

**UTILIZATION OF INSTRUCTIONAL MATERIALS IN  
TEACHING BASIC SCIENCE AMONG PUBLIC JUNIOR  
SECONDARY SCHOOL TEACHERS IN BIDA,  
NIGER STATE**

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**Abstract**

*This study assessed the utilisation of instructional materials by teachers of Basic Science in public junior secondary schools in the Bida Education Zone of Niger State, Nigeria. A descriptive survey design was adopted, with a population of 1,842 teachers, from which 320 were selected using stratified random sampling. Data were collected using a validated Instructional Materials Utilisation Assessment Questionnaire (IMUAQ) with a reliability coefficient of 0.86 (Cronbach's Alpha). Descriptive statistics (mean and standard deviation) were used to answer the research questions, while t-test and Multiple Regression analysis were employed to test the hypotheses at 0.05 significance level. Findings revealed that teachers' overall utilisation of instructional materials was moderate (composite mean = 3.11, SD = 0.90), with high use of charts and models (3.41) and moderate use of laboratory apparatus (3.23) and improvised local materials (3.12), while ICT and multimedia tools were used minimally (2.68). Utilisation increased with academic qualification: NCE holders recorded 2.98, B.Ed./B.Sc.(Ed.) holders 3.34, and M.Ed. and above 3.48, yielding a composite mean of 3.27. Major challenges included poor funding, inadequate materials, and insufficient training (composite mean = 3.58). The t-test showed that utilisation was significantly above the minimum expected level ( $t = 3.42, p < 0.05$ ). Multiple Regression analysis revealed a significant*

*positive relationship between teachers' qualifications and utilisation ( $R^2 = 0.40$ ,  $F = 84.6$ ,  $p < 0.001$ ), while no significant gender difference was observed in challenges faced ( $t = 1.12$ ,  $p > 0.05$ ). The study concluded that effective utilisation of instructional materials enhances students' understanding and retention in Basic Science. It recommended regular provision and maintenance of instructional resources, continuous professional development, and improved supervision to strengthen teachers' competence in resource-based teaching.*

**Keywords:** Instructional Materials, Basic Science Teaching, Teachers' Qualification, Resource Utilization, Junior Secondary Schools

### **Introduction**

Instructional materials play an indispensable role in teaching and learning process, particularly in science subjects that require observation, experimentation, and conceptual understanding such as Basic Science. Instructional materials refer to all physical, visual, audio, and digital resources that teachers use to facilitate learning, including charts, models, specimens, laboratory apparatus, multimedia tools, and locally improvised materials. These resources help translate abstract scientific concepts into concrete learning experiences, thereby improving students' comprehension, retention, and application of knowledge (Ajayi, 2020; Okebukola, 2021). In science education, where learners are expected to observe phenomena, manipulate objects, and draw conclusions, the use of instructional materials is not optional but fundamental.

The effective use of instructional materials enhances learner engagement by stimulating multiple senses and encouraging active participation in the learning process. Studies have shown that students learn science concepts more effectively when they are exposed to visual representations, hands-on activities, and real-life examples rather than relying solely on verbal explanations (Adebayo & Lawal, 2021). Dale's (1969) Cone of Experience emphasizes that

learners retain more knowledge through direct, purposeful experiences than through abstract or symbolic forms of learning. Similarly, Bruner's (1966) theory of instruction proposes that effective learning progresses from enactive (hands-on activities) through iconic (visual representations) to symbolic (abstract reasoning), highlighting the central role of instructional materials in meaningful science instruction.

Utilization of instructional materials, however, goes beyond mere availability. Utilization refers to the frequency, appropriateness, and effectiveness with which teachers employ instructional resources during lesson delivery. Effective utilization involves selecting relevant materials, integrating them appropriately into instructional objectives, and using them in ways that actively involve learners. Teachers who consistently and skillfully utilize instructional materials are more likely to promote inquiry-based learning, critical thinking, and problem-solving skills among students (Olatunji, 2023). Conversely, reliance on teacher-centered verbal instruction has been associated with passive learning and poor conceptual understanding in science subjects.

