Impact of Instructional Materials on Academic Achievement and Attitudes toward Physics among Senior Secondary Students of Apa, Benue State

OGUCHE, Emmanuel Achile., YAHAYA, Reuben Etuh

Department of Physics Education, Federal College of Education Odugbo, Benue State, Nigeria

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ABSTRACT

This study investigated the impact of instructional materials on senior secondary students' academic achievement and attitudes toward Physics in Apa Local Government Area of Benue State. An experimental research approach was employed using a post-test only design, in which parallel groups of students were tested after exposure to treatment. The sample comprised 100 Senior Secondary II students randomly selected from seven schools offering Physics within the study area. Two research instruments were developed: the Physics Students Achievement Test (PSAT) and the Students' Attitude Toward Physics Scale (SATPS). These instruments were validated by Physics education experts from Prince Abubakar Audu University, Anyigba. Reliability analysis using Cronbach's Alpha produced coefficients of 0.81 for PSAT and 0.84 for SATPS, indicating strong internal consistency.Students were assigned to experimental and control groups, with the experimental group taught Physics concepts using instructional materials. Three research questions and three null hypotheses guided thestudy. Data collected were analyzed using mean scores, frequency counts, percentiles, chi-square tests, and independent samples t-tests. Results revealed that students taught with instructional materials significantly outperformed those in the control group ($p < 0.05$). The findings also indicated that instructional materials positively influenced students' attitudes toward Physics. Furthermore, achievement and attitudes were shown to be closely related, suggesting a mutually reinforcing relationship. The study concluded that instructional materials significantly enhance both academic achievement and students' attitudes toward Physics. Recommendations were made for teachers, curriculum developers, and educational stakeholders to strengthen the integration of instructional materials into Physics instruction for improved learning outcomes.

Keywords: Instructional materials, Physics education, Academic achievement, Student attitudes

INTRODUCTION

Physics serves as the foundation of science and technology, as many of the tools essential for scientific and technological advancements are derived from physics. Due to its focus on the fundamental aspects of the natural world, physics plays a vital role in both scientific and technological domains, empowering individuals to make sense of the swiftly developing technological environment (Zhaoyganas, 2002). Despite being a core subject, physics is often regarded as one of the most challenging subjects in the school curriculum, according to the Nigeria Educational Research and Development Council (NERDC) (Isola, 2010).

Physics plays a central role in science, technology, and innovation. Its abstract nature, however, makes it one of the most difficult subjects for many secondary school students. In Nigeria, repeated reports by the West African Examinations Council (WAEC) have highlighted poor performance in Physics, which is often linked to ineffective teaching strategies, inadequate laboratory facilities, and the minimal use of instructional materials.

Yusuf (2012) defined academic performance as the knowledge and skills that students have acquired in a subject or course, serving as a measure of their success in various assessments based on educational criteria established by professional educators.

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Instructional materials ranging from physical models, charts, and laboratory equipment to digital simulations help concretize abstract Physics concepts, thereby improving comprehension, retention, and positive attitudes toward the subject. Beyond achievement, students' attitudes toward Physics also play a significant role in determining their persistence and career aspirations in science and technology fields.

As noted by Olaide (1990), the effectiveness of teachers' instructional materials is key to enhancing students' comprehension and their overall view of the subject. These materials provide clarity and recognition, enabling students to gain a comprehensive understanding of the content. They enhance learning, improve learners' competence, and make the educational experience more meaningful.

Instructional materials also stimulate students' desire to learn, facilitating the learning process by making it easier to assimilate and memorize information. Additionally, they help maintain students' attention. Ultimately, pedagogical tools broaden access to learning, regulate the pace of education, promote a better understanding of physics concepts, and assist in overcoming challenges in delivering physics lessons (Kay, 2008).

In psychology, an attitude is defined as a combination of feelings, thoughts, and behaviours directed toward a specific object, person, or event. Attitudes are often shaped by personal experiences or upbringing and can significantly influence how learners behave and respond in different situations. While attitudes tend to be stable, they are not immutable and can evolve over time. An individual's learned tendency to respond positively or negatively to an object, situation, idea, or another person is referred to as their "attitude" (Sarmah & Puri, 2014).

