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ASSESSMENT OF AVAILABILITY AND UTILIZATION OF INSTRUCTIONAL MATERIALS FOR TEACHING IN SECONDARY SCHOOLS IN AGEGE, LAGOS STATE, NIGERIA

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ABSTRACT

Instructional materials are wide range of teaching devices through which core educational values are disseminated to the learners by the facilitators, aiding and lubricating teaching–learning processes. Its application in education is imperative as it makes learning effective and efficient. The study examined Biology teaching using available and utilized instructional materials considering the senior secondary schools from Agege, Lagos. The study was guided by four objectives; evaluating the adequacy and extent of utilization of instructional materials in the teaching and learning of Biology; and ensuring the academic performance of Biology students. The survey design used was descriptive while stratified sampling technique was used in selecting 160 students via structured questionnaire from the population of the selected secondary school. The analysis of the data was achieved with the aid of frequency tables; and the hypothesis test was done with the employment of chi-square inferential statistical tool. It was evident, from the study that availability and utilization of instructional materials were very low. Moreover, from the study, it is expedient that instructional materials facilitate effective teaching and learning of Biology. The study therefore recommends that the government and head of schools should provide and make available, adequate instructional materials as teachers are expected to utilize same optimally.

Keywords: Availability, Instructional materials, Teaching, Utilization, Academic performance

INTRODUCTION

The quest for efficiency and effectiveness in course content and proper instructional materials to learners are paramount to science educators (Yu & Kaur, 2024) and this is achieved by improving students' comprehension (Khamzina *et al.,* 2024), thereby, fostering their performances in academics. Poor performances have been observed in secondary schools, especially the public schools as established by some researchers (Cheng *et al.,* 2023; Onowugbeda *et al.,* 2024). Many factors had been recorded to be responsible for the low performances experienced in secondary schools, which play significant roles in learning and teaching (Akanbi, 2015). Numerous authors had discussed instructional materials as important tools in improving the academic performances of students, making their utilization germane. Their usage aid in enriching the teaching and learning processes, thereby, contributing to an excellent learning. Leohard (2019) suggested that the utilization of instructional materials give ideal imagery and engage learners actively in the walls of the classroom. Instructional materials are different teaching aids or apparatus which a classroom teacher employs to facilitate his or her teaching for the achievement of the stated objectives (Okechukwu *et. al.,* 2024). The use of these materials employed in schools to aid learning have been helpful in maximizing learning (Agun, 2020). With proper utilization of instructional materials, it had been discovered that better imagination of the students is achieved Ajala *et al.,* 2017). Moreso, adopting a well-balanced communication between facilitators and learners, excellent academic performance is promoted (Chioma and Nkemakolam, 2023). Teaching the students with factual objects and using instructional materials with dexterity ensures accelerated understanding coupled with easier and faster content-detainment; such that better academic performance is usually achieved (Mkpa, 2019; Mohzana *et al.,* 2024). Better proven ways of enjoyed learning popped up during the pandemic era (Shahrill *et al.,* 2024).

Looking into the theory of constructivism, by the duo researchers, Jean Piaget and Lev Vygotsky, the Swiss Biologist and Russian Cognitive Psychologist, they suggested that many contents may remain strange and extremely difficult for learners if there are no provisions of instructional materials in teaching the concept (Abimbade, 2017; Yildiz, 2025). Hence, it is imperative that students are wide open to materials to enhance their learning, especially for topics considered very arduous to assimilate, thereby enhancing their academic performance (Bennet, 2020). Instructional materials may be grouped into the 3D, 2D, electronics, non-projected, hardware, software, audio, visual and audio-visual materials (Agun, 2020).

Researches had been conducted on the use of instructional resources with respect to the performance in West African Certificate examinations, showing the schools using instructional materials did well than those with none (Momoh, 2017; Moronfola, 2018; Popoola, 2020). Similarly, huge importance of instructional materials to the students' achievement has been revealed (Okechukwu *et. al.,* 2024). Even the use of ChatGPT and Artificial intelligence have been discovered to be productive towards better academic performance of certain students. The use of ChatGPT is encouraged for students with special needs in ensuring equal opportunities (Eid *et al.,* 2024; Zhai, 2023). Research has shown better reception of midwives and nurses during their clinical studies, using instructional materials (Hernon *et al.,* 2023); even for groups and individuals (Ataboyev and Tursunovich, 2023). Ogunyele (2022) conducted research considering the secondary school students in Ogun State, in instructional materials provision for learning and teaching, basically for science subjects.

