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EXAMINING THE UTILIZATION AND IMPACT OF INSTRUCTIONAL MATERIALS ON BIOLOGY EDUCATION IN AWKA SOUTH LOCAL GOVERNMENT AREA

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ABSTRACT

This study aims to examine the utilization and impact of instructional materials on biology education within Awka South Local Government Area. The research employs a descriptive survey methodology to gather data from secondary school teachers and students in the area. To ensure representative sampling, 38 biology teachers were randomly selected. Data collection was facilitated through a self-structured 4-point rating questionnaire comprising sections for personal data and items related to the research questions. Descriptive statistics were utilized to analyze the extent of usage of instructional materials among teachers. The findings reveal a diverse extent of usage of instructional materials among teachers, with certain materials being employed more extensively than others. While traditional tools like audio and video recorders, projectors, and microphones are utilized to a limited extent, innovative resources such as organ tissue specimens and multimedia aids exhibit greater usage. Results indicate that access to information and communication technology (ICT) facilitates students' ability to gather recent information, while the regular use of instructional materials promotes easy comprehension of difficult concepts and enhances students' abilities and interests in biology. Recommendations include providing educators with adequate training and resources to effectively incorporate instructional materials into their teaching practices, thereby optimizing the learning experience in Awka South Local Government Area.

Keywords: utilization, impact, instructional materials, biology education

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INTRODUCTION

Biology education serves as a fundamental pillar in shaping students' understanding of life sciences, providing foundational knowledge for further studies or careers in related fields. Central to the success of biology education is the effective utilization of instructional materials, which encompass a diverse array of resources ranging from traditional tools like textbooks and laboratory equipment to modern technologies such as multimedia presentations and interactive simulations (Sripathi et al, 2024; Musgrove et al, 2024). These materials play a crucial role in facilitating engaging and enriching learning experiences for students in biology classrooms.

In the realm of biology education, instructional materials serve as indispensable tools for educators to facilitate effective teaching and learning experiences (Silaban & Manalu, 2024). These materials encompass a wide range of resources, including textbooks, diagrams, laboratory equipment, multimedia presentations, and online resources (Amos et al, 2022). The utilization of instructional materials is essential for promoting active learning, fostering student engagement, and enhancing comprehension of biological concepts.

Within the context of Awka South LGA, the extent to which teachers utilize instructional materials varies. While some educators may rely predominantly on traditional methods such as textbooks and diagrams, others may incorporate innovative resources such as multimedia presentations or online simulations (Isma'il & Lukman, 2022). However, challenges such as limited access to technology, inadequate training, and resource constraints may hinder the effective integration of instructional materials into teaching practices (Etop et al, 2023).

Research literature provides valuable insights into the utilization of instructional materials in biology education. For example, studies have shown that the effective integration of multimedia resources can enhance students' engagement, comprehension, and retention of biological concepts (Musah & Umar, 2017). Similarly, the consistent utilization of instructional materials has been linked to improved academic achievement among secondary school students in various Nigerian contexts (Sripathi et al, 2024). These findings underscore the importance of promoting the utilization of diverse instructional materials to optimize biology education.

Instructional materials play a crucial role in shaping students' academic achievement, attitudes towards the subject, and overall learning outcomes in biology education (Mega et al, 2014). The impact of instructional materials extends beyond the mere provision of information; these resources can significantly influence students' learning experiences and outcomes (Arifin et al, 2024). Access to diverse instructional materials promotes active learning, enables students to explore biological concepts through hands-on experiences, and fosters a deeper understanding of the subject.

Research literature provides ample evidence of the positive impact of instructional materials on students' academic achievement in biology. For example, studies have shown that the consistent utilization of instructional materials correlates positively with students' academic performance in biology (Azeez, 2018). Similarly, the effective integration of multimedia resources has been associated with improved comprehension and retention of biological concepts among students (Soicher & Becker-Blease, 2020). These findings highlight the importance of promoting the use of instructional materials to enhance biology education in Awka South LGA.

The motivation for conducting a study stems from the recognition of the critical role these materials play in shaping students' learning experiences and academic achievement. Existing research literature highlights the importance of instructional materials in promoting active learning, enhancing comprehension, and improving students' academic performance in biology (Cleveland et al, 2017; Wilton et al, 2019; Junco & Nabua, 2023). However, despite the acknowledged significance of instructional materials, there exists a notable gap in the literature regarding their utilization and impact specifically within the context of Awka South LGA. While studies have explored the effectiveness of instructional materials in various educational settings across Nigeria, there is a dearth of research focusing on the unique challenges and opportunities present in Awka South LGA. This gap in the literature underscores the need for a comprehensive examination of the utilization and impact of instructional materials in biology education within this specific geographical area.

RESEARCH QUESTIONS

1. To what extent do teachers use instructional materials in teaching biology in Awka South Local Government area?
2. What is the influence of instructional material on students' academic achievement in Awka South Local Government area?

