

## Local Production of Laboratory Mirror and Students' Achievement in Physics in Abak, Akwa Ibom State, Nigeria

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### ABSTRACT

*The study investigates locally produced laboratory mirrors and students' achievement in Physics in Abak, Akwa Ibom State, Nigeria. A quasi-experimental research design was adopted; the population for the study comprised all Senior Secondary Two Physics students for the year 2024/2025 session in 11 public co-educational Secondary Schools. A sample of 68 SSII students drawn from two schools in their intact classes was used for the study through a purposive sampling technique. The Physics Practical Test was used as an instrument for data collection. It was validated and subjected to reliability analysis. The result showed a reliability coefficient of 0.81 and was deemed appropriate for the main study. Mean, standard deviation, and analysis of covariance were used for data analysis. The results showed that students taught using locally produced and standard laboratory mirrors demonstrated significant achievement in their Physics scores from pre-test to post-test, with the standard laboratory mirror group showing a slightly higher mean difference compared to the local laboratory mirror group. It was recommended that teachers should receive training and support on how to effectively use local and standard laboratory mirrors to improve student achievement in Physics. The researcher hereby concluded that students' exposure to different instructional materials in learning Physics was found to be most effective in facilitating students' achievement.*

**Keywords:** *Local Production, Laboratory Mirror, Students' Achievement and Physics*

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## INTRODUCTION

The local production of laboratory apparatus has been identified as a viable alternative to addressing the problem of inadequate instructional materials (Utibe & Onwiodukit, 2019). Local production of laboratory equipment can provide a cost-effective solution. Locally produced instructional materials are those fabricated from readily available resources within the environment, which are cheaper, durable, and adaptable to the local context. For example, mirrors can be produced using locally sourced glass. Such innovations not only make learning resources more affordable but also contextualize teaching to students' environments, making learning more meaningful (Nwosu, 2018).

The provision of adequate laboratory facilities makes science teaching and learning easier; students can learn through practical and interactive approaches. Laboratory work stimulates learners' interests as they are personally engaged in useful scientific activities and experimentation. It promotes the idea that science is not only a product or process; it affords the basic skills and scientific method of problem-solving (Muhammad & Ubendu, 2021). The laboratory experience enables students to translate what seems to be abstract into practical realities, thereby enhancing their understanding of the learning process. Musah & Umaru (2017) noted that the availability of laboratory facilities is essential for teaching and learning science, and consequently, good achievement in Physics students. Okoli & Osuafor (2010) pointed out that the method offers students the opportunity to develop scientific skills and attitudes such as objectivity, communication, questioning, formulating hypotheses, analyzing data, critical thinking, carefulness, open-mindedness, making inferences, and analysing data.

Local production of instructional material is a case of making available local substitutes in science materials in case of emergency or lack of standard materials in the process of teaching science. The use of such local materials has been researched to be useful to the teaching of science as it influences the activities of the teacher as well as the interest of the students (Harrison et al., 2025). The production of the alternative materials is initiated by the teacher and done either by the teachers, students, a combination of teachers and students, or the local craftsmen, for instance, carpenters and blacksmiths. The teacher uses the students for the production of some of the needed instructional materials or equipment. Local production of instructional materials in senior secondary schools for teaching purposes cannot be overemphasized. To be able to promote quality instruction in the school system, there is a need to pay attention to local production of instructional materials in the teaching process (Utibe & Agwagah, 2016).

The roles and responsibilities further influence decisions, beliefs, and behaviours of individuals (Utibe & Onwiodukit, 2019). Gender stereotyping influences a behavior, responsibility or attribute that is most suitable for students (Utibe *et al.*, 2022). Unamma (2024) and Onukwa & Unamma (2024) found that when students were taught physics

concepts using locally produced instructional materials. Globally, Holstein & Lunetta (2004) and Harrison *et al.* (2025) emphasize that science achievement is more influenced by learning environment, cultural perceptions, and instructional methods than by inherent ability. This implies that effective teaching strategies, particularly those involving practical and context-based learning, can help bridge the gap.