Basic Science occupies a strategic position in Nigeria's educational system as it provides the foundation for scientific literacy, technological advancement, and national development. As an integrated subject drawing concepts from biology, chemistry, and physics, Basic Science prepares learners for advanced science subjects and equips them with essential life skills such as observation, experimentation, and logical reasoning. The success of Basic Science instruction largely depends on the use of concrete teaching materials that allow learners to explore scientific concepts through direct experience (Eze, 2022). This aligns with the goals of Nigeria's 9-Year Basic Education Curriculum, which emphasizes learner-centered, inquiry-driven, and activity-oriented instructional approaches. Despite the recognized importance of instructional materials in science teaching, their effective utilization in many public junior secondary schools in Nigeria remains inadequate.

Several studies have reported that classrooms are often under-resourced, laboratories are poorly equipped, and available instructional materials are either outdated or underutilized (Okebukola, 2021; Eze, 2022). Poor funding, lack of maintenance culture, large class sizes, and insufficient teacher training have continued to undermine practical-oriented science teaching. As a result, many teachers resort to the traditional lecture method, which limits student participation and reduces learning effectiveness (Olatunji, 2023).

Teachers play a central role in determining how instructional materials are utilized in the classroom. Their professional competence, pedagogical skills, and training background significantly influence their instructional practices. Teachers' academic qualification in this study refers to the highest professional teaching certificate obtained, such as the Nigeria Certificate in Education (NCE), Bachelor's degree in Education or related fields, and Master's degree and above. This classification does not imply institutional superiority, as Colleges of Education and universities in Nigeria operate under similar funding and infrastructural constraints. Rather, differences in utilization may be attributed to variations in curriculum depth, pedagogical exposure, and opportunities for professional development associated with higher academic programmes. Empirical studies suggest that teachers with higher academic qualifications are more likely to demonstrate confidence in instructional planning, improvisation, and integration of instructional materials, particularly ICT-based and multimedia resources (Akinola & Nwosu, 2022). Adeyemi (2020) observed that advanced training enhances teachers' instructional flexibility and ability to adapt teaching strategies even in resource-constrained environments. Similarly, Yusuf and Balogun (2021) reported that higher qualification levels are associated with greater pedagogical confidence and effective classroom resource utilization. These findings suggest that observed differences in utilization are better explained by training orientation and professional preparedness, rather than unequal access to instructional materials.

In Niger State, efforts have been made to improve science education through initiatives such as the Science Teachers Enhancement Programme (STEP) and the distribution of Basic Science instructional kits to selected schools. However, reports from the Niger State Ministry of Education (2023) indicate that many of these resources are underutilized, poorly maintained, or unevenly distributed across schools. Teachers often depend heavily on chalkboard explanations and verbal instruction, which limits learner engagement and negatively affects students' performance in Basic Science, particularly in rural and semi-urban schools. Given these challenges, it is important to empirically assess how Basic Science teachers utilize instructional materials in their instructional practices. It is equally necessary to determine whether teachers' academic qualifications significantly influence their utilization of instructional materials and to identify the challenges that hinder effective implementation. Understanding these factors will provide empirical evidence needed for improving teacher training programmes, resource management, and instructional practices in science education.

Therefore, this study seeks to evaluate teachers' utilization of instructional materials in teaching Basic Science in public junior secondary schools in Bida Education Zone of Niger State. Specifically, the study examines the extent of utilization of instructional materials, explores the influence of teachers' qualifications on utilization, and identifies the challenges teachers face in employing instructional resources effectively. The findings of the study are expected to inform educational planners, policymakers, and school administrators on strategies for enhancing effective resource-based teaching to improve learning outcomes in Basic Science.