Over the years, several studies have indicated that many students do not seem to enjoy nor engage in active learning as it appears as if they are being forced to learn as the teachers engage them in the classroom which have resulted in poor performance in academics.

Instructional materials have been observed to aid the academic performances of students, if incorporated adequately into the teaching-learning processes in secondary schools in Nigeria., more in suburbs of Lagos as there are many unlearned and touts around this particular area, Agege. It is expedient that teachers adopt better ways of impacting knowledge as many still stay on the lane of archaic and pure theoretical method of teaching which seem to demoralize the students, as opposed to the several engaging approaches they see outside the walls of the classroom; such as in marketing, music, and most entertaining industries. For this study in secondary school, Biology was considered as a subject that cuts across the sciences; and even most non-science students engage in it. If the teaching-learning process is faulty in Biology, it is most likely to be faulty in all of the subject; both science and non-science oriented, which may definitely affect the academic performance of the students, majorly in secondary schools.

Hence, a dire need to further check on the roles of instructional materials on the academic performance of students in secondary schools. The study was conducted to investigate in this particular area of Agege in Lagos State, to ensure the availability and utilization of instructional materials in the schools. It is expedient to ensure the usage of effective and well-designed instructional materials for a better teaching-learning culture. This study therefore examined Biology teaching using available instructional materials in senior secondary schools in Agege, Lagos State, Nigeria.

Objectives

The objectives of the study were to:

i. Investigate the availability of instructional materials in teaching Biology.
ii. Ascertain the adequacy of instructional materials in teaching Biology.
iii. Assess the extent of utilization of instructional materials in the teaching and learning of Biology.
iv. Examine the effect of utilization of instructional materials in the teaching and learning of Biology.

Research Questions

The following questions were raised and answered in this study:

i. To what extent are instructional materials available in teaching Biology?
ii. How adequate are instructional materials in teaching and learning of Biology?
iii. To what extent do teachers utilize instructional materials in the teaching and learning of Biology?
iv. To what extent does utilization of instructional materials affect teaching and learning of Biology?

Research Hypothesis

H_0: Utilization of instructional materials has no significant effect on the academic performance of Biology students in secondary schools.

MATERIALS AND METHODS

Descriptive survey was employed as the research design, to obtain information concerning the level of availability and extent of utilization of instructional materials in teaching and learning of Biology.

Sample and Sampling Technique

The study population comprised the four randomly selected senior secondary schools in class II (SS 2); male and female. The schools comprised of Vetland Grammar School, Agege; (110); Brainfield Secondary School, Agbado; (105); Oloruntele Integrity School, Meiran (63); and Comprehensive High School, Ojokoro (102). Hence, the total population size was 380. Stratified sampling technique was used to randomly select the sample size in order to avoid bias and to ensure that each student has an equal chance of being selected. Sample size of 160 comprising SS2 Biology students were drawn from total population size; as 40 students were randomly selected from each of the selected schools comprising both male and female.

Stratified random sampling was used as the technique for the primary data collection. The instrument used for the data collection was a well-structured 20-item questionnaire, made up two categories; Sections A and B. The respondent's demographic information is the Section A, while the clustered 20-item content is the Section B. The questionnaire was designed to draw out responses with respect to the instructional materials being available, adequate and to investigate the extent their utilization in facilitating the learning of Biology, fostering academic performance. The instrument was built on a modified four-point Likert rating scale of Strongly Disagree, SD (1), Disagree, D (2), Agree, A (3) and Strongly Agree, SA (4).

Descriptive statistics, involving frequency table and percentage was used in presenting and analysing data with respect to the research questions. To test the formulated null hypothesis, Chi-Square, χ^2 inferential statistics was employed at 0.05 level of significance.

RESULTS AND DISCUSSION

Questionnaires administered were retrieved (156), indicating 98% return rate.