Onukwa & Unamma (2024) investigated the effect of laboratory activities on students' performance in practical physics in selected secondary schools, focusing on group and individual activities. The results revealed that students taught practical physics using group laboratory activity performed significantly more than students who were taught practical physics using individualized and lecturing activities. Teachers are therefore required to re-strategise on how best to involve students in group laboratory activities during practical physics instructions to facilitate high-level cognition. Sub-group approaches monitored by the teacher and a hybrid of fast and slow learners can be adopted. This study is related to the present study because it employed improvised material in teaching Physics, but differs in terms of subject area, level of students, and location.

Utibe & Onwioduokit (2007) in a study analyzing the performances of Physics students taught by external and non-external examiners, considering the influence of the gender of students, school location, and area of the paper marked by the Physics external examiners. 300 SS3 Physics students were randomly selected from thirty secondary schools spread across Akwa Ibom State.

Ocheni *et al.* (2024) examine the moderation of gender and school location in predicting test anxiety and students' achievement in wave motion in Physics. Results showed that test anxiety significantly predicts students' achievement in wave motion. The results showed that the location significantly influenced the prediction of test anxiety on students' achievement in wave motion. With this background, the researchers deem it necessary to examine the local production of laboratory mirrors and students' achievement in Physics in Abak, Akwa Ibom State, Nigeria.

Physics is a field of science that studies natural events and phenomena and the interactions between objects in nature. In physics learning, besides cognitive and psychomotor assessments, the teacher also conducts attitude assessments (Rahayu & Desma-Romadona, 2020). Many students think and say, "Physics is difficult." Students find Physics difficult because they have to compete against different representations, such as experiments, formulae, calculations, graphs, and conceptual explanations, at the same time. Finding Physics difficult has an effect on the overall learning outcomes of the students, including their academic achievement.

Physics is a core science subject at the secondary school level in Nigeria and serves as a prerequisite for students aspiring to pursue careers in science, technology, engineering, and medicine (STEM). Despite its importance, students' performance in Physics at the West African Senior School Certificate Examination (WASSCE) and the National Examinations

Council (NECO) has consistently remained below expectations (Ogunleye, 2019; WAEC Chief Examiners' Report, 2024). One of the major challenges identified is the lack of effective instructional materials, particularly in the teaching of abstract concepts such as light and optics.

Ezugwu *et al.* (2022) view academic achievement as the outcome of students' intellectual ability, which can be measured by grades obtained from examinations or continuous assessment. It is the outcome of a teaching process. Poor academic achievement in Physics could be attributed to many factors, among which the teacher's strategy itself was considered an important factor (Babayemi *et al.*, 2023). This implies that mastery of Physics concepts might not be fully achieved without the use of instructional materials. The teaching of Physics without instructional materials may certainly result in poor academic achievement.

Academic achievement is an indicator to measure the degree of success or failure of a learner, especially at the end of a learning process. Academic achievement is the extent to which a student, teacher, or institution has attained their short or long-term educational goals. Academic achievement is important for the successful development of young people in society. Students who do well in school are able to make the transition into adulthood and to achieve occupational and economic success (Utibe *et al.*, 2022).

Instructional materials are resources used by teachers to facilitate learning and improve students' understanding of difficult concepts. They range from textbooks and models to laboratory apparatus and other teaching aids (Akinbobola & Afolabi, 2019). In Physics, mirrors are essential instructional materials in teaching reflection, image formation, and optical instruments. However, many schools, especially in rural and semi-urban areas such as Abak in Akwa Ibom State, lack adequate laboratory mirrors for effective teaching (Effiong, 2020).

The cost of procuring standard laboratory mirrors and the challenges of maintaining imported instructional resources make it difficult for schools to provide adequate facilities (Owolabi & Oginni, 2020). As a result, teachers often resort to verbal explanations without practical demonstrations, which limit students' conceptual understanding and achievement in Physics.

