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# THE IMPACT OF INSTRUCTIONAL MATERIALS ON STUDENTS ACADEMIC PERFORMANCE IN BIOLOGY IN SENIOR SECONDARY SCHOOLS IN ORUMBA NORTH LOCAL GOVERNMENT AREA.

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## ABSTRACT

*The study examined the effect of instructional materials on academic performance among senior secondary school students in Orumba North Local Government Area. It posed one research question and tested one null hypothesis. A quasi-experimental research design was utilized. The study population comprised 1,490 senior secondary 2 students in Orumba North Local Government Area, Anambra State. A sample of 100 students was selected through simple random sampling. Data were collected using a Mathematics Achievement Test (MAT), which underwent face and content validity assessments. Reliability was measured with Pearson's product-moment correlation. Data were analyzed using mean and standard deviation, and the hypothesis was tested with the t-test at a 0.05 significance level. Results indicated that students taught with instructional materials outperformed those who were not. It was recommended that teachers should enhance student engagement by incorporating instructional materials in their teaching.*

**Keywords:** Instructional materials, Academic performance, Student engagement, Educational outcomes

## Introduction

Instructional materials are resources used in educational settings to support teaching and learning. They encompass a wide array of content, including textbooks, digital resources, multimedia presentations, and hands-on materials. These materials are designed to convey specific knowledge or skills, facilitate learning processes, and engage students in meaningful ways. Academic performance on the other hand generally refers to how well a student meets standards set by the educational institution or curriculum. It encompasses grades, test scores, and other measures of student learning and achievement.

The impact of instructional materials on students' academic performance in secondary schools has garnered significant attention in educational research globally. In Nigeria, where the educational system faces

myriad challenges such as inadequate infrastructure and underfunding, the role of instructional materials becomes even more critical. These materials, which encompass textbooks, visual aids, digital resources, and other educational tools, are integral to enhancing the teaching and learning process. Effective instructional materials can cater to diverse learning styles, facilitate understanding, and make abstract concepts more concrete.

Research indicates that the availability and utilization of quality instructional materials are positively correlated with improved academic outcomes. For instance, Osuolale (2019) highlights that students' performance in subjects like Mathematics and Science significantly improves when teachers effectively integrate instructional materials into their lessons. This is corroborated by Awofala and Lawani (2020), who found that instructional materials help bridge gaps in comprehension and retention, particularly in complex subjects.

Furthermore, the National Policy on Education in Nigeria underscores the necessity of instructional materials in achieving educational objectives. It advocates for the provision of adequate learning resources as a means to foster an engaging and interactive learning environment (Federal Republic of Nigeria, 2020). Despite this, disparities in resource allocation across different regions and schools result in uneven academic performance, as evidenced by various studies.

In rural areas, where schools are often under-resourced, the absence of adequate instructional materials contributes to lower academic achievement (Oni & Oladejo, 2021). Conversely, schools that have better access to such resources tend to report higher academic success. The digital divide also exacerbates these disparities, as urban schools are more likely to integrate digital instructional materials, thereby providing students with enhanced learning opportunities (Akinrinola et al., 2021).

The COVID-19 pandemic further emphasized the importance of instructional materials, particularly digital ones, in maintaining educational continuity. As schools transitioned to remote learning, those with adequate digital resources were better positioned to support student learning, highlighting the need for equitable distribution of instructional materials to ensure all students benefit regardless of their s**oc**io-economic background (Eneji et al., 2020).

Several studies have documented the positive effects of instructional materials on students' academic performance. For instance, Adebayo and Ogedengbe (2021) found that students exposed to a variety of instructional materials performed better in standardized tests compared to those who relied solely on textbooks. Similarly, Ayodele and Olatunde (2020) reported that multimedia resources enhance understanding and retention of complex concepts, particularly in science subjects.

However, the impact varies across different educational levels and contexts. At the primary level, instructional materials are crucial for foundational skills, while at the secondary level, they support more complex cognitive processes (Ajayi & Femi, 2022). In tertiary institutions, the availability and use of digital resources have been linked to improved research skills and academic performance (Eze & Nnaji, 2019).

