and Students improvisation and achievements of mathematics. However, no study has been conducted on the utilization of homemade materials in primary schools in Kwara State's Ilorin South Local Government Area. Only at the secondary level has experimental study been conducted, and it has only focused on a single area of mathematics, such as geometry, despite recommendations that more research be conducted at lower levels of schooling. This demonstrates why this study is necessary.

One may wonder why so many pupils have such hard time learning mathematics even most adults passed through all these problems while growing up, mathematics has never been a favourite subject of most learners this has impacted many life's negatively. It is disappointing to learn that despite the value Nigeria's educational system places on mathematics, low test scores have continued to be reported in recent years. Many struggled to learn and remember basic mathematics facts. Pupils sometimes get confused when the figures are changed. Pupils may have troubles recognizing numbers. They may take a long time to be capable to tell time. Many pupils may not be able to tell time correctly through primary school education. Then it would have been much better if mathematics teachers use different strategies to teach this may include: Bringing mathematics to pupils level, making use of adequate and relevant instructional materials, motivating and also promoting hands on activities in the class, welcoming mistakes made, providing more examples, learn to teach from concrete to abstract, linking mathematics with day to day activities and, most importantly, the use of improvised instructional materials, many researchers have tried many methods to improve performance of children in mathematics without success, this study intends to examine how the usage of improvised teaching materials affects the performance of elementary school students.

### **Research Hypotheses**

The following research hypotheses were tested:

**Ho1:** The academic performance of students in mathematics is not significantly impacted by improvised teaching materials.

**Ho2:** The gender of students' academic performance in mathematics is not significantly impacted by improvised instructional material.

**Ho3:** Based on the types of schools, there is no discernible impact of improvised instructional material on students' academic achievement in mathematics.

**Ho4:** Gender and improvised instructional material have no discernible impact on students' academic achievement in mathematics.

**Ho5:** The academic performance of students in mathematics is not significantly affected by the regular use of improvised instructional materials or the type of school.

**Ho6:** The academic performance of students in mathematics is not significantly affected by the interaction of gender and school type.

**Ho7:** There is no significant interaction effect of improvised instructional material, gender and school type on the academic performance of pupils in mathematics

### **Methodology**

Pre-test, post-test, control group, and quasi-experimental research designs were all used in this study. For the purpose of evaluating the students' mathematical knowledge, comprehension, and application, a table of specifications was created. The 2x2x2 factorial design was chosen to evaluate the study's hypotheses. The experimental and control groups are included in the first two factorial levels, male and female gender was included in the second factorial level of the design, and school type—which will include both private and public schools—was included in the last factorial level.

A table indicating the factorial design to be used in the study.

Groups	Pre test	Treatment	Post test
Experimental Group	O <sub>1</sub>	X <sub>1</sub>	O <sub>2</sub>
Control Group	O <sub>3</sub>		O <sub>4</sub>

Where:

O<sub>1</sub> – Pre-test of the experimental group, X<sub>1</sub> – Treatment for the experimental group, O<sub>2</sub> – Post test of experimental group, O<sub>3</sub> – Pre-test of the control group, O<sub>4</sub> – Post test of control group.

The factorial matrix that was employed in this study is 2 x 2 x 2.

**Showing the factorial matrix**

Treatment	Pupils' Gender	School Type	
		private	Public
Improvised instructional materials	Male		
	Female		
Control group	Male		
	Female		

All students in primary one classes from both public and private schools in Ilorin South Local Government Area, Kwara State, were selected to participate in the study. Four schools were chosen as the sample size because the study is exploratory. According to Kwara State Universal Basic Education Board, Ilorin 2018, there are a total of 261 schools in the Ilorin south local government area of Kwara State, including 59 public schools and 202 private schools. In each of the sampled schools, students in primary one were chosen. Multistage sampling was used to choose a sample of students. The initial step entailed choosing local government schools at random. Two public schools and two private schools were chosen at the second stage, totaling four schools. In Ilorin South Local Government, there are 2 public schools and 2 private schools out of a total of 202 schools.

The PMT, a tool created by researchers, was used to collect data (Pupils Mathematics Achievement Test). There were made-up instructional tools used. The teaching package of students' mathematics achievement test (PMT), improvised instructional guide (IIG), and conventional instructional guide was also a research tool used in this study (CIG). The stimulation tool was a hybrid of a conventional and improvised instruction manual. The instruments were all verified. Mathematics Achievement Test (PMT) for students; the researcher created the tool. There were two portions, numbered 1 and 2. The participants' demographic data, such as school name, school type, gender, class, and subject, was requested for Part 1. Part 2's math-related 10 multiple-choice questions had three possible answers (A to C). The test was hand scored, with one mark given for each correct response and zero for each incorrect one. The maximum mark that could be earned was 10 points. Improvised instructional guide (IIG): The research assistants in the experimental group followed this instructional guide. There were four lessons in it, The topic, technique, length of the lesson, teaching aids, and substance of the four weeks were covered in the guide's major feature, which also made reference to the unique

treatment plan for each week. The project manager and academics from the department of early childhood and primary education approved the improvised instructional guide. The guide was amended based on their advice.

