



# Examining the Utilization and Impact of Teaching Resources on Biology Education in Awka South Local Government Area, Nigeria

Tochukwu Ebuka Umeohana 

Chukwuemeka Odumegwu Ojukwu University, Uli, Anambra State, Nigeria

## ABSTRACT

**Objective:** This study investigates the use of teaching resources and their impact on the quality of Biology education in secondary schools within the Awka South Local Government Area. **Method:** A descriptive survey design was adopted to gather teacher and student data. A random sampling technique was used to select 38 Biology teachers. Data collection was facilitated using a self-structured 4-point rating scale questionnaire comprising personal information and items related to the study objectives. Descriptive statistics were used to analyze the data, particularly focusing on the frequency and extent of teaching resource utilization. **Result:** The study found varied levels of teaching resource utilization among Biology teachers. Traditional teaching tools such as audio and video recorders, projectors, and microphones were used to a limited extent. In contrast, more innovative resources like organ tissue specimens and multimedia aids were more widely employed. It was also found that consistent use of teaching resources improves students' understanding of complex Biology concepts and increases their interest and competence in the subject. Additionally, the integration of ICT supports students in accessing current and relevant information. **Conclusion:** The findings highlight the critical role of teaching resources particularly modern and ICT-based tools in enhancing student engagement, comprehension, and academic performance in Biology. The level of effectiveness largely depends on the type and consistency of teacher resource usage. **Contribution:** This study provides valuable insights for school administrators and educational policymakers on the importance of resource allocation and teacher training. It recommends equipping educators with adequate training and access to effective teaching aids to promote improved Biology education outcomes in the Awka South Local Government Area.

## KEYWORDS

Utilization, Impact, Teaching resources, Biology education

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## 1. INTRODUCTION

Thus, biology education is an important component of students' worldview and knowledge base, giving them the groundwork to continue their education or work in the sphere of life sciences. Instructional aids form the core of the learning process and are inclusive of teaching aids that include books, laboratories equipments, multimedia and simulation aids (Sripathi et al, 2024; Musgrove et al, 2024). All these materials have a very important role of enriching learning in biology classes through provision of unique micro environment that help students to learn with

\* **Corresponding Author:** Tochukwu Ebuka Umeohana,  [umeohanatoo@gmail.com](mailto:umeohanatoo@gmail.com)

Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University, Uli, Anambra State, Nigeria

Address: QR9P+WFR, Uli, Atughobi, Nigeria

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much fun. In the context of biology education, teaching resources are perceived as the essential learning resources that enable educators to create meaningful teaching and learning scenarios (Silaban & Manalu, 2024). These materials refer to locally produced teaching and learning resources which can be in form of textbooks, diagrams, lab equipment, teaching aids in form of multimedia presentations and materials on the internet (Amos et. Al, 2022; Okafor et al, 2022). The use of teaching resources is crucial for achieving effective learning, encouraging students' participation, and improving the understanding of biological provisions.

In the case of Awka South LGA, the use of teaching resources in teaching shows that teachers have a different level of implementing the materials. While some of the educators educate their learners through books and diagrams, others may use the multimedia components or online games (Isma'il & Lukman, 2022). Nonetheless, there can be barriers like restricted access to technology, lack of appropriate training, and resource availability that prevents the successful implementation of teaching resources in teacher practices (Etop et al, 2023). Research literature provides valuable insights into the utilization of teaching resources 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 teaching resources has been linked to improved academic achievement among secondary school students in various Nigerian contexts (Sripathi et al, 2024).

Hence, the results of the present study support the urgency of actively encouraging the use of various supplementary teaching aids for enhancing biology learning. Text/learning resources are among the critical determinants of students' performance, other attitudes of the subject and learning in biology education (Mega et al, 2014). Thus, teaching resources are not just a means of disseminating information, but these resources can have a considerable effect on the student learning process (Arifin et al, 2024). Evaluating the accessibility of variety of teaching resources encourages learners' engagement, allows them to discover many aspects of biology by using tools for hands-on activities, and enhances their learning of the content.

