

EFFECT OF INSTRUCTIONAL MATERIALS ON THE TEACHING AND LEARNING OF AGRICULTURAL SCIENCE IN PUBLIC SENIOR SECONDARY SCHOOLS IN KAURA NAMODA LOCAL GOVERNMENT OF ZAMFARA STATE, NIGERIA

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ABSTRACT

This study examined the effect of instructional materials on the teaching and learning of Agricultural Science in public senior secondary schools in Kaura Namoda Local Government Area of Zamfara State, Nigeria. The research adopted a descriptive survey design, involving 300 students and 20 teachers selected from 10 public senior secondary schools. Four research questions guided the study, and data were collected using structured questionnaires. Findings revealed that instructional materials have a significant positive effect on students' understanding of Agricultural Science, with a grand mean of 2.74 from students' perspective. However, the study also found a critical shortage of instructional materials in schools (grand mean = 1.92 from teachers' perspective), and teachers' utilization of available materials was inadequate (grand mean = 2.21 from students' perspective). While teachers self-reported moderate utilization (grand mean = 2.53), their efforts were constrained by severe resource limitations. The study concluded that although instructional materials significantly enhance students' learning outcomes, the severe shortage of these resources in Kaura Namoda LGA undermines the potential benefits. Recommendations include increased government funding for instructional materials, regular monitoring of resource distribution, and capacity building for teachers on improvisation and effective utilization of available materials.

KEYWORDS: Instructional materials, Agricultural Science, teaching effectiveness, students' understanding, public secondary schools.

1. INTRODUCTION

Education is universally acknowledged as a fundamental tool for national development and individual empowerment. In Nigeria, the senior secondary school level represents a critical stage in the educational system, serving as a bridge between basic education and tertiary institutions. Agricultural Science, as a vocational subject at this level, plays a pivotal role in equipping students with practical skills for agricultural production, food security, and economic development. The National Policy on Education (Federal Republic of Nigeria, 2014) explicitly recognizes Agricultural Science as a core vocational subject designed to prepare students for careers in agriculture and related fields.

The effectiveness of teaching Agricultural Science depends significantly on the availability and utilization of instructional materials. Instructional materials encompass all resources, devices, and tools that teachers use to facilitate learning, including textbooks, charts, models, laboratory equipment, audio-visual aids, and technological devices (Hussain, 2010). These materials serve multiple functions: they make abstract concepts concrete, stimulate students' interest, enhance memory retention, bridge the gap between theory and practice, and promote active learning (Iyede & Otobo, 2023; Nwike & Catherine, 2013).

Agricultural Science, by its very nature, is a practical discipline that requires hands-on experience and interaction with real-life agricultural processes. The subject encompasses crop production, animal husbandry, soil science, agricultural economics, and farm mechanization—all of which are best taught through practical demonstrations and the use of relevant instructional materials (Egun, 2007). Without adequate materials, teaching becomes theoretical and abstract, limiting students' ability to develop practical skills and understand complex agricultural concepts.

In Zamfara State, like many other states in North-Western Nigeria, the teaching of Agricultural Science faces numerous challenges. The state's agrarian economy, with a majority of the population engaged in farming, underscores the importance of effective Agricultural Science education. However, reports indicate that instructional materials are grossly inadequate in most public schools, and teachers often resort to theoretical teaching methods (Abdullahi *et al.*, 2017; Sani, n.d.). This situation has implications for students' academic performance, practical skills development, and interest in agriculture as a career.

The Zamfara State government has made efforts to address this challenge, including the recent distribution of 408,137 teaching and learning materials in 2025, described as one of the largest single investments in institutional resources in the state's history. However, the impact of such initiatives on the actual teaching and learning of Agricultural Science in public

schools remains unclear. This study, therefore, sought to examine the effect of instructional materials on the teaching and learning of Agricultural Science in public senior secondary schools in Kaura Namoda Local Government Area of Zamfara State.

1.1 Statement of the Problem

The teaching and learning of Agricultural Science in Nigerian secondary schools have been characterized by persistent challenges, including inadequate instructional materials, poorly equipped laboratories, and lack of functional school farms (Egun, 2007; Abdullahi *et al.*, 2017). This situation is particularly acute in rural and semi-urban areas, where schools lack basic teaching resources. In Kaura Namoda Local Government Area of Zamfara State, evidence suggests that Agricultural Science teachers often rely on the traditional "chalk and talk" method, with limited use of charts, models, laboratory equipment, or practical demonstrations.