Physics instruction should be based on the surroundings of the students, which necessitates the use of educational resources, which may be locally developed or standard educational resources. When there are shortages or a lack of certain first-hand teaching materials, locally produced teaching materials are necessary. The process of using alternative materials or resources to facilitate instruction that are capable of performing the same role as the standard materials is considered in this study. Laboratory equipment plays a crucial role in Physics education, as it enables students to conduct experiments and investigations that enhance their understanding of Physics concepts (Utibe & Agah, 2014).

However, commercially produced laboratory equipment can be expensive and unaffordable for many schools, particularly in developing countries.

In this study, the class teachers and students produce a mirror locally for use in the school laboratory. Materials needed for local laboratory production of a mirror include a plain mirror sheet, diamond tips, a wooden ruler, measuring tape, a rag for dusting and cleaning, high-performance lubricating oil, a brush, a worktable, a marker/pencil, and grinding stone. Locally made instructional materials can be provided by the teacher, a combination of teacher and students, schools, cooperative bodies, government, and the Parents and Teachers Association (PTA). The provision of instructional materials in this study was done by the combined efforts of the teacher and students. In producing the instructional material by the teacher and students. The researchers train the teacher and student on how to cut the sheet of mirror to the required laboratory mirror sizes of 75mm by 50mm using the instrument mentioned earlier in this study.

### **Statement of the Problem**

Despite the recognized importance of Physics in national development, students' performance in the subject has continued to be poor. Chief Examiners' reports (WAEC, 2024) consistently highlight students' weaknesses in topics related to optics, where practical demonstration is essential. A major factor attributed to this challenge is the unavailability of adequate instructional resources, such as mirrors for laboratory experiments. Schools in Abak, like many other schools in Nigeria, face financial constraints in procuring standard laboratory apparatus. Consequently, teaching of Physics is dominated by lecture methods, leaving students with abstract ideas rather than practical experiences. This is likely to contribute to persistent low achievement, misconceptions, and poor achievement of Physics concepts among students. While research has examined the effects of locally produced instructional materials in science education, few studies have focused specifically on the production and use of locally fabricated mirrors for optics teaching. The problem, therefore, is the lack of empirical evidence on whether the use of locally produced laboratory mirrors can significantly improve students' achievement in Physics in Abak, which this study will provide at the end of the study.

### **Purpose of the Study**

The purpose of the study is to examine the effect of the local production of laboratory mirrors on students' achievement in Physics in Abak, Akwa Ibom State, Nigeria. Specifically, the study seeks to:

1. Compare the difference in mean achievement scores of students taught using the locally produced and standard laboratory mirror as instructional materials in Physics.

## Research Hypotheses

To guide the researcher in the conduct of the study, the following null hypotheses was tested at a 0.05 level of significance:

1. There is no significant difference in the mean achievement scores of students taught using the locally produced and standard laboratory mirror as instructional materials in Physics.
2. There is no significant interaction between instructional materials and gender on students' academic achievement in Physics.

## Significance of the Study

The result of this study will be beneficial to the students, teachers, curriculum planners, and researchers. The work, when published, will help to improve students' performance in Physics and ensure better quality Physics candidates for the Senior Secondary School Certificate Examinations. Again, the work will help to produce more qualified candidates for courses in science and technology in the tertiary institutions of learning, which in turn will boost national wealth and development. The findings will help and motivate science teachers to develop an interest in utilizing local teaching materials that will be a possible means towards reducing failure in the teaching and learning of science. This study will help clarify among the teachers the need for continuous and regular improvement of suitable instructional materials for teaching and learning of science.

The results of this study will be of great significance to science curriculum planners, and the curriculum developers will find the work useful in reviewing the science curriculum by seriously laying emphasis on the local production of instructional materials so as to meet up with emerging needs of society. This study will be of immense benefit to researchers in the field of science by forming a basis for further studies on the usage of local instructional materials and teachers' quality in order learning aspects of science as a subject.