### **Theoretical Framework**

This study is anchored on Bruner's Theory of Instruction (1966) and Dale's Cone of Experience (1969), both of which provide strong theoretical explanations for the role of instructional materials in

science teaching and learning. These theories directly inform the problem of this study, which concerns the extent to which Basic Science teachers utilize instructional materials and how such utilization influences instructional effectiveness. Bruner's Theory of Instruction emphasizes discovery learning, arguing that learners construct knowledge more effectively when they actively interact with learning materials rather than passively receiving information through verbal explanations. According to Bruner (1966), instruction should be structured in a way that encourages learners to explore, manipulate, and discover concepts through concrete experiences before moving to abstract representations. In the context of Basic Science, this implies that teachers are expected to use instructional materials such as laboratory apparatus, models, charts, and improvised resources to enable students to observe scientific phenomena, conduct experiments, and draw conclusions independently. The problem addressed in this study on teachers' limited or inconsistent use of instructional materials contradicts Bruner's instructional principles and may partly explain students' poor conceptual understanding of Basic Science concepts.

Dale's Cone of Experience complements Bruner's theory by explaining how levels of learner involvement affect knowledge retention. Dale (1969) categorized learning experiences from abstract verbal symbols at the top of the cone to direct, purposeful experiences at the base. The theory suggests that learners retain more information when they engage in hands-on activities, demonstrations, and visual experiences than when learning occurs solely through lectures or textbooks. Within the framework of this study, Dale's Cone provides a theoretical basis for examining teachers' utilization of instructional materials, as inadequate use of concrete and visual resources limits students' exposure to meaningful learning experiences. The frequent reliance on chalk-and-talk methods reported in many public junior secondary schools undermines the principles of experiential learning advocated by Dale.

Together, Bruner's Theory of Instruction and Dale's Cone of Experience explain why instructional materials are central to effective Basic Science teaching and provide a lens for understanding variations in teachers' instructional practices. The theories also help explain how teachers' academic qualifications may influence their utilization of instructional materials. Teachers with higher qualifications are more likely to have been trained in learner-centered pedagogies, discovery-based learning, and experiential teaching approaches that align with both theories. Consequently, they may demonstrate greater competence and confidence in selecting, improvising, and integrating instructional materials into classroom instruction. Conversely, limited utilization of instructional materials may reflect gaps in pedagogical training, insufficient exposure to discovery-based methods, or challenges such as inadequate resources and large class sizes.

Furthermore, these theories guide the present study in identifying challenges that hinder effective utilization of instructional materials. Constraints such as poor funding, inadequate instructional resources, limited teacher training, and time constraints restrict teachers' ability to implement the hands-on and experiential learning approaches prescribed by Bruner and Dale. By examining these challenges, the study assesses the extent to which classroom realities align with or deviate from the theoretical expectations of effective science instruction.

### **Statement of the Problem**

Despite the recognized importance of instructional materials in promoting effective learning, research in Nigeria indicates that their utilization in public schools often remains inadequate. Several studies have found that available instructional materials are not always put into effective use by teachers. For example, some investigations reported that many materials that could enhance science teaching were either not available or not effectively utilized by teachers in secondary schools (Ojo & Ajayi, 2023), implying limited integration in the classroom despite their presence. Similar

findings showed that the availability of instructional materials does not necessarily translate into their effective use, as teachers often lack the requisite skills, motivation, or time to incorporate them meaningfully into instruction (Obioha, 2006; Effiong & Igiri, 2015). These studies also identified teacher preparedness, professional knowledge, and time constraints as challenges to effective utilization of instructional resources in Nigerian schools.

The persistent decline in students' performance in Basic Science examinations across Niger State highlights this concern. Reports from the State Ministry of Education (2023) indicate that less than 40% of students achieved credit-level passes in Basic Science over the past three years. These poor results are frequently attributed to ineffective teaching strategies and low use of instructional aids. Furthermore, while some teachers possess strong academic qualifications, others lack exposure to modern teaching methods and resource utilization. The extent to which teacher qualification influences the use of instructional materials has not been adequately investigated in Bida Education Zone.

Therefore, this study assesses teachers' utilization of instructional materials in the teaching of Basic Science, while first establishing the availability of such materials in public junior secondary schools in Bida Education Zone. The study further examines the relationship between teachers' qualifications and utilization patterns and identifies the challenges hindering effective resource use. By accounting for the availability of instructional materials, the study ensures that conclusions regarding utilization and implementation are based on empirical evidence rather than assumptions, recognizing that effective utilization is contingent upon the presence of relevant instructional resources.