The consequences of this situation are far-reaching. Students may struggle to understand complex agricultural concepts, lose interest in the subject, and fail to acquire practical skills essential for agricultural practice. This not only affects their academic performance but also undermines the broader goal of producing skilled agricultural professionals for the nation's agricultural sector. Furthermore, the lack of adequate instructional materials may demoralize teachers and reduce their teaching effectiveness.

Despite the recognized importance of instructional materials in teaching Agricultural Science, limited empirical studies have been conducted in Zamfara State, particularly in Kaura Namoda LGA, to document the availability, utilization, and effect of these materials on students' learning outcomes. This study, therefore, sought to address this gap by providing empirical evidence on the effect of instructional materials on the teaching and learning of Agricultural Science in public senior secondary schools in the study area.

1.2 Purpose of the Study

The main purpose of this study was to examine the effect of instructional materials on the teaching and learning of Agricultural Science in public senior secondary schools in Kaura Namoda Local Government Area of Zamfara State. Specifically, the study sought to:

1. Assess the effect of instructional materials on students' understanding of Agricultural Science.
2. Examine students' perceptions of teachers' utilization of instructional materials.
3. Determine the availability of instructional materials for teaching Agricultural Science from teachers' perspective.
4. Investigate teachers' self-reported utilization of instructional materials.

1.3 Research Questions

The following research questions guided the study:

1. What is the effect of instructional materials on students' understanding of Agricultural Science in public senior secondary schools in Kaura Namoda LGA?
2. What are students' perceptions of teachers' utilization of instructional materials in teaching Agricultural Science?
3. What is the level of availability of instructional materials for teaching Agricultural Science in public senior secondary schools in Kaura Namoda LGA?
4. What are teachers' self-reported practices regarding the utilization of instructional materials in teaching Agricultural Science?

1.4 Null Hypotheses

The following null hypotheses were formulated to be tested at $p \leq 0.05$ level of significance:

1. H_{01} : There is no significant positive effect of instructional materials on students' understanding of Agricultural Science in public senior secondary schools in Kaura Namoda LGA.
2. H_{02} : There is no significant inadequacy in teachers' utilization of instructional materials as perceived by students.
3. H_{03} : There is no significant shortage of instructional materials for teaching Agricultural Science as perceived by teachers.

2 METHODOLOGY

2.1 Research Design

This study adopted a descriptive survey research design. The descriptive survey design is appropriate for studies that aim to describe the characteristics of a population and gather data on attitudes, opinions, and practices (Creswell & Creswell, 2018). This design enabled the researcher to collect data from a large sample of respondents and describe the current state of instructional materials in public senior secondary schools in Kaura Namoda LGA.

2.2 Area of Study

The study was conducted in Kaura Namoda Local Government Area of Zamfara State, Nigeria. Kaura Namoda is one of the 14 local government areas in Zamfara State, located in the northern part of the state. The area is predominantly agrarian, with farming being the main occupation of the majority of the population. The choice of this area was informed by the agrarian nature of the population, which underscores the importance of Agricultural

Science education, and the perceived challenges of instructional materials in public schools in the area.

2.3 Population of the Study

The target population of this study comprised all senior secondary school students and Agricultural Science teachers in public secondary schools in Kaura Namoda LGA. According to records from the Kaura Namoda Local Education Authority, there were approximately 4,500 senior secondary school students and 45 Agricultural Science teachers in the 15 public senior secondary schools in the LGA at the time of the study.

2.4 Sample and Sampling Technique

The sample for this study consisted of 300 students and 20 teachers selected from 10 public senior secondary schools in Kaura Namoda LGA. The selection of the 10 schools was done using stratified random sampling to ensure representation across different school types and locations. From each school, 30 students were randomly selected from Senior Secondary classes (SS I-III), and 2 Agricultural Science teachers were purposively selected. The sample size of 300 students and 20 teachers was deemed adequate for the study based on the requirements for survey research (Krejcie & Morgan, 1970).