Syyeda (2016) notes that attitudes can change over time, and establishing a positive attitude can enhance children's learning (Akinsola & Olowojaiye, 2008; Mutai, 2011). Conversely, negative attitudes can obstruct effective learning and influence performance (Joseph, 2013), making attitude a key consideration. The extent to which attitude affects physics achievement differs among individual learners, with potential for both positive and negative outcomes. Throughout a child's educational journey, they encounter various subjects, teachers, and teaching methods that shape their experiences and behaviors, which are linked to their attitudes. The way students think and feel about physics, their study habits, and their likelihood of procrastinating are important factors in their academic performance. Furthermore, their overall attitude towards a subject can substantially influence their achievement, potentially leading to either strong or weak outcomes (Mohamed & Waheed, 2011; Mata et al., 2012, Ngussa & Mbuti, 2017). If attitudes are considered determinants of learning, it follows that a student's attitude toward a subject can affect their performance or success in that area. A negative attitude may lead to fear or aversion toward the subject and its mastery, potentially resulting in discouragement, failure, or underachievement. In 2004, Aggarwal described attitudes as being learned behaviors that are adopted and can be changed. He further identified their characteristics as direction, intensity, generality, and specificity.

Naki (2018) emphasized that students' attitudes toward physics, their study habits, and tendencies to procrastinate significantly influence their academic success.

Carmo (2020) notes that the widespread adoption of chalkboards and whiteboards in Nigerian schools paved the way for numerous other teaching aids. This development led to the integration of diverse instructional materials into the educational process, including visuals like pictures, technological tools such as radios and computers, and representational aids like charts, models, televisions, maps, and graphs. Studies indicate a strong link between the selection of instructional materials and both how involved students are in learning and what they ultimately achieve academically. Abdullahi (2010) defines the application of instructional materials as the skillful creation of representations that mimic real-world objects or situations to enhance the effectiveness of teaching and learning.

Furthermore, Nigeria's National Policy on Education (as stated in Section 10) mandates the government's role in supporting the execution of educational plans and goals, ultimately aiming to improve the quality of education. The objectives include amongst others to enhance teaching and improve the competence of teachers, to make learning more meaningful for children, to reduce educational costs and to develop and promote an effectiveness of innovative materials in schools.

Oduh and colleagues (2020) conducted a study in the Oredo Local Government Area of Edo State, Nigeria, to

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explore the connection between the presence of teaching resources (Instructional materials) and the level of interest shown by senior secondary school physics students in the subject. Their research focused on SS II physics students in public schools within this area, totaling 1,223 participants, and employed a correlational research design. Data analysis involved calculating means, percentages, standard deviations, and Pearson's product-moment correlation coefficient. The findings indicated that while many necessary instructional materials were present in the schools, they were often non-functional. Despite this, the physics students involved in the study demonstrated a significant degree of interest in learning various physics topics.

Idongesit and Ekukinam (2019) investigated how using locally made technological teaching aids impacted primary school students' understanding of specific science concepts. Their study employed a pre-test and post-test experimental design with non-randomized groups. The target population consisted of 3,368 primary six pupils from 48 public primary schools in Akwa Ibom State, from which a sample of 219 pupils across two schools was selected. Statistical analysis using a t-test showed no significant difference in the post-test scores between classes taught with improvised science equipment and those taught without standard equipment. This suggests that pupils learned equally well using both standardized and locally made materials, as the calculated t-value (1.34) was lower than the critical t-value (2.92). The reviewed study shares a similar experimental design with the present research but differs in its focus on primary rather than secondary school students.

In a 2015 investigation, Odo explored how the use of student-created teaching resources (instructional materials) impacted the academic performance of senior secondary year two (SSII) students in physics. The research was structured around five specific inquiries and five corresponding statistical tests of no difference. A non-randomized, controlled experimental design was utilized, involving a sample of 149 SSII students from the Obollo Afor Education Zone in Enugu State, Nigeria. The collected data were analyzed using descriptive statistics (mean and standard deviation) and an inferential statistical test (Analysis of Covariance, ANCOVA). The findings indicated that students who learned physics through the use of instructional materials they themselves had improvised demonstrated superior academic achievement compared to students who were taught using traditional teaching methods. It is noted that while both Odo's study and the current research focused on SSII students in secondary schools, the subject matter differed, with Odo's work examining physics and the present study focusing on economics.