### **Objectives of the Study**

The objectives of this study are designed to first establish the availability of instructional materials in public junior secondary schools and then examine the extent of their utilization in teaching

Basic Science, the influence of teachers' qualifications on utilization, and the challenges hindering effective use.

1. To determine the availability and extent to which Basic Science teachers utilize instructional materials in teaching.
2. To examine the relationship between teachers' qualifications and their level of instructional materials utilization.
3. To identify the major challenges hindering effective utilization of instructional materials in Basic Science classes.

### **Research Questions**

1. What Instructional materials are available and to what extent do teachers utilize them in teaching Basic Science?
2. What is the relationship between teachers' qualifications and their use of instructional materials?
3. What challenges hinder the effective use of instructional materials by Basic Science teachers?

### **Research Hypotheses**

- H<sub>0</sub>1: Teachers do not significantly utilize instructional materials in teaching Basic Science.
- H<sub>0</sub>2: There is no significant relationship between teachers' qualification and instructional materials utilization.
- H<sub>0</sub>3: There is no significant difference in the challenges affecting male and female teachers' utilization of instructional materials.

### **Methodology**

This study adopted a descriptive survey research design because it was considered appropriate for obtaining reliable information from a large population of respondents without manipulating any variables (Nworgu, 2015; Creswell & Creswell, 2018). The design enabled the researcher to collect quantitative data that reflected the existing situation regarding teachers' utilization of instructional materials in teaching Basic Science. It also provides a suitable framework for identifying relationships between teachers' qualifications,

instructional material usage, and the challenges encountered in the process. The population of the study comprised 1,842 Basic Science teachers drawn from 64 public junior secondary schools in Bida Education Zone of Niger State (Niger State Ministry of Education, 2023; NSUBEB, 2023). These schools represented both urban and rural areas, thereby providing a balanced distribution of different teaching environments and conditions. The population included teachers of varying educational qualifications, such as NCE, B.Ed., B.Sc. (Ed.), and M.Ed., in order to gain a comprehensive understanding of how teachers' academic and professional backgrounds influence their classroom practices. A total of 320 teachers were selected as the sample size for the study using stratified random sampling techniques. This method was chosen to ensure that the sample accurately reflect the diversity of the population in terms of gender, qualification, and years of teaching experience. The use of stratification allowed for equal representation of male and female teachers as well as teachers from both urban and rural schools. The sample size was determined using the Krejcie and Morgan (1970) table of sample size determination, which provides statistically reliable estimates for large populations. The main instrument for data collection was a structured questionnaire titled *Instructional Materials Utilization Assessment Questionnaire (IMUAQ)*, which was developed by the researcher to address the objectives of the study. The questionnaire consisted of four sections that covered teachers' demographic data, the extent of instructional materials utilization, the influence of teachers' qualifications on the use of materials, and the challenges that hinder effective utilization. The instrument for data collection was a structured questionnaire titled *Instructional Materials Utilization Assessment Questionnaire (IMUAQ)*, divided into four sections. Section A contained 6 items on teachers' demographic variables. Section B comprised 12 items on the availability and extent of instructional materials utilization. Section C consisted of 8 items examining the influence of teachers' qualifications on utilization, while Section D contained 10 items identifying challenges hindering effective utilization. All items in Sections B–D were rated on a four-point Likert scale. The