**Statement of Problem**

In Nigeria, educational outcomes are often suboptimal due to various factors, including inadequate instructional materials. Instructional materials are critical in the teaching-learning process as they enhance understanding, retention, and application of knowledge. This problem is particularly pronounced in Nigeria, where disparities in resource allocation, coupled with socio-economic challenges, exacerbate the issues in educational delivery.

Nigeria faces significant challenges in its educational sector. According to UNESCO (2019), a substantial number of schools, especially in rural areas, suffer from inadequate educational resources, including textbooks, laboratory equipment, and digital learning tools. This shortage affects both teaching and learning processes, leading to poor academic performance among students. The National Bureau of Statistics (NBS, 2020) also highlights that limited access to quality instructional materials contributes to low literacy and numeracy rates in Nigeria.

Recent studies have shown a strong correlation between the availability of instructional materials and student performance. For instance, a study by Adeniji et al. (2021) found that students with access to textbooks and supplementary reading materials performed significantly better in standardized tests than those without such resources. Similarly, Yusuf and Dada (2020) observed that the use of audiovisual aids in teaching enhances students' understanding and retention of complex concepts in science subjects.

Despite the recognized importance of instructional materials, there is limited empirical research focusing on how these resources impact secondary school levels. Most existing studies are either region-specific or focus on primary education, leaving a gap in understanding the broader implications across various educational stages and geographic areas.

**Objectives of the Study**

The objectives of this study are to:

1. Find out the extent to which students taught with instructional materials perform higher than those taught without instructional materials.

**Research Question**

1. To what extent do students taught with instructional materials perform higher than those taught without instructional materials?

**Hypothesis**

The null hypothesis was formulated and tested at 0.05 level of significance.

1. There is no statistical significant relationship between the academic performance of students and the use of instructional materials in Teaching-learning.

**Research Method**

The researcher used a quasi-experimental design for this study, targeting all Senior Secondary two students in Orumba North Local Government Area, Anambra State. The population of the senior secondary two students is 1490. A sample of 100 students from five secondary schools was selected using a random sampling technique. To ensure a representative sample, a stratified random sampling method was employed to choose the schools. The gender ratio of boys to girls was 1:1 to reflect gender equality. Simple random sampling was used to select students, minimizing bias and facilitating effective student-material interaction and classroom management. Two different lesson plans were prepared for the students. They were divided into two groups: the experimental group received instruction with instructional materials, while the control group did not. Both groups were taught the topic "Determining gradient of a curve by graph reading." Following the lessons, a Mathematics Academic Test (MAT) with twenty multiple-choice questions was administered to both groups. Each question had four options, with one correct answer, and each correct answer was worth one mark. The researcher noted differences in performance between the pre-test and post-test analyses for both groups. Mathematics experts validated the instruments, and the MAT's reliability was assessed using Pearson product-moment correlation for split-half, yielding a reliability coefficient of 0.67.

The study's purpose was explained to the students. A pre-test based on the topic to be taught was administered before teaching both groups. Immediately after the pre-test, the students were taught the topic "Determining gradient of a curve by graph reading," one group with instructional materials and the other without. Both groups returned their test scripts, achieving a 100% return rate. Identical examination conditions were maintained for both pre-tests and post-tests to ensure reliability and validity. To maintain confidentiality and avoid bias, students were asked not to write their full names.

The students' scores from the pre-test and post-test were converted into group data, and their performance frequency was calculated. The mean scores and standard deviations for both groups were also computed and used to analyze the research question. The hypothesis was tested at 0.05 level of significance using independent t-test.