Daniel and colleagues (2021) conducted an experiment to examine how instructional materials affected the academic performance and attitudes of second-year secondary school students towards the study of Biology within the Biu Local Government Council. They employed a post-test-only experimental design, administering a test to parallel groups of students after one group received the treatment (presumably the use of specific instructional materials). Two sets of questionnaires, the Biology Students' Achievement Test (BSAT) and the Students' Attitude Scale (SAS), were developed and given to both the control and experimental groups. The researchers analyzed their hypotheses using mean scores, frequency counts, percentages, independent samples t-tests, and chi-square methods. The findings revealed a significant positive influence of instructional materials on both the students' achievement in Biology and their attitudes towards the subject. Furthermore, the study indicated a direct and interconnected relationship between academic achievement and attitude. The researchers concluded that instructional materials have a significant impact on the achievement and attitudes towards the subject.

While existing studies have investigated the influence of instructional materials on senior secondary students' performance and attitudes in diverse subjects and settings, a gap exists concerning Physics education in Apa Local Government Area (LGA), Benue State, Nigeria. Specifically, no research has yet explored the Impact of Instructional Materials on Academic Achievement and Attitudes toward Physics among Senior Secondary Student in this region. Therefore, a detailed examination is needed to understand how various teaching resources can improve both their academic achievement and their feelings about studying Physics.

This study aims to explore the impact of various teaching resources (instructional materials) on physics achievement and attitudes Among Senior Secondary Students of Apa LGA, providing insights into how these resources (materials) can enhance educational outcomes in this essential subject.

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Statement of the Problem

The persistent low performance of Nigerian students in Physics has become a serious educational concern. In Apa Local Government Area of Benue State, the subject is often regarded by students as abstract, difficult, and unappealing. Several factors contribute to this challenge, including inadequate laboratory facilities and instructional resources, the dominance of teacher-centered "chalk-and-talk" approaches, limited opportunities for hands-on practical activities, and insufficient teacher training in the effective application of instructional materials.

As a result, students not only perform poorly in Physics but also develop negative perceptions of the subject, often viewing it as irrelevant and inaccessible. Without the effective integration of instructional materials, both achievement levels and students' attitudes toward Physics are likely to deteriorate further.

This situation is particularly pronounced in rural contexts such as Apa Local Government Area, where schools are typically under-resourced and Physics instruction is largely theoretical, with minimal demonstration or practical engagement. Against this backdrop, the present study investigates the effect of instructional materials on senior secondary students' academic achievement and attitudes toward Physics. The prevalence of negative attitudes and consistent underachievement in Physics across Nigeria may be attributed to the neglect of appropriate pedagogical tools, underscoring the relevance and necessity of this research.

Purpose of the Study

This study is intended to investigate the influence of instructional materials on the academic achievement and attitudes of senior secondary school students toward Physics in Apa Local Government Area of Benue State. The specific objectives of the research are as follows:

1. To determine the impact of instructional materials on students attitude towards Physics.
2. To determine the impact of instructional materials on the achievement of students Physics.
3. To find out the attitudes of students towards Physics after PSAT.
4. To find out whether achievement in Physics determinesattitudes of students towards the subject.

Research Questions

These research questions were formulated in order to guide towards the direction of the study

1. To what extend does the use of instructional materials enhance achievement of students in Physics?
2. What is the influence of instructional materials on student's attitude towards learning Physics?
3. To what extent does achievement determines attitudes towards Physics?

Research Hypothesis

The following hypothesis was formulated in order to verify the variables of the study:

1. There are no significant relationship between instructional materials and achievement in Physics.
2. There are no significant relationship between instructional materials and attitudes towards Physics.
3. There are no significant relationship between achievement and attitude towards Physics

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METHODOLOGY

Research Design

The study employed a post-test only experimental design, in which parallel groups of students were assessed after receiving the treatment.

Population

The target population consisted of all Senior Secondary II (SSS II) students enrolled in Physics in public secondary schools within Apa Local Government Area.

Sample and Sampling Technique

The sample was drawn through simple random sampling. Schools were selected using the hat-and-draw method with replacement, thereby giving each school and student an equal chance of inclusion in the study. Schools sampled for the research are:

a. Saint John's secondary school, Amoke

b. Christ the King Academy, Ugbokpo

c. El-shadai Secondary School, Ugbokpo

d. Odugbo Community Secondary School, Odugbo

e. Government secondary school Ugbokpo

f. Oiji Demonstration College, Oiji

g. Achema Memorial Community Secondary School, Iga-Okpaya

100 SSII students were randomly selected from seven (7) schools. The students were divided into experimental group (taught with instructional materials) and control group (taught with conventional lecture).