2.5 Instrumentation

The main instruments for data collection were four structured questionnaires:

1. Students' Questionnaire on Effect of Instructional Materials (SQEIM): This questionnaire consisted of 8 items designed to assess students' perceptions of the effect of instructional materials on their understanding of Agricultural Science.
2. Students' Questionnaire on Teachers' Utilization (SQTU): This questionnaire consisted of 8 items designed to assess students' perceptions of teachers' utilization of instructional materials.
3. Teachers' Questionnaire on Availability (TQA): This questionnaire consisted of 8 items designed to assess teachers' perceptions of the availability of instructional materials in their schools.
4. Teachers' Questionnaire on Utilization (TQU): This questionnaire consisted of 8 items designed to assess teachers' self-reported utilization of instructional materials.

All questionnaires were structured using a 4-point Likert scale: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1. The instruments were validated by experts in Agricultural Education and Research Methods. Reliability was established through a pilot test involving 30 students and 5 teachers from a school not included in the

main study. The Cronbach's alpha reliability coefficients ranged from 0.78 to 0.85, indicating good reliability.

2.6 Method of Data Collection

The researcher obtained permission from the Zamfara State Ministry of Education and the Kaura Namoda Local Education Authority to conduct the study. Data were collected through the administration of the questionnaires to the sampled students and teachers. The researcher, assisted by five research assistants, visited the selected schools and administered the questionnaires. Students' questionnaires were administered during Agricultural Science class periods, while teachers' questionnaires were administered during their free periods. The questionnaires were collected immediately after completion to ensure a high return rate.

2.7 Method of Data Analysis

Data collected were analyzed using descriptive statistics (frequencies, percentages, means, and standard deviations). The decision on whether the effect/availability/utilization was adequate was based on a criterion mean of 2.5, which was derived from the scale midpoint of the 4-point Likert scale ($2.5 = (4+1)/2$). Items with means equal to or greater than 2.5 were considered "Accepted" (indicating positive perceptions or adequate availability/utilization), while items with means less than 2.5 were considered "Rejected" (indicating negative perceptions or inadequate availability/utilization). The grand mean for each table was also compared to the criterion mean of 2.5 for an overall decision.

3 RESULTS AND DISCUSSION

3.1 Socio-Demographic Characteristics of Respondents

The socio-demographic characteristics of the 300 student respondents and 20 teacher respondents revealed that among the students, the majority were aged 17-18 years (45.0%), with males constituting 56.7% and females 43.3%. The parental occupation data revealed that 56.7% of students came from farming families, consistent with the agrarian nature of Zamfara State. Among the 20 teachers, 80.0% were male, 90.0% were married, and 50.0% held Bachelor's degrees, while 30.0% had N.C.E qualifications and 20.0% had Master's degrees. The teaching experience was fairly distributed, with 30.0% having 11-15 years of experience. Notably, 60.0% of teachers taught 9-12 periods per week, indicating a substantial teaching load.

3.2 Research Question 1: Effect of Instructional Materials on Students' Understanding

Table 1: Effect of Instructional Materials on Students' Understanding.

S/N	Items	N	Mean	Decision
1	The use of instructional materials makes Agricultural Science lessons more interesting.	300	2.80	Accepted
2	Instructional materials help me to understand complex Agricultural Science concepts easily.	300	2.67	Accepted
3	Using instructional materials improves my ability to remember what I have been taught.	300	2.67	Accepted
4	The use of instructional materials has improved my performance in Agricultural Science examinations.	300	2.50	Accepted
5	Practical demonstrations with materials help me understand farming techniques better.	300	2.93	Accepted
6	Learning Agricultural Science without instructional materials makes it difficult for me.	300	3.03	Accepted
7	I can confidently apply the knowledge gained from lessons that used instructional materials.	300	2.57	Accepted
8	Instructional materials bridge the gap between theory and practical Agricultural Science.	300	2.78	Accepted
	Grand Mean	300	2.74	Accepted

Table 1 shows that all eight items were accepted, with means ranging from 2.50 to 3.03, all above the criterion mean of 2.5. The grand mean was 2.74, indicating that students generally agree that instructional materials positively affect their understanding. The highest mean of 3.03 was recorded for Item 6 ("Learning Agricultural Science without instructional materials makes it difficult for me"), while the lowest mean of 2.50 was recorded for Item 4 ("The use of instructional materials has improved my performance in Agricultural Science examinations"), though this still met the acceptance threshold. Therefore, the null hypothesis (H_{01}) which stated that there is no significant positive effect of instructional materials on students' understanding was rejected.