The findings of various research studies show that teaching resources have significant influence in determining the performance of the students in biology. For instance, various research works have revealed that there is a positive relationship between the use of teaching resources and academic achievement of student in biology (Azeez, 2018). Likewise, the appropriate use of multimedia resources has been correlated with enhanced understanding and retention of biological concepts among learners (Soicher & Becker-Blease, 2020). Based on the above findings, it is recommended that efforts should be made to encourage the use of teaching resources to improve biology education in Awka South LGA.

The need to undertake a study lies in acknowledging the importance of the said materials in enhancing students' learning experiences and their performance. Previous studies underscore the role of instructional content in facilitating engagement, understanding, and better performance in Biology, (Cleveland et al, 2017; Wilton et al, 2019; Junco & Nabua, 2023). Nonetheless, despite the generally established importance of teaching resources, little information has been advanced with regard to its application or effectiveness for Awka South LGA. Although previous research has assessed the utility of teaching resources in many types of learning settings throughout Nigeria, few of these studies are tailored to the features of learning environments in Awka South LGA. This research gap highlights the importance of conducting a research study of the use and effects of teaching resources in biology education in this particular LGA.

#### Research Questions:

- 1.1 To what extent do teachers use teaching resources in teaching biology in Awka South Local Government area?
- 1.2 What is the influence of teaching resource on students' academic achievement in Awka South Local Government area?.

## 2. METHOD

### 2.1 Research Design

In this research, the survey research was descriptive in design where data was collected at one particular point in time with the aim of providing a snapshot of the situation and/or for benchmarking.

### 2.2 Research Object

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.

2.3 Data Collection

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.

2.4 Data Analysis

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.

3. RESULT AND DISCUSSION

3.1 Result

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

**Table 1.** Mean and standard deviation on the extent teachers using teaching resources in teaching biology in Awka South LGA.

| S/N | Items                                                                                        | VGE | GE | LE | VLE | Total | ΣX | 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 teaching resources in teaching biology within Awka South LGA. The data indicates varying extents of usage among teachers. However, the extent of using audio and video recorders is very low and has a mean score of 1.68 and a standard deviation of 0.7. Also, the usage of projectors and microphones has a low level of adoption with an average rating of 1.50 and the standard error of the mean equals to 0.58. Two of the 20 items given are related to posters and computers and the rating given to teachers that fall under these categories are 2 which suggests they have a low extent of using posters and computers. On the other hand, some of the teaching resources depict a high level of utilization as to a great extent. For example, the clerk may use organ tissue specimens, cheek tissue specimens, dissected lizard, mammalian skeleton, and plasma specimens with charts, and all of them present great extents with the mean scores ranging from 2.86 to 3.45 and standard deviations ranging from 0.63 to 0.92. Therefore, the studies imply that teaching resources are used differently by the biology teachers in Awka South LGA with some of them being used frequently than others.

**Research Question 2:** What is the influence of teaching resource on students' academic achievement in Awka South LGA?

**Table 2.** Mean and standard deviation on the influence of teaching resource on students' academic achievement in Awka South LGA.

| S/N | Items                                                                                                    | VGE | GE | LE | VLE | Total | $\Sigma X$ | 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 teaching resources promotes easy understanding of difficult concepts                              | 20  | 2  |    |     | 22    | 86         | 3.91 | 0.29    | Accepted |
| 11  | Regular use of teaching resources 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 teaching resources promotes students retention of facts                                 | 18  | 4  |    |     | 22    | 84         | 3.82 | 0.39    | Accepted |
| 14  | Use of teaching resources 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 teaching resources on students' academic achievement within Awka South LGA. On their use of ICT in accessing recent information, students considered this as rights in which the mean score of 2.95 and a standard deviation of 0.98. Likewise, instructional learning materials are considered to enable easier understanding of the more complex instructions with a mean score of 3.91 and a low standard deviation of 0.29. Further, it was postulated that frequent use of teaching resources Strengthen students' abilities, skills, and interest in biology, with the mean score of 3.86 and a standard deviation of 0.34.