Instruments for Data Collection

The instruments employed for data collection in this study included a Teacher Questionnaire (TQ), developed by the researcher to generate information relevant for addressing the research questions outlined in Chapter One. In addition, the Physics Students' Achievement Test (PSAT), comprising 30 multiple-choice items adapted from West African Examinations Council (WAEC) standards, was administered to assess students' academic performance. To measure students' dispositions toward the subject, the Students' Attitude Toward Physics Scale (SATPS), a 20-item Likert-type questionnaire, was also utilized.

Validity and Reliability

The instruments were validated by Physics education experts from Prince Abubakar Audu University, Anyigba. Their reliability was established through Cronbach's Alpha, yielding coefficients of 0.81 for the Physics Students' Achievement Test (PSAT) and 0.84 for the Students' Attitude Toward Physics Scale (SATPS), indicating high internal consistency.

Procedure for the Data Collection

The researcher first sought permission from the principals of the selected schools and enlisted the cooperation of the Physics teachers to deliver the instructional content and assist in administering the instruments. Adequate time was provided for students to complete their responses, after which all scripts were promptly collected and

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prepared for data analysis. The Physics Students' Achievement Test (PSAT) and the Students' Attitude Toward Physics Scale (SATPS) were administered following a four-week instructional period.

Data Analysis

All data collected were analyzed using mean scores, standard deviation, percentiles, t-test statistics, and chi-square tests. Research Question One was addressed through mean scores and standard deviation, as this approach was most appropriate for determining differences in students' performance (mean) and the extent of score variation (standard deviation). Since attitudes cannot be assessed using raw scores, Research Questions Two and Three, which focused on students' attitudes, were analyzed using simple frequencies and percentiles. For interpretation, the overall mean scores from both the Physics Students' Achievement Test (PSAT) and the Students' Attitude Toward Physics Scale (SATPS) served as benchmarks for classifying higher or lower achievement and positive or negative attitudes, respectively.

In testing the hypotheses, Hypothesis One was analyzed with an independent samples t-test, applied to raw scores to determine whether a statistically significant difference existed between the two groups. This method was considered the most appropriate for evaluating that hypothesis. For Hypotheses Two and Three, chi-square tests (χ^2) were employed, as the data involved nominal responses, particularly regarding attitudes, which cannot be measured effectively through raw scoring alone. Results of the statistical analyses were presented in tables and figures to enhance clarity and effective communication. All tests were conducted at a 0.05 level of significance with degrees of freedom determined by n – 1.

RESULTS

Research Question One

To what extent does the use of instructional materials enhances the achievement of students in Physics?

Table 1: Students means scores on PSAT

S/N	Group	Mean	Std. Deviation	Decision
1	Experimental	17.05	2.5240	
2	Control Group	10.72	2.3605	

Source: Field Study, 2025

The findings indicate that the use of instructional materials significantly improves students' achievement in Physics. As shown in the table, the experimental group taught with instructional materials achieved a higher mean score of 17.05 with a standard deviation of 2.524. In contrast, the control group, which received instruction without such materials, recorded a lower mean score of 10.72 and a standard deviation of 2.361. This suggests that students exposed to instructional materials had a greater likelihood of attaining a 74% success rate, compared to only 26% among those taught through conventional methods without instructional aids. The results therefore highlight the positive influence of instructional materials on learning outcomes, demonstrating that their integration fosters better comprehension and achievement in Physics.

Research Question Two

What is the influence of instructional materials on student's attitude towards learning Physics?

Table 2: Student's attitude based on responses.

S/N	Group	Positive	Negative	Total
1	Experimental	37	13	50

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2	Control	28	22	50
Total		65	35	100

Source: Field Study, 2025

The results presented in Table 2 demonstrate that students' attitudes toward Physics can be significantly influenced by the use of instructional materials. This trend is further illustrated in Figure 1, where the experimental group displayed a larger proportion of students with positive attitudes compared to the control group. Specifically, the control group recorded 36% negative attitudes against 24% positive attitudes, while the experimental group showed 14% negative and 26% positive responses. These findings clearly indicate that students taught with instructional materials not only develop greater interest in Physics but also cultivate a stronger sense of appreciation and engagement with the subject, thereby fostering more positive attitudes.