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**Presentation of Results**

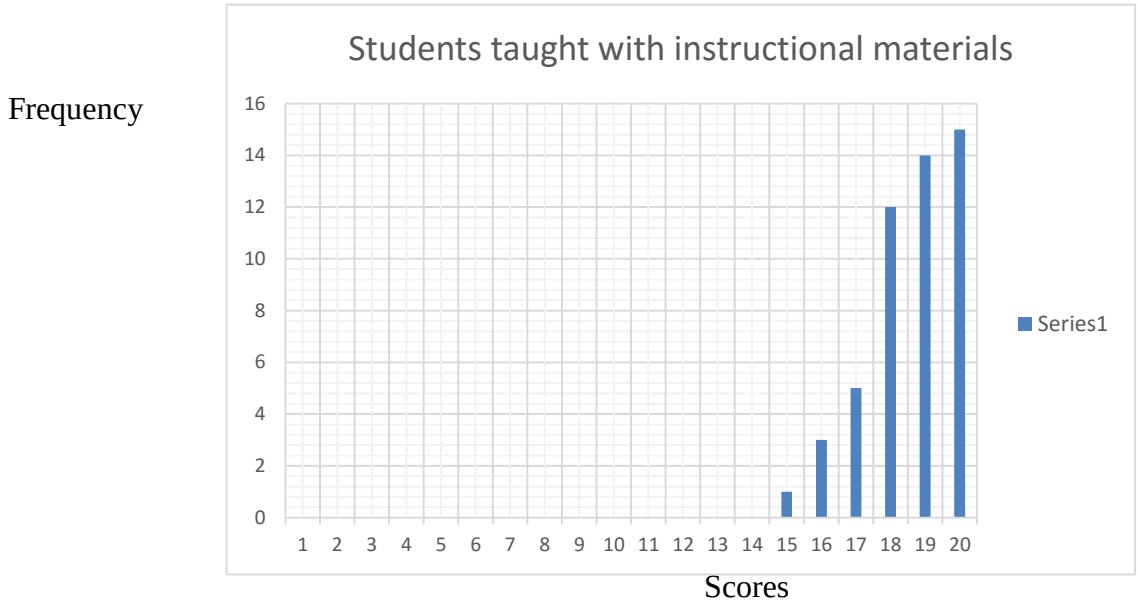



Figure 1: Graphical representation of scores of students taught with instructional materials.

Figure 1, represents the scores of the students taught using instructional materials. From figure, it was observed that all the students scored above 10 marks, with the least score of 15 marks and the highest score of 20 marks. The mean score of the students was 18.6.

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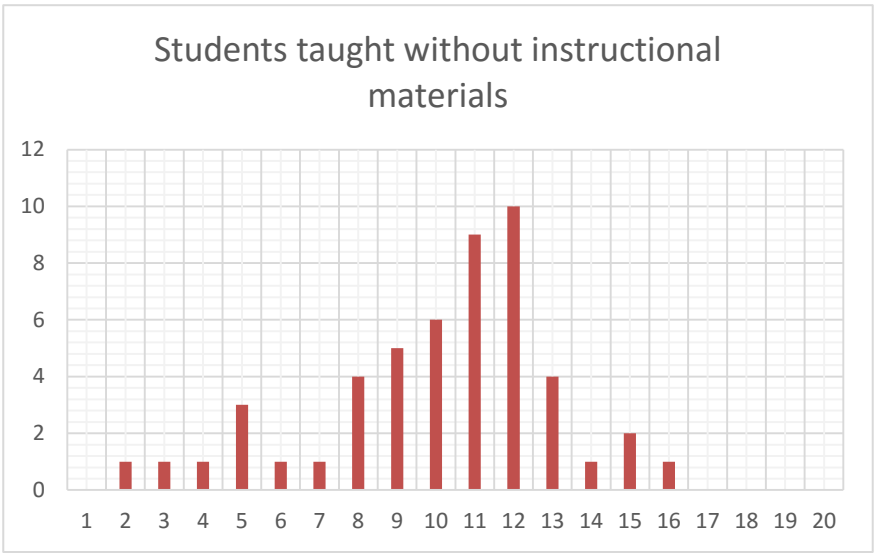



Figure 2: Graphical representation of scores of students taught without instructional materials.

Figure 2, represents the scores of the students taught without instructional materials. From figure 2, it was observed that more than half of the students scored below 10 marks, with the highest score of 12 marks and the lowest score of 2 marks. The mean score of the students was 10.1.

**Research question 1:** To what extent do students taught with instructional materials perform higher than those taught without instructional materials?