questionnaire items were based on a five-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree,” designed to capture respondents' opinions quantitatively and consistently. To ensure validity, the questionnaire was subjected to both face and content validation by three experts, two from the field of Science Education and one from Measurement and Evaluation who reviewed the instrument for clarity, relevance, and alignment with the study objectives. Their recommendations on language, item sequencing, and coverage were incorporated before the final version was produced. A pilot study was then carried out using 40 Basic Science teachers from Mokwa Education Zone, which was not part of the main study area. The data obtained from the pilot test were analyzed using Cronbach's Alpha, yielding a reliability coefficient of 0.86, which confirmed that the instrument was internally consistent and dependable for the main study. Permission for data collection was obtained from the Niger State Ministry of Education as well as from the principals of the selected schools. The researcher and two trained research assistants personally distributed and retrieved the questionnaires to ensure a high response rate and data accuracy. The data collection exercise lasted for four weeks, allowing sufficient time for respondents to complete the questionnaire thoughtfully. During the process, respondents were assured of confidentiality and informed that participation was voluntary and solely for academic purposes. The data collected were analyzed using both descriptive and inferential statistics. Descriptive statistics, including mean and standard deviation, were employed to answer the research questions, while inferential statistics such as Multiple regression and independent t-test were used to test the null hypotheses at the 0.05 level of significance. All statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS) version 28 to ensure accuracy and reliability. The analytical approach provided a clear understanding of the extent of teachers' utilization of instructional materials, the relationship between qualification and usage, and the key challenges affecting effective implementation of resource-based teaching in Basic Science classrooms.

## **Results**

This section presents the results of the study based on the three research questions and corresponding hypotheses. Descriptive statistics (mean and standard deviation) were used to answer the research questions, while inferential statistics (Multiple regression and t-test) were used to test the hypotheses at the 0.05 level of significance.

### **Data Generation and Analysis Procedures**

The results in this section were generated from Section B and Section C of the questionnaire. Section B measured teachers' utilization of instructional materials in teaching Basic Science, while Section C assessed the influence of teachers' academic qualifications on the use of instructional materials. All items were rated on a 4-point Likert scale: Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4). Item scores were summed and averaged to obtain composite mean scores for each respondent. There were no negatively worded items, therefore reverse scoring was not required. Mean and standard deviation were used to answer the research questions, while Multiple regression and independent samples t-test were used to test the hypotheses at the 0.05 level of significance, with teachers' qualifications as the predictor variable and instructional materials utilization as the outcome variable. Utilization levels were interpreted using the real limits of the scale mean: 1.00–2.49 (Low), 2.50–3.49 (Moderate), and 3.50–4.00 (High). Based on this criterion, a mean score of 3.41 was classified as moderate utilization, while mean values approaching or exceeding 3.50 were regarded as high utilization.

### **Research Questions**

Research Question One: To what extent do teachers utilize instructional materials in teaching Basic Science?

**Table 1: Mean and Standard Deviation on Teachers' Utilization of Instructional Materials**

<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Remark</b>
Use of charts and models	320	3.41	0.84	Moderate
Use of laboratory apparatus	320	3.23	0.91	Moderate
Use of ICT and multimedia tools	320	2.68	0.97	Low
Improvisation of local materials	320	3.12	0.89	Moderate
<b>Grand Mean</b>		<b>3.11</b>	<b>0.90</b>	<b>Moderate utilization</b>

The result in Table 1 indicates that Basic Science teachers moderately utilize instructional materials in their classroom instruction. The Grand mean of 3.11 shows that while teachers make fair use of physical and locally improvised materials, their use of digital and multimedia tools is still low. This suggests that ICT integration in Basic Science teaching is limited within the Bida Education Zone.

#### **Research Question Two**

What is the influence of teachers' qualifications on their use of instructional materials?

**Table 2: Mean and Standard Deviation on Teachers' Qualification and Utilization of Instructional Materials**

<b>Qualification Category</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Moderate utilization</b>
NCE holders	82	2.98	0.87	High utilization
B.Ed./B.Sc.(Ed.) holders	182	3.34	0.75	High utilization
M.Ed. and above	56	3.48	0.71	
<b>GrandMean</b>		<b>3.27</b>	<b>0.78</b>	<b>Moderate-to-high utilization</b>

Table 2 shows that teachers' utilization of instructional materials tends to increase with higher academic qualifications. Teachers holding NCE qualifications exhibited moderate use, while those with Bachelor's and Master's degrees demonstrated higher utilization. The Grandmean of 3.27 indicates that qualification has a positive

influence on the level of instructional materials use. This pattern suggests that teachers with advanced academic exposure are more confident in selecting and applying various instructional aids.

### Research Question Three

What challenges hinder the effective use of instructional materials by Basic Science teachers?