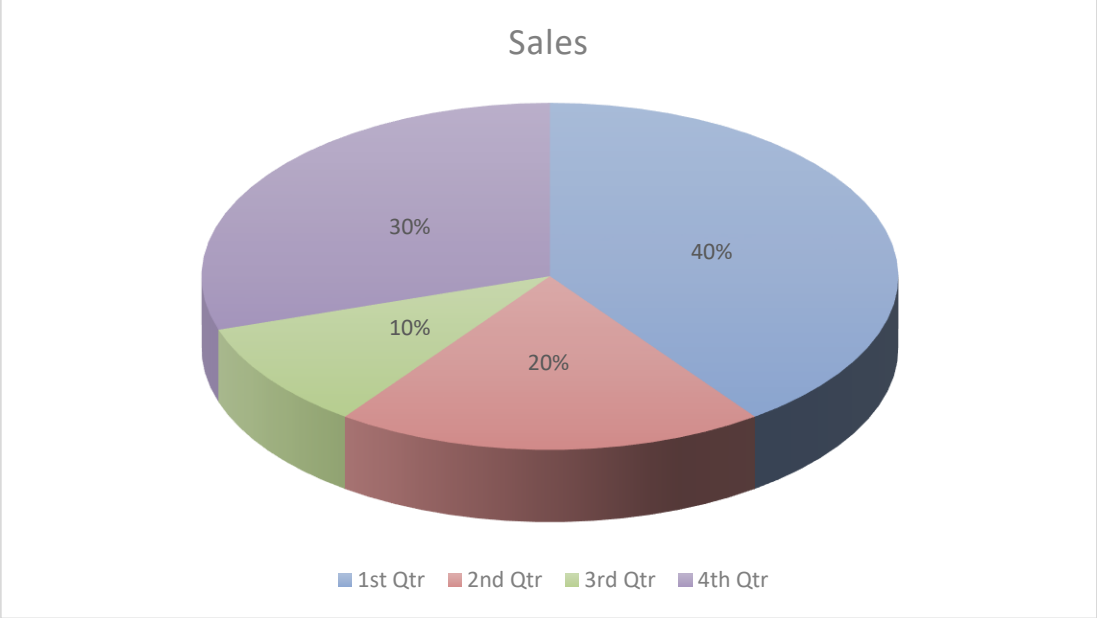

Fig. 1: A pie chart for attitude/group distribution

Research Question 3

To what extent does achievement determines attitude of students towards Physics?

Table 2: Student's attitude based on responses.

S/N	Group	Positive Attitude	Negative Attitude	Total
1	High	35	15	50
2	Low	19	31	50
Total		62	38	100

Source: Field Study, 2025

The findings indicate that students' attitudes are closely linked to their levels of achievement. As illustrated in Figure 2, high-achieving students with positive attitudes recorded the highest percentage frequency, followed by low-achieving students with negative attitudes. Conversely, the smallest proportion was observed among high achievers with negative attitudes, as shown by the shortest bar. Overall, the results clearly demonstrate the interdependent relationship between achievement and attitude, suggesting that students' performance significantly shapes their disposition toward Physics.