## METHOD

This study adopts a quasi-experimental pretest and posttest comparison group design. This is a research design that assesses the impact of an intervention (locally produced and standard laboratory mirror) by measuring participants' characteristics (students') before (pretest) and after the intervention (posttest), using a comparable but non-randomly assigned group (intact class) to provide a baseline for comparison (Price *et al.*, 2024). This design was considered appropriate because it allowed the researchers to use intact classes in the school without disrupting the system. The structure is as shown below:

$E_1: O_1 \times O_1$

$E_2: O_1 \times O_1$

Where  $E_1$ : Experimental group 1 (group using locally produced laboratory mirror)

$E_2$ : Experimental group 2 (group using standard laboratory mirror)

$O_1$ : pre-test

$O_1$ : post-test

X: Treatment

The study was conducted in Abak Local Government Area (LGA) of Akwa Ibom State, Nigeria. Abak is one of the 31 LGAs in the State, located in the South-South geopolitical zone of Nigeria. The people of Abak predominantly engaged in farming, petty trading, artisan work, and small-scale industries. Crops such as cassava, yams, maize, palm produce, and vegetables are widely cultivated. The socio-economic status of many households is relatively average, which sometimes affects their ability to provide educational resources for their children. Abak LGA presents a microcosm of the wider educational challenges faced across Akwa Ibom State, such as a lack of resources and gender differences. This makes it a strategic location for investigating the influence of local production of laboratory mirrors on students' achievement in Physics. Abak has 11 public government coeducational secondary schools (Abak Britannica, 2023).

The population for the study comprised all 586 Senior Secondary Two (SS2) Physics students for the year 2024/2025 session (LEC, Abak, 2024). The sample for this study consisted of 68 (30 in the experimental group I and 38 in the experimental group II) SS2 Physics students drawn from two secondary schools. A purposive sampling technique was employed to select schools that had qualified physics teachers and a functional Physics laboratory.

One instrument and one treatment package were used to gather data for the study. Physics Practical Test (PPT) was developed using past Physics practical questions of the West African Senior School Certificate Examinations (WASSCE). The instruments were used for teaching and training of students on the local production of laboratory mirrors and measuring the students' pre-test and post-test achievement in Physics. The pretest and posttest contain the same set of items.

The Physics Practical test (PPT) was subjected to face validation. This was through a panel of three experts consisting of two Physics lecturers and one Research, Measurement and Evaluation lecturer, the Department of Science Education, Akwa Ibom State University, Mkpat Enin. The evaluators were expected to read through the test for the correctness of tenses and the ability of the contents to help in providing a solution to the study. In the learning package, the evaluators were expected to read through and see if it would be able to guide the students in the local production of a laboratory mirror. The suggestions from the three evaluators were incorporated into the final production of the instrument and lesson package.

To further strengthen the validity of the instrument, the instrument was administered to a trial testing group of 30 Physics students who were not part of the main subjects for the study, but were found to be equivalent in all respects of Physics knowledge to the subjects in the study. The internal consistency of the Physics Achievement Test (PAT) was determined using Kuder-Richardson's Formula 21 Statistics (KR21) because the instrument in the study was polychotomously scored. The value of 0.81 was obtained, showing that the instrument was reliable for assessing students' practical achievement in Physics.

The following procedures were followed during the students' learning and administration of the instrument: Relevant permission was obtained from the Director of Schools, Local Education Committee (LEC), Abak for the use of the two selected secondary schools in the LEC for the conduct of the study.

The approval from the Director of Schools was conveyed to the Principals of the selected schools for proper arrangement for use of the Physics students, Physics teachers, and relevant facilities in the school for the conduct of the study, having briefed them of the purpose of the study and the benefit of the study to the students, school, and the Ministry of Education.