METHODOLOGY

In this study, a descriptive survey methodology was employed to gather data at a specific point in time, with the objective of describing existing conditions or establishing standards for comparison. The research was conducted within the Awka South Local Government Area (LGA) in Anambra State, Nigeria, characterized by a population engaged predominantly in artisanal activities, trade, farming, and civil service. The geographical context of Awka South, bordered by Awka North, Dunukofia, and Aniocha LGAs, has been marked by deforestation attributed to agricultural expansion and human settlement.

To ensure representative sampling, 38 biology teachers were randomly selected. Data collection was facilitated through a self-structured 4-point rating questionnaire comprising sections for personal data and items related to the research questions. The instrument underwent thorough validation by two teachers within Awka South LGA to ensure its content adequacy, coverage, and potential for data yield. Additionally, reliability testing was conducted by distributing questionnaires to ten teachers outside the study area, followed by a test-retest method, which resulted in a high internal reliability score of 0.75.

The administration of 38 questionnaires was personally facilitated by the researcher, ensuring prompt collection upon completion. Data analysis involved the utilization of weighted mean scores and standard deviation, with an acceptance criterion set at 2.50. The mean score calculation employed a formula that included summing the frequency of each questionnaire item and deviations from the mean, divided by the total number of respondents. Items scoring 2.50 and above were considered acceptable, while those below 2.50 were deemed inadequate for inclusion in the analysis.

RESULTS

Research Question 1: To what extent do teachers use instructional materials in teaching biology in Awka South LGA?

Table 1: Mean and standard deviation on the extent teachers using instructional materials in teaching biology in Awka South LGA.

S/N	Items	VGE	GE	LE	VLE	Total	∑X	Mean	Std Dev	Decision
1	Teachers use Audio and Video recorders regularly in teaching Biology courses.		3	9	10	22	37	1.68	0.7	Low Extent
2	Each lesson is usually taught with projectors and microphones.		1	9	12	22	33	1.50	0.58	Low Extent
3	Teachers use poster and computers in teaching Biology courses.	3	5	9	5	22	50	2.27	0.96	Low Extent

4	Good number of teachers are interested in the use of organ tissue specimen	9	11	2		22	73	3.32	0.63	Great Extent
5	Teachers use cheek tissue specimen and maps in teaching of biology.	5	12	2	3	22	63	2.86	0.92	Great Extent
6	Teachers use whole blood specimen for teaching	2	7	9	4	22	51	2.32	0.87	Low Extent
7	Dissected lizard and Mammalian Skeleton are used regularly by teachers for teaching Biology.	14	4	4		22	76	3.45	0.78	Great Extent
8	Teachers use Plasma specimen and charts in teaching topics in the Biology classroom.	7	11	4		22	69	3.14	0.69	Great Extent

Table 1 presents the mean and standard deviation regarding the utilization of instructional materials in teaching biology within Awka South LGA. The data indicates varying extents of usage among teachers. Notably, the use of audio and video recorders shows a low extent, with a mean score of 1.68 and a standard deviation of 0.7. Similarly, the utilization of projectors and microphones exhibits a low extent, with a mean score of 1.50 and a standard deviation of 0.58. Teachers employing posters and computers also demonstrate a low extent of usage, with a mean score of 2.27 and a standard deviation of 0.96.

In contrast, certain instructional materials show a great extent of usage. For instance, the utilization of organ tissue specimens, cheek tissue specimens, dissected lizard, mammalian skeleton, and plasma specimens with charts all exhibit great extents, with mean scores ranging from 2.86 to 3.45 and standard deviations ranging from 0.63 to 0.92. Overall, the findings suggest a varied utilization of instructional materials among biology teachers in Awka South LGA, with some materials being utilized to a greater extent than others.

Research Question 2: What is the influence of instructional material on students' academic achievement in Awka South LGA?

Table 2: Mean and standard deviation on the influence of instructional material on students' academic achievement in Awka South LGA.

S/N	Items	VGE	GE	LE	VLE	Total	∑X	Mean	Std Dev	Decision
9	Students are allowed to operate ICT at their own leisure which helps then gather more recent information	8	7	5	2	22	65	2.95	0.98	Accepted

10	Use of instructional materials promotes easy understanding of difficult concepts	20	2		22	86	3.91	0.29	Accepted
11	Regular use of instructional materials improve student's abilities, aptitudes and interest in biology	19	3		22	85	3.86	0.34	Accepted
12	The use of audio-visual aids while teaching improves learning and assimilation	9	12	1	22	73	3.32	0.7	Accepted
13	Educators use of instructional materials promotes students retention of facts	18	4		22	84	3.82	0.39	Accepted
14	Use of instructional materials gives room for experimentation and discovery of new information	15	7		22	81	3.68	0.47	Accepted

Table 2 illustrates the mean and standard deviation concerning the impact of instructional materials on students' academic achievement within Awka South LGA. Students' access to ICT for gathering recent information is widely accepted, as indicated by a mean score of 2.95 and a standard deviation of 0.98. Similarly, the use of instructional materials is perceived to facilitate easy comprehension of complex concepts, with a high mean score of 3.91 and a low standard deviation of 0.29. Moreover, regular utilization of instructional materials is believed to enhance students' abilities, aptitudes, and interest in biology, supported by a mean score of 3.86 and a standard deviation of 0.34.