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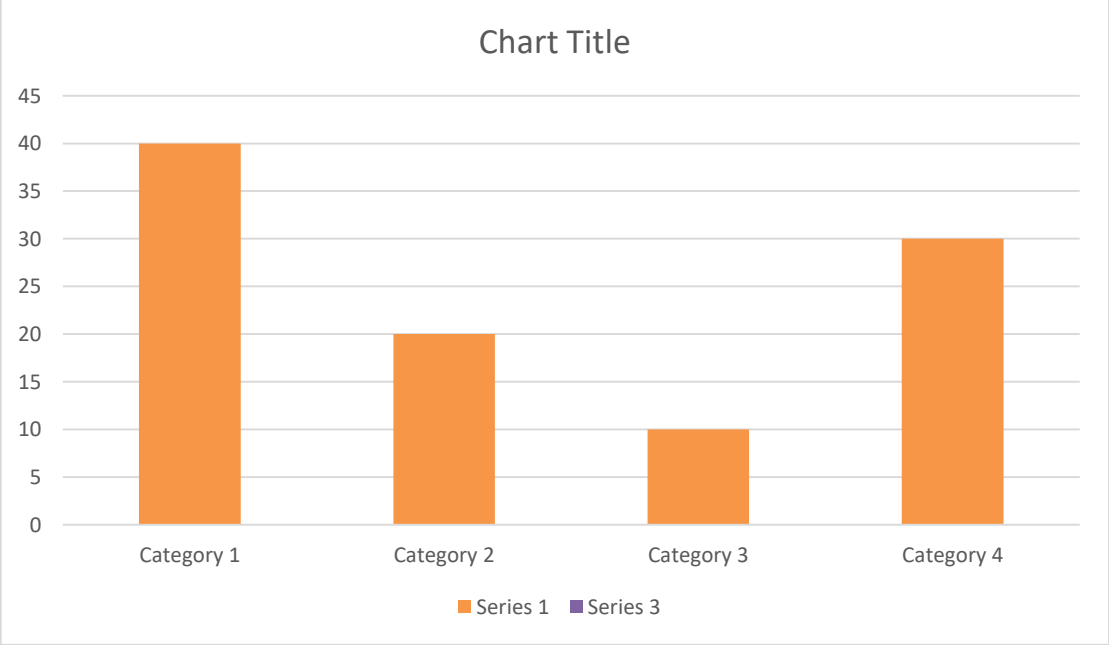

Fig. 2: Percentage by/achievement/attitude

Interpretation of result to test the hypothesis

Hypothesis One

There is no significance relationship between instructional materials and achievement in Physics.

Table 4: Mean scores and t – values of students on PSAT

S/N	Group	Mean	T-cal	T-tab	Decision p = 0.05
1	Experimental	17.05	5.7428	1.98	Rejected
2	Control Group	10.72			

The result indicates a calculated value of 5.7428, which is significant at the 0.05 level. This leads to the rejection of the first hypothesis, confirming that students' achievement is significantly influenced by the use of instructional materials.

Hypothesis Two

There is no significant relationship between instructional materials and attitude towards Physics.

Table 5: Observed frequencies for control and experimental groups.

S/N	Group	Positive Attitude	Negative Attitude	Total
1	High	35	15	50
2	Low	19	31	50
Total		62	38	100

Source: Field Study, 2025

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Table 6: Expected frequencies for control and experimental groups.

S/N	Group	Positive Attitude	Negative Attitude	Total
1	High	35	15	50
2	Low	19	31	50
Total		62	38	100

Source: Field Study, 2025

Table 7: Chi – square summary for student's attitude

0	$\sum$	$(\mathbf{0} - \sum)^2$	$(\mathbf{0} - \sum)^2/\sum$
18	25	49	1.96
23	30	49	1.63
31	24	49	2.04
43	36	49	1.36
			6.99

$X^2 \approx 7.00$

Tables 5 and 6 present the observed and expected frequencies of responses on the SATPS for both the experimental and control groups. The chi-square (χ^2) summary shown in Table 7 reveals a calculated value of approximately 7.00 with one degree of freedom. At the 95% confidence level, the critical χ^2 value is 3.9204, which is lower than the calculated χ^2. Since χ^2-cal > χ^2-tab at the 0.05 significance level, the null hypothesis is rejected. This indicates that the use of instructional materials had a significant positive influence on students' attitudes toward Physics.

Hypothesis 3

There is no significant relationship between achievement and attitude toward Physics.

Table 8: Contingency table for observed frequencies of SATPS/PSAT

S/N	Group	Positive Attitude	Negative Attitude	Total
1	High	35	15	50
2	Low	19	31	50
Total		62	38	100

Table 9: Expected frequencies on the basis of this hypothesis.

S/N	Group	Positive Attitude	Negative Attitude	Total
1	High	35	15	50

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2	Low	19	31	50
Total		62	38	100

Table 10: Chi – square summary for student's attitude

0	∑	**(0 - ∑)²**	**(0 - ∑)²/∑**
48	38	100	2.6
34	24	100	4.2
26	36	100	2.8
12	22	100	4.5
			14.1

$X^2 = 14.1$

This will be approximately a chi – square distribution with 1 degree of freedom of which 95% percentile is 3.9204<14.1 the observed x^2 is significant at 5%, so the null hypothesis is rejected with the conclusion based on the information available on the achievement of students, extremely determine their attitude

FINDINGS AND DISCUSSION

Research Question One

To what extent does the use of instructional materials enhance achievement in Physics?