At least two professional Physics teachers from each of the two selected secondary schools were recruited and briefed on the teaching package (specifically on the local production of laboratory mirrors and Physics practical test), practical test administrations, and evaluations. At the end of the briefing, the teachers were selected and used as research assistants in the selected schools for the proper conduct of the study. The students in experimental group 1 were trained to produce the local laboratory mirror and used same in the main practical, while the students in experimental group 2 were trained on the production of local laboratory mirrors, but were to use the standard laboratory mirror in the main practical. The use of different mirrors (local and standard) was to test the effect of the two types of mirrors on students' achievement in Physics.

To predict the effects of the locally produced mirror, a pretest was administered to the students. Both groups (group 1 and 2) were given the pre-test. This established baseline equivalence. At the end of two weeks of training and teaching, the students were given the posttests (groups 1 and 2). The data were analysed using the Statistical Package for Social Sciences (SPSS). The hypotheses formulated were tested at a 0.05 level of significance. Using Analysis of Covariance (ANCOVA) with pretest scores as covariates.

## RESULTS

**Table 1:** Mean achievement score difference of students taught using the locally produced and standard laboratory mirror

Groups	N	Pretest		Posttest		Mean Gain	Mean Difference
		Mean ( $\bar{x}$ )	SD	Mean ( $\bar{x}$ )	SD		
Local	30	7.67	1.12	19.17	1.37	11.50	0.29
Standard	38	7.84	1.15	19.63	1.62	11.79	

Table 1 reveals the pre-test mean and standard deviation scores ( $\bar{x}=7.76$ ,  $SD=1.12$ ) of the group of students taught using locally produced mirror and post-test mean and standard deviation scores ( $\bar{x}=19.17$ ,  $SD=1.37$ ) of the same group with mean gain of 11.50. Also, the pre-test mean and standard deviation scores ( $\bar{x}=7.84$ ,  $SD=1.15$ ) of the group of students taught using standard laboratory mirror and a post-test mean and standard deviation scores ( $\bar{x}=19.63$ ,  $SD=1.62$ ) of the same group with mean gain of 11.79. The standard deviation scores in both groups reveal that students' achievement did not differ widely based on either of the instructional materials used. Also, the mean of the two groups shows that students' mean achievement score increased under the use of both locally produced and standard laboratory instructional materials. More so, the difference in the mean gains in both groups was 0.29, in favour of the standardized group.

**Table 2:** Mean achievement score difference of students taught using the locally produced and standard laboratory mirror

Groups	N	Pretest		Posttest		Mean Gain	Mean Difference
		Mean ( $\bar{x}$ )	SD	Mean ( $\bar{x}$ )	SD		
Male	34	7.74	1.02	19.71	1.36	11.97	0.61
Female	34	7.79	1.25	19.15	1.64	11.36	

Table 2 reveals the pre-test mean and standard deviation scores ( $\bar{x}=7.74$ ,  $SD=1.02$ ) of the male students in Physics and post-test mean and standard deviation scores ( $\bar{x}=19.71$ ,  $SD=1.36$ ) of the same group with mean gain of 11.97. Also, the pre-test mean and standard deviation scores ( $\bar{x}=7.79$ ,  $SD=1.25$ ) of the female students in Physics and a post-test mean and standard deviation scores ( $\bar{x}=19.15$ ,  $SD=1.64$ ) of the same group with mean gain of 11.36. The standard deviation scores in both groups reveal that students' achievement did not differ widely based on their gender. Also, the mean of the two groups shows that students' mean achievement score increased for both gender groups after the instruction. More so, the difference in the mean gains in both groups was 0.61 in favour of male students.