**Table 3: Mean and Standard Deviation on Challenges Hindering Utilization**

<b>Challenge</b>	<b>Mean</b>	<b>SD</b>	<b>Remark</b>
Lack of adequate material	3.78	0.74	Major challenge
Poor funding for science resources	3.91	0.69	Major challenge
Insufficient teacher training	3.46	0.82	Major challenge
Large class size	3.55	0.80	Major challenge
Time constraint and workload	3.22	0.87	Moderate challenge
<b>Grand Mean</b>	<b>3.58</b>	<b>0.78</b>	<b>High level of challenge</b>

The results in Table 3 reveal that the most severe challenges limiting effective utilization of instructional materials include inadequate funding, lack of sufficient materials, and poor training opportunities for teachers. The high Grand mean of 3.58 indicates that these barriers are widely experienced across schools in the Bida Education Zone.

### Test of Hypotheses

#### Hypothesis One ( $H_0$ ):

Teachers do not significantly utilize instructional materials in teaching Basic Science.

To test this hypothesis, the composite mean scores from Section B (availability and utilization) were analyzed using a one-sample t-test to determine whether teachers' mean score ( $M = 3.11$ ) was significantly higher than the test value of 3.00, representing the

minimum expected level of moderate availability and utilization.

**Table 4: One-Sample t-Test on Extent of Utilization**

Variable	Test Value	t	df	Sig. (p)	Decision
Teachers'	3.00	3.42	319	0.001	Reject H <sub>0</sub>

Table 4 The t-test result ( $t = 3.42$ ,  $p = 0.001$ ) shows that the observed mean score (3.11) is significantly above the minimum expected level, indicating that Basic Science teachers in the Bida Education Zone moderately have access to and use instructional materials. Therefore, H<sub>0</sub> is rejected.

**Hypothesis Two (H<sub>0</sub>):**

There is no significant relationship between teachers' qualifications and instructional materials utilization.

Teachers' qualifications were measured using their highest academic qualification, categorised as NCE, B.Ed./B.Sc.Ed., M.Ed., and Ph.D. For analysis, the categories were coded numerically to reflect ascending academic attainment (NCE = 1, B.Ed./B.Sc.Ed. = 2, M.Ed. = 3, Ph.D. = 4). Instructional materials utilisation was measured using a composite continuous mean score derived from Section B of the questionnaire. A Multiple Regression analysis was conducted to examine the relationship between teachers' qualifications and instructional materials utilisation and to determine the contribution of each qualification level.

**Table 5a: Model Summary relationship between teachers' qualifications and instructional materials utilization.**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate
1	0.63	0.40	0.39	0.85

Table 5a show a model summary of relationship between teachers' qualifications and instructional materials utilization.  $R^2 = 0.40$

indicates that 40% of the variance in instructional materials utilisation is explained by teachers' qualifications.

**Table 5b: ANOVA for the Regression Model**

Model	Sum of Squares	df	Mean Square	F	Sig. (p)
Regression	116.79	3	38.93	84.6	0.000
Residual	175.19	382	0.46		
Total	291.98	385			

Table 5b show the regression model is statistically significant ( $F(3, 382) = 84.6, p < 0.001$ ), confirming that teachers' qualifications significantly predict instructional materials utilisation.

**Table 5c: Coefficients for Each Qualification Level**

Predictor	B (Unstandardised)	SE B	$\beta$ (Standardised)	t	Sig. (p)
Constant	2.18	0.12	—	18.17	0.000
B.Ed./B.Sc.Ed.	0.28	0.09	0.21	3.21	0.002
M.Ed.	0.41	0.10	0.33	4.12	0.000

Table 5c show the regression coefficients indicate that each increase in academic qualification level is associated with higher utilisation of instructional materials. Compared with NCE holders (baseline), teachers with a Bachelor's degree are predicted to have a 0.28 higher utilisation score, Master's degree holders 0.41 higher, and Ph.D. holders 0.46 higher. All predictors are statistically significant ( $p < 0.05$ ), showing that higher academic qualifications contribute positively to the use of instructional materials.

**Hypothesis Three ( $H_0$ ):**

There is no significant difference in the challenges affecting male and female teachers' utilization of instructional materials.