Analysis of research question one revealed that instructional materials exert a substantial influence on students' academic achievement. The findings showed clear variations in mean scores and frequency distributions between students taught with instructional materials and those taught without them. Specifically, approximately 82% of students exposed to instructional materials had a high probability of scoring 60% or above, while about 78% of students in the control group were more likely to score below 60%. Nonetheless, around 18% of students in the experimental group still recorded lower scores. These results align with Abubakar (2020), who emphasized that instructional materials significantly improve students' performance in Physics, and also support Adebayo & Adigun (2018), who reported similar outcomes. While factors such as age, intellectual maturity, and cognitive capacity may have influenced performance, the controlled research design helped minimize their impact. Furthermore, the present study corroborates earlier findings by Olaide (1990), Odo (2015), Kay (2008), and Carmo (2020), all of whom concluded that activity-based and resource-supported instructional approaches enhance students' academic achievement.

Research Question Two

What is the influence of instructional materials on student's attitude towards Physics?

Findings and Discussion

Findings from research question two revealed that instructional materials significantly enhance students' attitudes toward Physics. While Naki (2018) reported that instructional resources neither improved achievement nor promoted attitude, such differences may be attributable to geographical or contextual variations. In the present study, approximately 74% of students exposed to instructional materials demonstrated positive attitudes, whereas 26% displayed negative attitudes. In contrast, the control group recorded a balanced distribution of 50%

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positive and 50% negative attitudes. This pattern could be influenced by other factors, such as intrinsic motivation, peer influence, attempts to please the teacher, or even random responses due to limited knowledge.

The experimental group's results, however, provide stronger evidence, affirming Daniel's (2021) assertion that attitude is shaped by its direction, intensity, generality, and specificity, and can therefore be altered. The positive attitudes observed among students taught with instructional materials may stem from the engaging and concrete nature of the resources, which capture attention and foster understanding, as well as from the clarity and creativity of teacher delivery. These findings align with Abdulahi (2020), who noted that instructional materials stimulate interest and enhance achievement, thereby promoting positive attitudes, and with Olaniyi & Hassan (2019), who highlighted the role of innovative instructional strategies in fostering student engagement.

Research Question Three

To what extent does achievement determines attitudes of students towards Physics?

Findings and Discussion

The findings of this study corroborate Yusuf (2012), who emphasized the interdependence of achievement and attitude. Results from research question three further demonstrate that students' attitudes are strongly influenced by their academic performance. Specifically, 35 students were identified as high achievers with positive attitudes, compared to 31 low achievers with negative attitudes. Additionally, 15 students exhibited high achievement but negative attitudes, while 19 showed low achievement yet maintained positive attitudes. This distribution highlights a stronger likelihood of high achievers developing positive attitudes than low achievers.

Supporting this, Syyeda (2016) argued that students often derive satisfaction and motivation from academic success, which fosters positive attitudes. However, the data also reveal exceptions, as approximately 20% of high achievers displayed negative attitudes, suggesting that personal factors such as intrinsic interest and passion also play critical roles.

Daniel (2021) noted that most students are visual learners, with nearly 98% of information processed through sensory input. This aligns with the present findings, which show that instructional materials substantially enhance achievement by making learning more concrete, engaging, and memorable. The clarity of explanations, effective presentation of concepts, and conducive classroom environments likely contributed to the permanence of knowledge and the observed positive outcomes.

Discussion of findings based on the Hypothesis

Hypothesis One

There is no any significant difference between instructional materials and achievement in Physics.

Findings and Discussion

The study established that instructional materials significantly improve students' achievement in Physics, consistent with the findings of Naki (2018). Results further showed that approximately 74% of students taught with instructional materials developed positive attitudes, while 26% displayed negative attitudes. In contrast, the control group recorded an even split, with 50% demonstrating positive attitudes and 50% negative. This variation suggests that attitudes may also be influenced by other factors such as intrinsic motivation, peer influence, the desire to satisfy teachers, or even random responses due to limited knowledge.