Table 1: Analysis of Respondents' Demographic Data

Variables	Frequency	Percentage %
Gender		
Male	76	48.7
Female	80	51.3
Total	156	100
Age Distribution (in years)		
10 - 12	4	2
13 - 15	98	63
16 - 21	48	31
19 - 22	6	4
Total	156	100
Class		
Science	103	67

Variables	Frequency	Percentage %
Non-Science	53	33
Total	156	100

Source: Field Survey, 2023

It can be deduced from Table 1 that the male students are 76 (48%) with the female counterpart of 80 (52%), depicting females are more than males. Also, ages 10-12 years were observed to be 4 (2%) students while ages 13-15 years were 98(63%). 48(31%) were between 16-19 years of age, 6(4%) were between 19-22years of age, while none was 22 and above. This now implies that majority of the students fall between age range 13 -16 years.

It is clearly observed from Table 1 that 103(67%) of the students were science while 53(33%) of the students are non-science students, acknowledging the fact that the study was focused on science students.

Research Question 1

To what extent do instructional materials available in teaching and learning of Biology?

Table 2: Extent of Availability of Instructional Materials in Secondary Schools

S/N	ITEM	SA	A	SD	D	TOTAL
1	There is no Biology instructional materials in my school	28 (18)	12 (7)	45 (29)	71 (46)	156 (100)
2	There is no relevant textbook in my school library.	20 (13)	19 (12)	52 (33)	65 (42)	156 (100)
3	The biology laboratory in my school has no apparatus, chemical and simple equipment to perform practical.	30 (19)	34 (21)	49 (31)	43 (29)	156 (100)
4	Students are only allowed entry to Biology practical laboratory whenever examination is at hand	18 (11)	20 (14)	61 (39)	57 (36)	156 (100)

Source: Field Survey, 2023 (Bracket figure is in %)

Table 2 shows that 40 students (28 and 12 respectively) agreed that there is no Biology instructional materials in their school while 116 students (45 and 71 respectively) disagreed. From the results, it shows that majority of the students disagreed that there are no Biology instructional materials in their school.

39 students (20 and 19 respectively) agreed there is no relevant textbook in their school library, while only 117 students (52 and 65 respectively) disagreed. This shows that majority of the students disagreed that there is no relevant textbook in their school library.

64 students (30 and 34 respectively) agreed that the Biology laboratory in their school has no apparatus, chemical and simple equipment to perform practical, while 92 students (49 and 43 respectively) disagreed. Therefore, results show that majority of the students disagreed although some of the students agreed that their school laboratory has no simple apparatus to perform practical.

However, 38 students (18 and 20 respectively) agreed that students are only allowed entry to Biology practical laboratory whenever examination is at hand, while 118 students (61 and 57 respectively) disagreed. This shows that that majority of the students disagreed. Therefore, it can be inferred that instructional materials are available in secondary schools.

Research Question 2

How adequate are instructional materials in teaching and learning of Biology?

Table 3: Adequacy of Instructional Materials in Teaching and Learning of Biology

S/N	ITEM	SA	A	SD	D	TOTAL
5	Biology instructional materials in my school are sufficiently available compared to other schools.	22 (14)	30 (19)	53 (34)	51 (33)	156 (100)
6	Modern instructional technologies are adequately available in my school	14 (8)	15 (9)	58 (37)	69 (46)	156 (100)
7	Biological apparatus, chemicals, specimen and models are adequate in my school Biology laboratory	10 (6)	12 (7)	70 (45)	64 (42)	156 (100)
8	Good and relevant textbooks are available in adequate quantity in my school library.	24 (15)	30 (19)	44 (28)	58 (38)	156 (100)

Source: Field Survey, 2023 (Bracket figure is in %)

Table 3 shows that 52 students (22 and 30 respectively) agreed that Biology instructional materials in their school are sufficiently available compared to other schools, while 104 students (53 and 51 respectively) disagreed. From this results, it shows that majority of the students completely disagreed that Biology instructional materials in their school are sufficiently available.

29 students (14 and 15 respectively) agreed that modern instructional technologies are adequately available in their school while 127 students (58 and 69 respectively) disagreed. Therefore, this shows that majority of the students completely disagreed that modern instructional technologies are adequately available in their school only few students agreed.

22 students (10 and 12 respectively) agreed that biological apparatus, chemicals, specimen and models are adequate in their school Biology laboratory, while 134 students (70 and 64 respectively) disagreed. This shows that majority of the students completely disagreed, only few of them agreed.