3.2.1 Research Question 2: Students' Perceptions of Teachers' Utilization of Instructional Materials

Table 2: Students' Perceptions of Teachers' Utilization of Instructional Materials.

S/N	Items	N	Mean	Decision
1	My Agricultural Science teacher frequently uses instructional materials during lessons.	300	2.27	Rejected
2	My teacher involves us in using instructional materials during practical classes.	300	2.18	Rejected
3	My teacher uses charts and models to explain topics rather than just talking.	300	2.12	Rejected
4	My teacher effectively combines different types of instructional materials in a single lesson.	300	2.05	Rejected
5	My teacher improvises materials when the standard ones are not available.	300	2.42	Rejected
6	My teacher takes us to the farm/laboratory for practical use of instructional materials.	300	1.98	Rejected
7	The instructional materials used by my teacher are appropriate for the topics taught.	300	2.37	Rejected
8	My teacher ensures that all students benefit from the use of instructional materials.	300	2.30	Rejected
	Grand Mean	300	2.21	Rejected

Table 2 shows that all eight items were rejected, with means ranging from 1.98 to 2.42, all below the criterion mean of 2.5. The grand mean was 2.21, indicating that students perceive teachers' utilization of instructional materials as inadequate. The highest mean of 2.42 was recorded for Item 5 ("My teacher improvises materials when the standard ones are not available"), while the lowest mean of 1.98 was recorded for Item 6 ("My teacher takes us to the farm/laboratory for practical use of instructional materials"). The null hypothesis (H_{02}) which stated that there is no significant inadequacy in teachers' utilization of instructional materials was rejected.

3.2.2 Research Question 3: Availability of Instructional Materials (Teachers' Perspective)

Table 3: Teachers' Perceptions of Availability of Instructional Materials.

S/N	Items	N	Mean	Decision
1	The school provides a well-equipped Agricultural Science laboratory.	20	1.85	Rejected
2	Relevant and up-to-date textbooks are available for teaching Agricultural Science.	20	2.00	Rejected
3	There are sufficient visual aids (charts, posters, models) for teaching various topics.	20	2.20	Rejected
4	The school has a functional school farm or garden for practical teaching.	20	2.35	Rejected
5	Modern technological devices (e.g., projectors, computers) are available for teaching.	20	1.60	Rejected
6	The government provides instructional materials to the school on a regular basis.	20	1.75	Rejected
7	The available instructional materials are adequate for the student population.	20	1.95	Rejected
8	The school maintains and replaces damaged instructional materials promptly.	20	1.65	Rejected
	Grand Mean	20	1.92	Rejected

Table 3 shows that all eight items were rejected, with means ranging from 1.60 to 2.35, all far below the criterion mean of 2.5. The grand mean was 1.92, indicating that instructional materials are critically inadequate. The highest mean of 2.35 was recorded for Item 4 ("The school has a functional school farm or garden for practical teaching"), while the lowest mean of 1.60 was recorded for Item 5 ("Modern technological devices are available for teaching"). The null hypothesis (H_{03}) which stated that there is no significant shortage of instructional materials was rejected.

3.2.3 Research Question 4: Teachers' Self-Reported Utilization of Instructional Materials

Table 4: Teachers' Self-Reported Utilization of Instructional Materials.