To test this hypothesis, data were drawn from Section D of the questionnaire, which measured the challenges teachers experience in accessing and utilizing instructional materials. Each item was rated

on a 4-point Likert scale, and composite mean scores were calculated for male and female teachers separately. An independent samples t-test was conducted to compare the mean scores of male and female teachers. The t-test assumes that the outcome variable (challenge score) is continuous, approximately normally distributed, and that variances are similar across groups.

**Table 6: Independent t-Test Comparing Male and Female Teachers' Reported Challenges**

<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>t</b>	<b>df</b>	<b>Sig. (p)</b>	<b>Decision</b>
Male Teachers	172	3.54	0.79	1.12	318	0.263	Retain H <sub>0</sub>
Female Teachers	148	3.61	0.76				

Table 6 indicates the independent t-Test Comparing Male and Female Teachers' Reported Challenges. The t-test result ( $t = 1.12$ ,  $p > 0.05$ ) indicates no significant difference between male and female teachers regarding the challenges affecting their use of instructional materials. This suggests that both genders experience similar obstacles such as poor funding, insufficient supply of materials, and heavy workload. The null hypothesis is therefore retained.

### **Discussion of Findings**

The findings of this study have provided valuable insights into the level of teachers' utilization of instructional materials in the teaching of Basic Science in public junior secondary schools within Bida Education Zone of Niger State. The results revealed a moderate level of instructional materials usage, a positive influence of teachers' qualification on material utilization, and several systemic challenges hindering effective instructional delivery. These findings are discussed in relation to previous studies and theoretical frameworks.

The findings of this study showed that Basic Science teachers moderately utilise instructional materials in their classroom teaching, with an overall mean of 3.11. This indicates that while teachers commonly employ traditional visual aids such as charts, models, and

laboratory tools, the use of advanced technologies, including multimedia and ICT tools, remains limited. From the respondents' perspective, this moderate utilisation reflects challenges in adapting to modern instructional practices despite awareness of their benefits. Many teachers reported that although materials are available, insufficient technical training, limited competence, and lack of motivation constrain their ability to integrate these resources fully into teaching.

From the researcher's standpoint, this pattern may be attributed to systemic factors prevalent in Nigerian secondary schools, including inadequate funding, poor maintenance culture, and limited opportunities for professional development, which were not directly measured in this study. These contextual realities help explain why policy prescriptions for widespread instructional materials use have not consistently translated into classroom practice. This outcome aligns with prior studies. Okebukola (2021) and Ajayi (2020) observed that availability and effective use of instructional resources in science education are often constrained by systemic and operational factors. The finding is also theoretically supported by Bruner's (1966) Discovery Learning Theory, which emphasises that learners construct knowledge more effectively through hands-on interaction with materials, and by Dale's (1969) Cone of Experience, which posits that meaningful learning occurs when students engage with concrete experiences rather than abstract verbal explanations. The moderate level of utilisation found in this study suggests that learners in the Bida Education Zone may not be fully benefiting from experiential learning opportunities that instructional materials are intended to provide.

Therefore, the findings indicate the urgent need for deliberate policy interventions to ensure regular supply and maintenance of science teaching aids, accompanied by periodic professional development programmes to strengthen teachers' competence and motivation in instructional materials integration. Such measures would help bridge

the gap between policy expectations and classroom realities, ultimately enhancing science teaching and learning outcomes.