**Table 3:** Mean interaction between instructional materials and gender on students' academic achievement in Physics

Groups		N	Pretest		Posttest		Mean Gain	Mean Difference
			Mean ( $\bar{x}$ )	SD	Mean ( $\bar{x}$ )	SD		
Local	Male	13	7.69	0.95	19.69	0.85	12.00	0.89
	Female	17	7.65	1.27	18.76	1.56	11.11	
Standard	Male	21	7.76	1.09	19.71	1.62	11.95	0.36
	Female	17	7.94	1.25	19.53	1.66	11.59	

Table 3 reveals the pre-test mean and standard deviation scores ( $\bar{x}=7.69$ ,  $SD=0.95$ ) of the male students who were taught using locally produced materials and posttest mean and standard deviation scores ( $\bar{x}=19.69$ ,  $SD=0.85$ ) of the same group with mean gain of 12.00; the pre-test mean and standard deviation scores ( $\bar{x}=7.65$ ,  $SD=1.27$ ) of the female students who were taught using locally produced materials and posttest mean and standard deviation scores ( $\bar{x}=18.76$ ,  $SD=1.56$ ) of the same group with mean gain of 11.11. Also, for students in the standardized (improvised) group, the pre-test mean and standard deviation scores ( $\bar{x}=7.76$ ,  $SD=1.09$ ) of the male students and a posttest mean and standard deviation scores ( $\bar{x}=19.71$ ,  $SD=1.62$ ) of the same group with mean gain of 11.95; the pre-test mean and standard deviation scores ( $\bar{x}=7.94$ ,  $SD=1.25$ ) of the female students and posttest mean and standard deviation scores ( $\bar{x}=19.53$ ,  $SD=1.66$ ) of the same group with mean gain of 11.59. The standard deviation scores in all the groups reveal that students' achievement in Physics did not differ widely based on their gender. Also, the mean of the all the groups shows that students' mean achievement score increased for all gender groups after the instruction. More so, the difference in the mean achievement scores a 0.89 and 0.36 for the students taught with locally made materials and those taught using improvised materials, respectively, was in favour of the male students.

**Table 4:** Significance of difference in the mean achievement scores of students taught using the local and standard laboratory mirror as an instructional material

Source	Type III		Mean Square	F	Sig.	Partial Eta Squared
	Sum of Squares	df				
Corrected Model	24.42 <sup>a</sup>	8	3.052	1.38	0.22	0.16
Intercept	538.49	1	538.49	243.99	0.00	0.81
PreScore	0.28	1	0.28	0.13	0.72	0.00
Groups	3.00	1	3.00	1.36	0.25	0.02
Gender	4.99	1	4.99	2.26	0.14	0.04
Groups * Gender	2.82	1	2.82	1.28	0.26	0.02

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Error	130.22	59	2.21
Total	25817.00	68	
Corrected Total	154.63	67	

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- a. R Squared = 0.158 (Adjusted R Squared = 0.44)  
 b. Dependent Variable: Posttest

Table 4 shows the significance of the difference in the mean achievement scores of students taught using the local and standard laboratory mirror as an instructional material in Physics. With an F-ratio of 1.34, and a p-value of 0.25, which is greater than the 0.05 level of significance, the null hypothesis one, which states that there is no significant difference in the mean achievement scores of students taught using the local and standard laboratory mirror as an instructional material in Physics, is not rejected. Hence, there is no significant difference between the mean achievement scores of students taught using the local and standard laboratory mirror as instructional materials in Physics. The effect size of 0.02 indicates that 2% change in students' achievement in Physics can be attributed to the use of either a local or standard laboratory mirror as an instructional material.

Table 4 shows the significance of the difference in the mean achievement scores of male and female students in Physics. With an F-ratio of 2.26, and a p-value of 0.14, which is greater than the 0.05 level of significance, the null hypothesis two, which states that there is no significant difference in the mean achievement scores of male and female students in Physics, is not rejected. Hence, there is no significant difference between the mean achievement scores of male and female students in Physics. The effect size of 0.04 indicates that 4% change in students' achievement in Physics can be attributed to gender.

Table 4 shows the significance of the interaction between instructional materials and gender on students' academic achievement in Physics. With an F-ratio of 1.28, and a p-value of 0.26, which is greater than the 0.05 level of significance, the null hypothesis, which states that there is no significant interaction between instructional materials and gender on students' academic achievement in Physics, was not found to be significant. Therefore, the null hypothesis is not rejected. Hence, there is no significant interaction between instructional materials and gender on students' academic achievement in Physics. The effect size of 0.02 indicates that 2% change in students' academic achievement in Physics can be attributed to the interaction between the instructional materials and gender.