Furthermore, incorporating audio-visual aids in teaching is seen as beneficial for learning and assimilation, with a mean score of 3.32 and a standard deviation of 0.7. Additionally, educators' use of instructional materials is thought to aid in students' retention of factual knowledge, with a mean score of 3.82 and a standard deviation of 0.39. Moreover, instructional materials are perceived to create opportunities for experimentation and the discovery of new information, reflected in a mean score of 3.68 and a standard deviation of 0.47.

DISCUSSION OF FINDINGS

Research question 1 examined the extent teachers use instructional materials in teaching biology in Awka South LGA. According to the findings, the use of audio and video recorders, projectors, and microphones is reported to be at a low extent. Similarly, the utilization of posters, computers, and whole blood specimens also falls within the low extent category. In contrast, a substantial number of teachers demonstrate a great extent of interest in utilizing organ tissue specimens, cheek tissue specimens, dissected lizards, mammalian skeletons, plasma specimens, and charts in their biology classrooms. This discrepancy in the utilization of instructional materials reflects the diverse approaches adopted by teachers in Awka South LGA. While some educators may prioritize traditional teaching methods or face constraints in accessing modern instructional tools, others embrace innovative techniques to enhance the learning experience. These findings align with similar studies conducted in Nigeria. For instance, in a related study by Mohammadi et al, (2015) and Callo & Yazon (2020), it was found that teachers' familiarity with and access to instructional materials significantly influenced their usage in the classroom. This finding is in agreement with the observed variation in the extent of utilization among teachers in Awka South LGA.

Furthermore, the importance of instructional materials in promoting active learning and student engagement has been highlighted by Suleiman et al, (2022) in their examination of curriculum teaching versus teaching-to-the-test: Towards an appropriate classroom instructional practice in Nigeria. They emphasized the need for educators to leverage various resources, including audio-visual aids and laboratory specimens, to facilitate experiential learning and conceptual understanding. This perspective resonates with the positive association between the utilization of certain instructional materials and their perceived impact on students' academic achievement in Awka South LGA, as evidenced by the high extent category assigned to specific items.

Analysis of research question 2 showed that regular use of instructional materials improves student’s abilities, aptitudes and interest in biology. The influence of instructional materials on students' academic achievement in Awka South LGA is multifaceted, encompassing various aspects of learning and engagement. The data provided indicates that the use of instructional materials, particularly ICT, promotes active learning and facilitates access to up-to-date information. Allowing students to operate ICT at their own leisure enables them to gather recent information, fostering a deeper understanding of biology concepts and enhancing their academic achievement.

In contrast, related studies by Agbo (2015) and Toyo (2017) found that limited access to ICT among students hindered their ability to gather recent information and engage with course content effectively. However, this finding is mitigated by the positive impact of other instructional materials, such as audio-visual aids and experimental tools, on students' academic achievement. Moreover, the regular use of instructional materials is reported to improve students' abilities, aptitudes, and interest in biology. This finding is supported by a study conducted by Musah and Umar (2017), which observed a positive correlation between the consistent utilization of instructional materials and students' academic performance in biology. Similarly, the use of audio-visual aids during teaching is shown to enhance learning and assimilation, aligning with the findings of Hung and Chen (2018), who emphasized the importance of multimedia resources in facilitating conceptual understanding and knowledge retention.

Furthermore, educators' use of instructional materials is found to promote students' retention of facts and facilitate experimentation and the discovery of new information. These findings corroborate the results of a study by Choppin et al, (2022), which highlighted the role

of instructional materials in reinforcing learning outcomes and fostering a conducive learning environment for students.

CONCLUSION

In conclusion, this study provides valuable insights into the utilization and impact of instructional materials on biology education within Awka South Local Government Area. The findings reveal a varied extent of usage among teachers, with certain materials being employed more extensively than others. While the utilization of traditional tools such as audio and video recorders, projectors, and microphones remains at a low extent, there is a notable interest in utilizing innovative resources like organ tissue specimens, cheek tissue specimens, and multimedia aids, which are considered to have a great extent of usage.

Moreover, the study highlights the positive influence of instructional materials on students' academic achievement in biology. Access to ICT facilitates the gathering of recent information, while the regular use of instructional materials promotes easy comprehension of difficult concepts, improves students' abilities and interests in biology, and enhances learning and assimilation through audio-visual aids. Additionally, educators' utilization of instructional materials is found to contribute to students' retention of facts and provide opportunities for experimentation and the discovery of new information.

These findings underscore the importance of incorporating diverse instructional materials into biology education to foster a conducive learning environment and enhance students' academic performance. Moving forward, efforts should be made to provide educators with adequate training and resources to effectively integrate instructional materials into their teaching practices. By doing so, we can further optimize the learning experience and promote excellence in biology education within Awka South Local Government Area.

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