Similarly, use of audio-visual aids in teaching is perceived to have positive impacts on learning and absorption, with a mean score of 3.32 and a standard deviation of 0.7. Furthermore, it is believed that the way teachers employ the teaching resources enables the students to deal with content accrual, receiving a mean score of 3.82 and a standard deviation of

0.39. Furthermore, the role that instructionals are thought to facilitate, such as the opportunity to try new strategies and find new information, was found to have a mean score of 3.68 and a standard deviation of 0.47.

### 3.2. Discussion

Research question 1 focused on how much the teachers rely on the teaching resources when teaching biology in Awka South LGA. Therefore, findings reveal that, the use of the audio/ video recorders, projector, microphones and the like are said to be at a little extent used. 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 teaching resources 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 teaching resources 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 teaching resources 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 teaching resources 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 teaching resources improves student's abilities, aptitudes and interest in biology. The impact that teaching resources have on the learner's performance is a complex one that cuts across all aspects of learning in schools in Awka South LGA. From the data presented here, a positive correlation can be deduced from the use of the teaching resources especially the ICT as a tool to enhance on method of learning and information search ([Yazon & Callo, 2021](#)). 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 is offset by the positive influence of other instructional appliances like audio-visuals, experiments among other teaching aids has on the students' performance. Furthermore, a daily usage of the teaching resources enhances the students' skills, accomplishments, and passion towards studying Biology. In support of this finding, [Musah and Umar \(2017\)](#) conducted a study that revealed that students who frequently used teaching resources in biology had better academic performance.

In the same vein, the studies reveal that aural and visual teaching tools improve student learning, which supports the results of [Hung and Chen \(2018\)](#) who asserted that teaching aids should include multimedia to improve student learning and knowledge acquisition. In addition, the study reveals that as teachers employ certain teaching resources, it enhances fact recall among students and also encourages experimentation in the acquisition of new knowledge. These findings align with a study by [Choppin et al, \(2022\)](#) that revealed the importance of teaching resources in supporting students' learning and maintaining a positive learning environment.

### 4. IMPLICATIONS AND CONTRIBUTIONS

The findings show that ICT enhances the ability of students to obtain recent information to meet their needs and wants while the consistent use of teaching resources enhances students' understanding of complex concepts in Biology and improves their abilities and interest in Biology. Recommendations are: Training the educators properly in the handling of teaching resources and ensuring that the educators get the best teaching aids to enhance their learning lessons for the improved learning in Awka South Local Government Area.



## 5. CONCLUSION

In conclusion, this study enabled detailed understanding of how teaching resources are being used, the effectiveness or otherwise on the teaching and learning of biology in Awka South Local Government Area. The results show that, in general, there is a rather diverse utilization of these components by teachers, where some of them are used more frequently than others. Audio and video recorders and projectors, microphones, and telephones are used at a lesser degree, although there is high engagement in using advanced materials like organ tissue specimens, cheek tissue specimens, and multimedia aids, which are seen as possessing an extremely large degree of usage. Further, the study reveals the significance of teaching resources in enhancing of students' performance in the area of biology. The use of ICT provides an opportunity to get recent information's The regular use of teaching resource simplifies learning of difficult topics, increases students interest and proficiency in biology, aids in learning and absorption through audio visual means. Also, the use of teaching resources by educators is identified to enhance students' recall of facts and afford chances for testing new information. From these conclusions, it is clear that more use should be made of the varied learning resources in biology class so as to nurture a proper teaching environment and at the same time, boost the learning achievement of the students. Moving forward, efforts should be made to provide educators with adequate training and resources to effectively integrate teaching resources 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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## Author Contribution Statement

The author declares that the data in this research entitled The Examining the Utilization and Impact of Teaching Resources on Biology Education in Awka South Local Government Area are original and the author is responsible for all data reported.

## Conflict of Interest Statement

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Ethical Approval Statement

The author has approved the article to be published in the Jurnal Indonesia Pendidikan Guru (JIPPG) by following the Publication Ethics and Journal Policies.

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