Table 4 revealed that there is no significant difference between the mean achievement scores of students taught using the local and standard laboratory mirror as an instructional material in Physics. The achievements of students when taught using local and standard laboratory mirrors as instructional materials in Physics were compared. The outcome of the comparison indicated that the use of local and standard laboratory mirrors in teaching Physics significantly enhanced students' achievement in Physics. This result could be attributed to the fact that both the students who were exposed to the local and

standard laboratory mirrors in teaching Physics. The result of this finding is in line with Nwosu (2018), whose study investigated the effect of locally produced instructional materials on students' performance in Basic Science, and all students were able to make use of instructional materials. Also, Effiong (2020) and Holstein & Lunetta (2024) in another similar study found out that the use of instructional materials contributes to students' achievement.

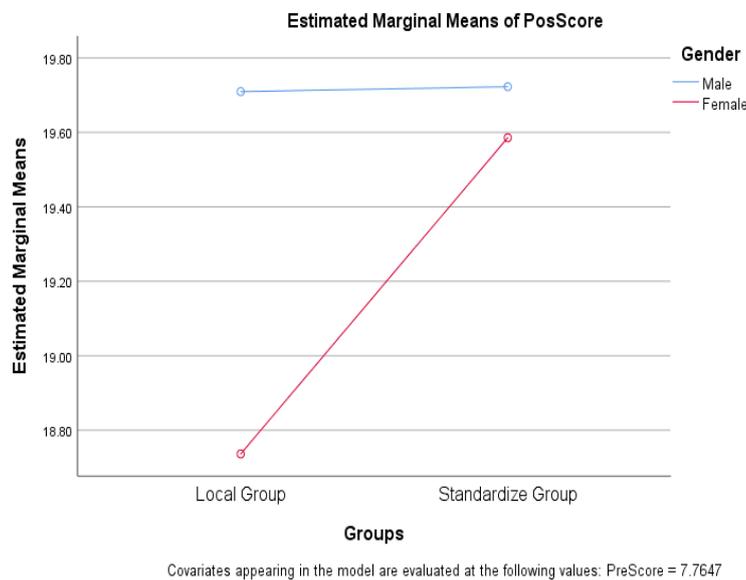


Figure 1: Interaction between instructional materials and gender on students' achievement

Table 4 revealed that there is no significant difference between the mean achievement scores of male and female students in Physics. The achievements of male and female students when taught using local and standard laboratory mirrors as instructional materials in Physics were compared. The outcome of the comparison indicated that the use of local and standard laboratory mirrors in teaching significantly enhanced both male and female students' achievement in Physics. This result could be attributed to the fact that both the male and female students who were exposed to local and standard laboratory mirrors in teaching Physics. The result is in line with Onukwa & Unamma (2024) whose study examined the effects of locally produced instructional materials and students' academic performance in Physics. Also, Ocheni et al. (2024) in a similar study found out that the use of instructional materials contribute equally to male and female students' achievement.

Table 4 revealed that there is no significant interaction between instructional materials and gender on students' achievement in Physics. Thus, the use of instructional

materials in teaching in Physics was not gender-specific, hence, the result obtained. This result could be attributed to the fact that both groups tend to build more confidence while working with the instructional materials. This of course, provides them with equal opportunities to engage in the instructional process using the instructional materials provided by the teacher. The result of this finding is in line with Harrison *et al.* (2025) whose study investigated the comparative effect of the production of locally made meter bridges and students' achievement in Physics in Mkpato Enin, Akwa Ibom State, Nigeria.

## CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, the researchers hereby concluded that students' exposure to different instructional materials in learning in physics was found to be most effective in facilitating students' achievement without bias to gender.

Based on the findings and the conclusions reached, the following recommendations were made. Physics teachers should effectively utilize different instructional materials in the general teaching of Physics as it has proven to enhance students' achievement.

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