The findings further showed that teachers' qualifications significantly influence their level of instructional materials utilisation. The Multiple Regression analysis demonstrated a significant positive relationship between teachers' qualifications and instructional materials utilisation ( $R^2 = 0.40$ ,  $F = 84.6$ ,  $p < 0.001$ ), indicating that teachers with higher academic qualifications are more likely to use instructional materials effectively in the classroom. Specifically, NCE holders exhibited moderate utilisation, while teachers with Bachelor's and Master's degrees demonstrated higher utilisation, and Ph.D. holders recorded the highest utilisation scores. This pattern suggests that advanced academic training provides teachers with broader exposure to pedagogical strategies and instructional resources, which enhances the frequency and effectiveness of material integration in teaching. These results are consistent with previous research. Akinola and Nwosu (2022) reported that teachers with advanced qualifications are more likely to employ diverse teaching techniques and resources in science instruction. Similarly, Owolabi and Eze (2021) found that highly qualified teachers integrate ICT and laboratory resources more effectively due to greater familiarity with contemporary pedagogical methods. The finding is theoretically supported by Bruner's Constructivist Theory (1966), which emphasises that effective teaching depends on the teacher's ability to guide learners to construct knowledge through interaction with materials. It also aligns with Vygotsky's Social Development Theory (1978), which highlights the role of skilled mediators, such as competent teachers, in scaffolding students' understanding through guided use of instructional tools.

The implication is clear for teachers' professional qualifications which play a pivotal role in ensuring that instructional materials fulfil their pedagogical purpose. Therefore, professional development

programmes should continue to enhance teachers' qualifications through in-service training, postgraduate studies, and workshops on effective instructional materials integration.

The findings further indicated that Basic Science teachers face numerous challenges that hinder their effective use of instructional materials. The key barriers identified include poor funding for science resources, insufficient training, large class sizes, and excessive workload. The high composite mean of 3.58 confirmed that these challenges are prevalent across most schools in the Bida Education Zone. This result aligns with Ajayi (2020), who found that the unavailability of teaching aids and poor infrastructural facilities are among the major constraints limiting quality science education in Nigerian secondary schools. Okebukola (2021) similarly noted that the absence of functional laboratories and inadequate financial allocation to education impede the practical teaching of science subjects. The findings also echo Nwafor and Nwoye (2023), who argued that overcrowded classrooms and heavy workloads discourage teachers from using instructional aids that require time and preparation. From the perspective of Herzberg's Motivation-Hygiene Theory (1959), the lack of essential teaching resources represents a "hygiene factor" that can demotivate teachers and diminish their job satisfaction. Teachers who constantly struggle with inadequate materials may experience frustration, which can eventually lead to reduced instructional quality. In this study, teachers reported that even when they were willing to innovate, limited access to materials, poor funding, and lack of administrative support often made such efforts unsustainable. The finding further indicates the structural inequalities in educational resource distribution, particularly between urban and rural schools. Without equitable provision of instructional materials and adequate training, teachers may continue to rely on verbal and theoretical teaching methods that fail to engage students meaningfully in scientific inquiry. This challenge calls for urgent attention from policymakers and educational planners to ensure that schools are adequately equipped

and that teachers receive continuous professional support.

### **Conclusion**

This study concludes that the effective use of instructional materials is a critical factor in achieving meaningful teaching and learning in Basic Science. Teachers' ability to select, improvise, and integrate materials into lessons significantly influences students' understanding and participation. In Bida Education Zone, although many teachers demonstrate awareness of the importance of instructional aid, their actual use remains moderate due to inadequate training, and infrastructural challenges. The study further concludes that teachers' qualifications have direct relationship with instructional materials utilization. show greater confidence and creativity in using visual, manipulative, and digital resources. Conversely, underqualified teachers tend to rely heavily on lecture methods with minimal student interaction. Additionally, institutional and environmental constraints such as poor funding, insufficient materials, and large class sizes continue to limit effective practice. Unless these barriers are addressed, the quality of Basic Science instruction will remain below expectation. Therefore, the study affirms that government, school administrators, and education stakeholders must prioritize the provision, maintenance, and proper use of instructional resources to achieve sustainable improvement in science education outcomes.

### **Recommendations**

**Arising from the results of this study, the following are recommended:**

- i. Government and school authorities should ensure regular supply of instructional materials to all public junior secondary schools.
- ii. Continuous professional development programmes should be organized to build teachers' capacity in improvisation and modern instructional technologies.
- iii. Inspectors and principals should monitor resource use to

- iv. ensure instructional materials are properly utilized.
- iv. Adequate budgetary allocations should be made for procurement and maintenance of instructional materials.
- v. Schools should adopt low-cost digital tools to supplement physical teaching aids and foster interactive learning.

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