Findings from the experimental group, however, provide stronger evidence, supporting Daniel's (2021) assertion that attitude is shaped by direction, intensity, generality, and specificity, and can therefore be modified. The positive attitudes observed among students taught with instructional materials may be attributed to the concrete and engaging nature of the resources, as well as logical presentation and effective teacher delivery. These results further align with Abdulahi (2020), who posited that instructional materials stimulate students' interest and

achievement, thereby fostering positive attitudes, and with Olaniyi & Hassan (2019), who highlighted the importance of innovative instructional strategies in enhancing student engagement.

Hypothesis Two

There is no significant difference between instructional materials and attitude towards Physics.

Findings and Discussion

The hypothesis two suggests that instructional materials enormously encourage attitudes towards Physics. The result specified that influence of instructional materials on attitude of students is highly distinct such that up to 70% and above of students that were taught using instructional materials may develop positive attitude towards the subject while less than 10% may have established negative attitude. The positive attitude students may not be unconnected to the physical teacher – student's interaction nature characterized as a result of the usage of instructional materials. However, those who were taught devoid of instructional materials may develop positive attitude. This may not be separated from other factors such as gender, nature of school, condition of students, maturity of the students, teaching methods as well as other classroom conditions in which the students find themselves. This finding is in agreement with Daniel (2021) who stated that instructional materials stimulate interest and make learning more meaningful as well as permanent therefore, increases performance.

Hypothesis Three

There is no significant difference between achievement and attitude towards Physics.

Findings and Discussion

The interpretation of hypothesis three supports the conclusion that academic achievement has a significant influence on students' attitudes. The results suggest that the likelihood of high achievement coinciding with negative attitudes is relatively low, indicating that achievement and attitude are strongly interwoven, such that one rarely exists without the other. This finding aligns with Joseph (2013), who argued that achievement and attitude are closely interconnected.

The positive attitudes observed among high achievers may be attributed to the engaging, visual, and auditory nature of instructional materials, which enhance students' interest and motivation. However, as previously discussed in relation to the research questions, attitude cannot be attributed solely to the use of instructional materials or to academic achievement. Other contributing factors must also be considered. This is evident in the results, where approximately 15% of high achievers displayed negative attitudes, while about 40% of low achievers demonstrated positive attitudes.

These variations suggest that low achievers may develop negative attitudes due to discouragement from poor performance or difficulties in understanding Physics. Conversely, the presence of positive attitudes among some low achievers indicates that personal interest, external support, or motivational factors may also shape disposition toward the subject. Therefore, although exceptions exist, the overall evidence strongly indicates that achievement and instructional materials significantly influence students' attitudes toward Physics when other factors are held constant.

CONCLUSION

The findings of this study clearly demonstrate that the use of instructional materials has a profound impact on both students' achievement and their attitudes toward Physics. The evidence indicates that academic achievement strongly influences students' disposition toward the subject. Results further revealed that effective utilization of instructional materials can significantly enhance performance, foster positive attitudes, and encourage greater student participation, ultimately leading to higher grades and stronger interest in Physics. Conversely, poor or inadequate use of instructional materials may result in lower performance, which can, in turn, discourage students and diminish their motivation to learn.

The effectiveness of instructional resources is closely tied to their relevance, the clarity of presentation, the teacher's competence, and the extent of subject mastery. When appropriately selected and skillfully applied, instructional materials not only enrich the teaching–learning process but also improve skills acquisition and make learning more concrete, meaningful, and enduring.

In conclusion, this study establishes that instructional materials significantly enhance both academic achievement and attitudes toward Physics among senior secondary students in Apa, Benue State. Students exposed to instructional aids not only achieved better results but also developed greater interest and positive attitudes toward the subject. Addressing the shortage of instructional resources and strengthening teacher training are therefore essential steps toward improving the quality and outcomes of Physics education.

RECOMMENDATIONS

1. Government agencies and education boards should ensure the regular provision of sufficient, up-to-date instructional materials for secondary schools.

2. Teachers should receive continuous training on the improvisation and effective utilization of teaching aids.

3. The gradual introduction of multimedia-based instructional tools should be encouraged in secondary schools within Apa Local Government Area.

4. School administrators should establish clear policies for the proper maintenance, supervision, and accountability of instructional resources.

5. Communities and non-governmental organizations (NGOs) should partner with schools to supply 6affordable, locally improvised instructional materials.

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