Traditional instruction manual (TIM): The instrument used to instruct students in the control group was a traditional instructional handbook. Each of the four lessons had three steps: an introduction, a presentation, a conclusion, and an evaluation. The project manager and the academics from Kwara State University's Department of Early Childhood and Primary Education approved the instructional guide. Each lesson's guide was updated based on their suggestions. The instrument's reliability was assessed using the test-retest procedure. A trial test was conducted in the same Local Government Area, which does not contain the chosen schools, to ascertain the students' reliability regarding the outcomes of consistent usage of improvised instructional materials in the subject. The dependability index of PMT (0.86) was computed using Pearson Product Moment Correlation (PPMC).

## RESULTS

The analysis of the data and the study's conclusions are presented in this chapter. **Demographic Characteristics**

**Table 2: Distribution of the Pupils Based on Gender**

Gender	Frequency	Percentage
Male	21	45.7
Female	25	54.3
Total	46	100.0

Table 2 displays the distribution of students by gender. Twenty-one responders were men, or 45.7 percent of the total, while twenty-five were women, or 54.3 percent of the total. It is clear that there were more female respondents than male students.

**Table 3: Distribution of the Pupils Based on School Type**

School Type	Frequency	Percentage
Public	33	71.7
Private	13	28.3
Total	46	100.0

Table 3 shows the distribution of pupils based on gender. 33 of the respondents representing 71.7% were public school pupils while 13 of them who represent 28.3% were private school pupils. It is apparent that public school respondents were more in number.

## Research Hypothesis

**Ho1:** There is no significant effect of improvised instructional material on the academic performance of pupils in mathematics.

**Table 3: Summary of evidence from Analysis of Covariance (ANCOVA) demonstrating a significant impact of improvised educational materials on students' academic achievement in mathematics**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected model	1867.033 <sup>a</sup>	8	233.379	.603	.769	.118
Intercept	49379.910	1	49379.910	127.686	.000	.780
Pre_test	647.447	1	647.447	1.674	.204	.044
Gender	116.611	1	116.611	.302	.586	.008
Treatment	289.644	1	289.644	.749	.003	.020
School type	293.309	1	293.309	.758	.034	.021
Gender * treatment	59.411	1	59.411	.154	.697	.004
Gender * school type	8.970	1	8.970	.023	.880	.001
treatment * school type	31.613	1	31.613	.082	.777	.002
Gender * treatment * school type	26.362	1	26.362	.068	.796	.002
Error	13922.211	36	386.728			
Total	258964.000	45				
Corrected total	15789.244	44				

a. R Squared = .118 (Adjusted R Squared = -.078)

The impact of improvised instructional resources on pupils' academic progress in mathematics is clearly shown in Table 4. Finding 1 ( $F(1,45) = .749$ ;  $p = 0.05$ ;  $2 = 0.02$ ) indicates that students' academic performance in mathematics was significantly impacted by improvised instructional materials. The effect size is shown by 2 percent. The first theory is refuted as a result. To determine the amount of the treatment, Table 4 shows the estimated marginal mean score.

**Table 4: Estimated Marginal Mean Score Of Effect Of Improvised Instructional Material On The Academic Performance Of Pupils In Mathematics**

Treatment	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control	70.833 <sup>a</sup>	6.410	57.832	83.834
Experimental	77.408 <sup>a</sup>	4.078	69.137	85.680

According to Table 4, students taught using improvised lesson plans performed better on average (mean = 77.408) than students exposed to the conventional group (mean = 70.833). Ho2: The gender of students' academic performance in mathematics is not significantly impacted by improvised instructional material. According to gender, Table 3 demonstrates a strong impact of improvised teaching material on students' academic achievement in mathematics. The results showed that there is no gender-based difference in the significance of the influence of improvised instructional material on students' academic performance in mathematics ( $F(1,45) = .302$ ;  $p > 0.05$ ;  $2 = 0.008$ ). As a result, hypothesis 2 is not disproved.

**Ho3:** Based on the type of school, there is no discernible impact of improvised instructional material on students' academic achievement in mathematics.

Based on the type of school, Table 4 demonstrates the strong impact of improvised instructional material on students' academic achievement in mathematics. The results showed that, depending on the type of school, there is a substantial impact of improvised teaching material on students' academic performance in mathematics ( $F(1, 45) = .758$ ;  $p = 0.05$ ;  $2 = 0.021$ ). 2.1% is the effect size. As a result, idea 3 is disproved. Table 5 shows the predicted marginal mean score in order to estimate the size of the treatment.