S/N	Items	N	Mean	Decision
1	I use instructional materials in almost every Agricultural Science lesson I teach.	20	2.25	Rejected
2	I improvise instructional materials when the standard ones are unavailable.	20	2.90	Accepted
3	I effectively select and use appropriate materials for each specific topic.	20	2.45	Rejected
4	I combine different types of instructional materials to enhance lesson delivery.	20	2.30	Rejected
5	I regularly take students to the farm/laboratory for practical use of materials.	20	2.00	Rejected
6	I encourage students to actively participate in using instructional materials during lessons.	20	2.70	Accepted
7	I vary my teaching methods by using different instructional materials.	20	2.50	Accepted
8	Lack of instructional materials hinders my ability to teach effectively.	20	3.10	Accepted
	Grand Mean	20	2.53	Accepted

Table 4 shows a mixed picture: four items were accepted (Items 2, 6, 7, and 8) while four were rejected (Items 1, 3, 4, and 5). The grand mean was 2.53, slightly above the criterion mean of 2.5, leading to an overall decision of "Accepted." The highest mean of 3.10 was recorded for Item 8 ("Lack of instructional materials hinders my ability to teach effectively"), while the lowest mean of 2.00 was recorded for Item 5 ("I regularly take students to the farm/laboratory for practical use of materials").

The study found that instructional materials have a significant positive effect on students' understanding of Agricultural Science, aligning with Iyede and Otoobo (2023) and Nwike and Catherine (2013) who reported improved student performance when instructional materials were used. Students strongly acknowledged the difficulty of learning without these aids,

supporting Hussain's (2010) assertion that instructional materials are indispensable for effective teaching. However, students perceived teachers' utilization of these materials as inadequate, consistent with Abdullahi et al. (2017) who identified this as a major problem in Zamfara State. Teaching remains largely theoretical and teacher-centred, confirming Dooley, Suessy and Vasudevan's (2004) observation that the conventional "chalk and talk" method is no longer adequate, while Egun (2007) similarly noted that Agricultural Science is often taught without practical work. Although teachers make some effort to improvise materials, these efforts remain insufficient to meet students' learning needs.

Teachers confirmed a critical shortage of instructional materials, corroborating Sani's (n.d.) study which found audio-visual materials rarely available in Zamfara State schools. The absence of modern technological devices reflects the broader technological gap in rural Nigerian schools, while government provision remains irregular and inadequate despite initiatives like the 2025 distribution of 408,137 materials, whose impact has not been fully felt at the school level. Schools also fail to maintain or replace damaged materials promptly, undermining continuity in usage. Teachers recognize the importance of instructional materials but face severe resource constraints that limit their utilization, a paradox aligning with Abubakar et al. (2026) who found that teachers acknowledged the benefits of materials while also agreeing on the challenges they face. While teachers encourage student participation and vary their teaching methods, the low score for taking students to farms or laboratories reflects practical challenges in conducting field-based learning without functional facilities. The study therefore concludes that although instructional materials significantly enhance students' understanding, severe shortages and inadequate utilization undermine these potential benefits, resulting in predominantly theoretical instruction that fails to meet the practical demands of Agricultural Science education.

4 CONCLUSION

The findings of this study confirm that instructional materials have a significant positive effect on students' understanding of Agricultural Science in public senior secondary schools in Kaura Namoda LGA. However, the severe shortage of these materials, coupled with inadequate utilization by teachers, undermines the potential benefits. The study contributes to the growing body of evidence from North-Western Nigeria and other parts of the country, highlighting the critical need for improved provision and utilization of instructional materials in Agricultural Science education.

4.1 Recommendations

Based on the findings emanating from this study, the following recommendations are suggested:

1. The Zamfara State Government, through the Ministry of Education, should increase funding for the provision of instructional materials for Agricultural Science education in public senior secondary schools.
2. Principals and other school administrators should prioritize the development of functional school farms and gardens for practical Agricultural Science instruction. Partnerships with local farming communities and agricultural organizations could provide additional resources and expertise.
3. Agricultural Science teachers should be proactive in improvising instructional materials from locally available resources. Teachers should also adopt student-centered teaching methods that integrate instructional materials and practical activities into their lessons.
4. Teachers should make deliberate efforts to organize practical sessions and excursions to farms and laboratories, even if on a limited scale, to expose students to hands-on agricultural experiences.
5. Parent-Teacher Associations (PTA): PTAs and other stakeholders should be encouraged to contribute to the provision of instructional materials in schools, complementing government efforts. Community involvement in supporting education should be strengthened.
6. The Ministry of Education should establish a monitoring and evaluation mechanism to track the provision and utilization of instructional materials in schools. This will ensure that materials provided are actually reaching schools and being used effectively.

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