However, 54 students (24 and 30 respectively) agreed that good and relevant textbooks are available in adequate quantity in their school library while 102 students (44 and 58 respectively) disagreed. Therefore, this shows that majority of the students disagreed.

Therefore, it can be inferred that instructional materials are not adequately in the teaching and learning of Biology in secondary schools.

Research Question 3

To what extent do teachers utilise instructional materials in the teaching and learning of Biology?

Table 4: Extent of Utilization of Instructional Materials in Teaching and Learning of Biology

S/N	ITEM	SA	A	SD	D	TOTAL
9	Biology laboratory material resources such as incubators, water bath, centrifuge, microscope, computer and projector are not adequately available in my school and the few available ones are rarely utilized by the teachers	75 (48)	65 (43)	9 (6)	7 (3)	156 (100)
10	Biology practical instructional materials like flasks, beakers, desiccator, refrigerator, and chemicals are readily available in my school. The level of utilization of these materials by Biology teachers is very low	47 (30)	53 (34)	24 (15)	32 (21)	156 (100)
11	Charts, real objects, first aid box, models, thermometers, test tubes are readily available in my school but they are not usually used by teachers to demonstrates an experiment to the whole class	52 (33)	59 (38)	20 (13)	25 (16)	156 (100)
12	In my school, teachers usually skip biology concept that require laboratory practical instructional resources to teach Biology	72 (46)	54 (34)	15 (10)	15 (10)	156 (100)
13	In my school, where real objects are not available, teacher rarely improvise instructional materials to teach Biology concept	60 (38)	62 (40)	16 (10)	18 (12)	156 (100)

Source: Field Survey, 2023 (Bracket figure is in %)

Table 4 shows that 140 students (75 and 65 respectively) agreed Biology laboratory material resources such as incubators, water bath, centrifuge, microscope, computer and projector are not adequately available in their school and the few available ones are rarely utilized by the teachers, while 16 students (9 and 7 respectively) disagreed.

100 students (47 and 53 respectively) agreed that Biology practical instructional materials like flasks, beakers, desiccator, refrigerator, and chemicals are readily available in their school, but the level of utilization of these materials by Biology teachers is very low. Whereas 56 students (24 and 32 respectively) disagreed.

111 students (52 and59 respectively) agreed that charts, real objects, first aid box, models, thermometers, test tubes are readily available in their school but they are not usually used by teachers to demonstrate an experiment to the whole class, while 45 students (20 and 25 respectively) disagreed.

126 students (72 and 54 respectively) agreed that teachers usually skip Biology concept that require laboratory practical instructional resources to teach Biology, whereas only 30 students (15 and 15 respectively) disagreed.

However, 122 students (60 and 62 respectively) agreed that where real objects are not available in their school, teacher rarely improvise instructional materials to teach Biology concept while 34 students (16 and 18 respectively) disagreed. Therefore, it can be inferred that to learn and teach Biology, one of the major science subjects, it is paramount instructional materials are sufficiently used.

Research Question 4

To what extent does utilization of instructional materials affect teaching and learning of Biology?

Table 5: Effect of Utilization of Instructional Materials on Teaching and Learning of Biology

S/N	ITEM	SA	A	SD	D	TOTAL
14	Students using instructional materials learn more than those without instructional materials. It also helps to comprehend abstract concept easily.	65 (42)	51 (33)	18 (11)	22 (14)	156 (100)
15	Utilization of adequate instructional materials makes Biology learning effective. It also helps in creativity and problem solving	68 (43)	65 (42)	13 (8)	10 (7)	156 (100)
16	Utilization of adequate instructional materials helps to clarify difficult Biology concept. It also helps in construction of idea.	73 (47)	41 (26)	22 (14)	20 (13)	156 (100)
17	Utilization of adequate instructional materials motivates students and makes Biology lesson more interesting and interactive.	57 (35)	60 (38)	31 (20)	8 (7)	156 (100)

Source: Field Survey, 2023 (Bracket figure is in %)