**Table 4: Estimated Marginal Mean Score Of Effect Of Improvised Instructional Material On The Academic Performance Of Pupils In Mathematics based on school type**

School Type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PUBLIC	70.813 <sup>a</sup>	3.662	63.386	78.240
PRIVATE	77.429 <sup>a</sup>	6.657	63.928	90.930

Table 5 shows that children taught with improvised instructional material in private school had higher mean scores (mean = 77.429) than children in public (mean = 70.813).

**Ho4:** Gender and unplanned educational material have no discernible impact on students' academic achievement in mathematics.

The academic achievement of students in mathematics is significantly influenced by gender and the improvised instructional material, as shown in Table 4. The results showed that neither gender nor improvised instructional material had a significant impact on students' academic achievement in mathematics ( $F(1, 45) = .154$ ;  $p > 0.05$ ;  $2 = 0.004$ ). As a result, hypothesis 4 is not disproved.

**Ho5:** On students' academic achievement in mathematics, gender and school type do not significantly interact.

Table 4 displays a substantial relationship between gender and school type and students' academic achievement in mathematics. The results showed that there is no discernible relationship between gender and school type and students' academic achievement in mathematics ( $F(1, 45) = .023$ ;  $p > 0.05$ ;  $2 = 0.001$ ). Thus, hypothesis 5 is not disproved.

**Ho6:** On students' academic achievement in mathematics, there is no discernible interaction impact between the type of school and the improvised instructional material.

The academic achievement of students in mathematics is significantly impacted by improvised instructional content, school type, and other factors, as shown in Table 4. The results showed that neither improvised teaching material nor school type had a significant impact on students' academic achievement in mathematics ( $F(1, 45) = .082$ ;  $p > 0.05$ ;  $2 = 0.002$ ). So, hypothesis 6 is not disproved.

**Ho7:** Students' academic performance in mathematics is not significantly impacted by the use of improvised instructional material, gender, or kind of school.

The academic achievement of students in mathematics is shown in Table 4 to be significantly influenced by the interaction of improvised instructional material, gender, and school type. According to the results, there is no discernible interaction effect of improvised teaching material, gender, and school type on students' academic performance in mathematics ( $F(1, 45) = .068$ ;  $p > 0.05$ ;  $2 = 0.002$ ). As a result, hypothesis 7 is accepted.

## Discussions, conclusion and recommendations

The study's conclusions showed that the treatment had a significant major effect on students' academic performance in mathematics. This suggests that math students who were taught utilising improvised instructional material outperformed those who were taught without it in terms of performance. The usage of improvised educational resources during mathematics sessions, which encourage active learning, may be the reason why students' academic performance has improved. This finding supports an earlier study that found that when professors employ improvised instructional resources in their classes, students may learn more. It is possible to increase students' interest in mathematics by the use of educational resources, which will considerably enhance their performance.

Another outcome of the study showed that, in the Ilorin South Local Government Area of Kwara State, students' academic performance in mathematics was not significantly influenced by gender. This result supported the findings of Koran (2001), who had examined the impact of motivation on students' mathematical achievement. Etukudo conducted a study on the effects of computer-assisted instruction on junior-senior high school students' performance in mathematics (2002). This study was carried out in the Rivers state of Nigeria. It employed a quasi-experimental design with a sample size of 40 students (20 male and 20 female). Finally, it was found that students' ability for mathematics is unaffected by their gender. Eze (2005) evaluated the impact of

improvised educational materials on primary school students' achievement in mathematics as an additional contribution. This was done in the public schools of Kano Municipality in Kano State. Additionally, a quasi-experimental design was used.

According to the study, students in the experimental group outperformed those in the control group in terms of performance. The study's results also showed that school type had no discernible main effect on students' academic achievement in mathematics in the Ilorin South Local Government Area of Kwara State. This result corroborated the findings of a study by Iyekekpolor and Tsue (2008) that looked at the impact of improvised instructional materials on math achievement. Federal Unity College in Taraba State was the subject of study. The results showed that experimental group students outperformed control group pupils in mathematics.

In the Ilorin South Local Government Area of Kwara State, the purpose of this study was to determine the impact of improvised instructional materials on students' academic performance in mathematics. It is clear that improvised instructional materials have an impact on students' academic performance in mathematics. Regardless of gender or the kind of school a student attends, the usage of improvised educational materials can increase their academic performance in mathematics. According to the study's results, students who were taught utilising improvised teaching materials did noticeably better than students in the control group. This suggests that students will perform better in mathematics if they are given the opportunity to interact or actively participate in the teaching and learning process using instructional resources.

Owners and Ministry of Education officials should ensure that regular oversight is in place to improve the effective use of instructional materials and resources in the teaching of mathematics in schools. In order to enhance classroom instruction and raise academic standards, school principals should also encourage teachers and students to improvise educational materials. The government should arrange an annual workshop for instructors on how to use makeshift teaching tools in math classes. In order to refresh skills, emphasis should be placed on using improvised teaching materials during teacher preparation and in-service training.

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