The analysis in Table 1 shows that the calculated t-cal (18.69) is greater than the critical value (1.98) at 0.05 alpha significant levels and mean of students taught with instructional materials (18.6), is greater than the mean of students taught without instructional materials (10.1). The result shows that the performance of experimental group is higher than that of the control group to a very great extent.

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Table 1: T-test analysis of students taught with instructional materials and those taught without instructional materials.

| Group of students. | N. | Mean. | SD. | Df. | t-cal. | t-crit. Decision |
|---|---|---|---|---|---|---|
| Students taught with instructional materials. | 50 | 18.6 | | | | 1.28 |
| | | | | 98 | 18.69 | 1.98 Reject |
| Students taught without instructional materials | 50 | | 10.1 | | | 3.02 |

**Hypothesis:** There is no statistical significant relationship between the academic performance of students and the use of instructional materials in teaching-learning.

The analysis in Table 1 shows that the calculated t-value (18.69) is greater than the critical value (1.98) at 0.05 alpha significant levels. Therefore, the null hypothesis is rejected. This implies that there is a statistical significant relationship between the academic performance of students and the use of instructional materials in Teaching-learning.

**Discussion of Findings**

The research hypothesis revealed a statistical relationship between the academic performance of students and the use of instructional materials in teaching and learning. This aligns with Osuolale (2019), who found that teaching is more effective when instructional materials are utilized. Similarly, Awofala and Lawani (2020) confirmed a significant correlation between the use of library materials by students and teachers and improved academic performance. Ayodele and Olatunde (2020) observed a direct link between students' engagement and enhanced academic achievement. Analysis indicates that the availability and use of resources such as chalkboards, math kits, teaching guides, science guides, audio-visual aids, and science kits positively impact the academic performance of students. Instructional materials not only stimulate learners but also enhance learning outcomes by engaging relevant senses and making instruction clear and meaningful. Adebayo and Ogedengbe (2021) asserted that the evolution of teaching equipment and materials facilitates the teaching-learning process and addresses instructional needs. They also emphasized that regular instructional supervision and adequate supply of resources significantly affect students' academic performance.

The findings from research question one indicated that the experimental group's performance surpasses that of the control group. This aligns with the principle that effective learning is enhanced when laboratories function as dynamic environments for various student activities, including experimental investigations,

confirmatory exercises, and skills acquisition. Oni and Oladejo (2021) highlight that students engage more effectively through activity-oriented instruction, leading to better performance compared to passive learning approaches. Similarly, Ajayi and Femi (2022) underscore the crucial role of instructional materials in facilitating the teaching-learning process, thereby improving learning outcomes. Technological advancements have made instructional tools, such as projected and electronic materials, essential for contemporary education, as emphasized by Eneji et al. (2020). They argue that these tools are pivotal for knowledge transfer and academic excellence. Moreover, incorporating such resources into teaching strategies allows students to actively participate and manipulate learning materials, thereby enhancing their understanding and retention of knowledge.

## Conclusion

This study aimed to examine the impact of instructional materials (teaching aids) on the academic performance of senior secondary school students. The findings lead to the following conclusions:

- Students taught with instructional materials perform significantly better than those taught without them.
- There is a statistical relationship between the use of instructional materials and the academic performance of students.

## Recommendations

Based on the study results, the following recommendations are made:

1. Teachers should foster active student participation by incorporating instructional materials in their teaching.
2. Workshops, seminars, conferences, or orientation courses should be organized to update teachers on the latest developments in the field.
3. Teachers should create and use improvised instructional materials to enhance the teaching and learning process.
4. The government, even with limited financial resources, should ensure equitable distribution of instructional materials to schools in both urban and rural areas to facilitate effective science education.
5. The Ministry of Education should ensure an even distribution of trained and qualified chemistry teachers across all secondary schools.
6. The Ministry of Education, in collaboration with corporate organizations and other concerned citizens, should allocate sufficient funds for the provision of up-to-date books and other resource materials for both teachers and students.
7. The government should make educational technology a mandatory part of the teacher training curriculum in state and federal colleges of education.

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