Table 5 shows that 116 students (65 and 51 respectively) agreed that there is a better assimilation and comprehension of students engaging in instructional materials than those without instructional materials while 40 students (18 and 22 respectively) disagreed. 133 students (68 and 65 respectively) agreed that adequate instructional materials make Biology learning effective while 23 students disagreed (13 and 10) . 114 students agreed (73 and 41) on the utilization of adequate instructional materials helps to clarify difficult Biology concept, whereas 42students (22 and 20 respectively) disagreed. However, 117 students (57 and 60 respectively) agreed that utilization of adequate instructional materials motivates students and makes Biology lesson more interesting, while 39 students (31 and 8 respectively) disagreed. Therefore, to deduce the proper usage of instructional materials aids the teaching-learning process, thereby promoting academic performance.

Test of Hypothesis

H_0: Utilization of instructional materials has no significant effect on the teaching and learning of Biology in secondary schools.

Table 6: Hypothesis Testing of Effect of Instructional Materials on Teaching and Learning of Biology

16	N	$\bar{x}$	SD	df	χ^2_{cal}	χ^2_{tab}	Decision
Students Perception		20.00	9.71				H_o
Alternative Assessment	156	19.96	9.67	3	39.7	7.8	Rejected

Source: Research Survey, 2023

The result of the chi-square observed (χ^2_{cal}) showed 39.7 with the tabulated value (χ^2_{tab}) suggesting 7.81 with the level of significance of 0.05. Since the calculated Chi-Square value is greater is greater than the tabulated value ($\chi^2_{cal} > \chi^2_{tab}$), then the null hypothesis is rejected while the alternate hypothesis is accepted.

Therefore, utilization of instructional materials has significant effect on the learning and teaching Biology, affecting also the academic performance.

Discussion

The analysis of data arising from research question one which seeks to find out the extent of availability of instructional materials in the teaching and learning of Biology in secondary schools, revealed a great degree of supply in all the schools for instructional materials. The findings revealed that all the selected school have a good number of instructional materials, being consistent with study of Onuekwusi (2017), emphasizing that Nigerian schools lack standard materials for better interaction with the students. However, this study disagrees with the study of Ewudo (2019) who concluded that instructional materials in teaching were not available in our institution of learning. The study also elicited students' opinions on the adequacy of Biology instructional materials. The responses evidently showed that all the selected schools lack adequate instructional materials. This study concurred with the findings of some other researchers; Obioha (2016) and Ogunyele (2022). It is agreed, with other studies, that the resources in aiding better teaching-learning process in our country and cities are not sufficient. There is a need to improve on them and increase them for better academic performance of our science students, taking Biology into consideration.

The findings of this study tend to agree with those of researchers such as who reported that there were inadequate resources for teaching science subjects in secondary schools in Nigeria. They further stated that the available ones are not usually in good conditions.

Also, the study revealed that the extent of utilization of instructional materials by the teachers in the teaching of Biology was very low. This study agrees with those of Abimbade (2017) and Daramola (2018) who noted that extent of utilization of instructional material in secondary school was very low. The study also consolidates the research of Agun (2020) who observed little support system observed towards educational inputs account for low educational output in Nigeria, as shown in the availability and the use of instructional materials; even in basic amenities to foster their usage. Purchasing some of these materials can be a difficult task to achieve both by the students and teachers, hence the prompt intervention of the government is highly required. Accessibility should be opened to all.

Furthermore, results obtained from research question four visibly showed, from students' responses, that utilization of adequate instructional materials can enhance effective teaching and learning of Biology. The finding was also in agreement with those of earlier researchers like (Moronfola, 2018; Popoola, 2020, Momoh, 2017, Onah *et. al.*, 2024) who conducted researches on the effects of instructional resources on students' performance in West African Certificate examinations (WASCE). Their findings showed that schools with adequate instructional materials performed better than those with inadequate instructional materials.

CONCLUSION

From the findings and discussion of the study, the following conclusions are made. Instructional materials are available in secondary schools but are not in adequate quantity. The available ones are not enough to meet up with the demand of the methods of teaching Biology. Due to the paucity of instructional materials needed in teaching, utilization has become unrealizable. Teachers possess the necessary expertise and skills to carry out teaching of Biology but facilitators are hindered by the paucity of requisite materials. Hence, utilization of instructional materials has significant effect on the teaching and learning of Biology in the selected schools.

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