
Teachers And Instructional Resources Availability For Effective Biology Education In Schools In Akwa Ibom State - Nigeria

By

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Abstract

The study was carried out to investigate teachers and instructional resources availability for effective biology education in schools in Akwa Ibom State of Nigeria. A total population of 523 consisting of 237 heads of science departments (HOD) and 286 Biology teachers (134 males and 152 females) drawn from public secondary schools in the state was used in the study. The stratified sampling technique was adopted for the study and the sample stood at 209 respondents (95 HODs and 114 Biology teachers) out of the 523 respondents. Data collection was carried out with a researcher-developed instrument tagged: Teachers Availability and Instructional Resources Questionnaire (TAIRQ). The instrument, which had 20 items, was duly validated and tested for reliability using the Cronbach alpha formula, which yielded a reliability index of 0.83. Independent t-test was used in analyzing the data collected for the study. The results indicated availability of Biology teachers and inadequacy of instructional resources for

the teaching of Biology in schools in State. Based on the findings, it was concluded that the State has competent Biology teachers for effective Biology education; and that the State needs to pay more attention to the provision of instructional resources as these were in short supply in most of the schools. It was recommended, among others that, training through seminars, workshops and conferences should be regularly organized for the teachers to keep them abreast of modern trends in the Sciences and Biology in particular; and that the relevant government agencies in charge of secondary education in the State should pay more attention to the provision of instructional resources in the school to aid in the teaching of Biology.

Keywords: Teachers' Availability, Instructional Resources, Biology Education and Public Secondary Schools.

Students' poor academic performances and lack of interest in a school subjects including Biology are attributed to a number of factors among which are lack of personnel and material resources. Many authorities have expressed concern about these serious obstacles to academic work. Eshiet (2000) comment that it is unrealistic and unnatural to envisage anything excellent of academic performance under these conditions.

Again, instructional resources are known to influence positively the teaching and learning process of Biology (Mapaderum, 2002; Obah, 2008) in secondary schools but it is realised that they are not sufficiently provided and used in secondary schools (Aderounmi, 2006). It is on the basis of this, that the researcher sought to examine how instructional resources are provided and used in secondary schools in Akwa Ibom State. Ibe-Bassey (2001) indicated that the use of teaching aid in the teaching and learning process in Nigeria dates back to the early 1950s with the establishment of the inspectorate division of the Ministry of Education in the country. Teacher training programmes started to stress the importance of these "Educational magic". Students' teachers were always busy looking for artists who should produce these aids for them so that they could "effectively" teach during the teaching practice. Hence, boards, with other life specimens, models, pocket chart etc. were frequently seen in elementary schools. Students, teachers were drilled on how to use the black board to enhance effective teaching.

Gagne (2002) also observed that one of the reasons for the use of objects or their representation for instructions in that they are involved directly in the performance expected as a result of learning. This means that instructional materials influence the learning capabilities of learners (students).

Again, instructional resources are known to influence positively the instruction process in our secondary schools but it is realized that they are not sufficiently provided and use in our secondary schools. It is on the basis of this, that the researcher sought to

examine how instructional resources are provided and use in our secondary schools in Akwa Ibom State.

Availability of Competent Teacher for Effective Biology Education

As observed by Lawal (2011), the teacher plays a very important role in curriculum content implementation and dissemination by acting as a bridge between the curriculum and the learners, and by translating the content of the curriculum to the learner. Effective teaching of the sciences, including Biology, in Secondary Schools in Nigeria is hindered by dearth of qualified teachers (Ogunleye, 2006). This militates against effective implementation of the Biology Curriculum, and does not augur well for effective Biology education in schools.

Adequacy of Instructional Resources for Effective Biology Education

According to Kola (2007), instructional resources refer to information carrying technologies (teaching aids) that are used for instructional purposes with the hope of delivering educational information very quickly and effectively. Education consists of two components classified into outputs and inputs. While inputs consist of human and material resources, outputs are the goals and outcomes of the educational process. Both the inputs and outputs form a dynamic organic whole and if one wants to investigate the educational system in order to improve its academic achievement, effect of one component on the other must be examined. Instructional resources, without which even a good curriculum cannot be properly implemented, are needed in the process of teaching Biology for effective learning. Instructional resources are the hardware and media used in teaching, learning and research (Onwuegbu, 2006). This underscores the provision of a functional equipped Biology Laboratory for effective teaching of the subject.

The effective teaching of some school subjects, like Biology which can be very abstract and quite confusing, calls for the provision of functional laboratories. When Biology is taught through a practical approach, a lot of enjoyable learning takes place (Bajah, 1984). To teach Biology, it is imperative that this subject should be observed and experienced rather than just read and heard from the instructor. Available literature support the fact that human beings remember 10% of what they see; 50% of what they see and hear; and about 75% of what they do, see and hear (Piaget, 1966). Piaget (1973) emphasizes the importance of laboratory practicals which he noted are indispensable in learning Biology because they excite all the senses of the body.

Aderounmi (2006) in an empirical study found out that essential instructional resources are not adequately provided for use in secondary schools in Nigeria. This inadequacy in the provision and utilization of learning materials has been of serious concern to educators in the country. Mapadrum (2002) and Obah (2008) emphasized

that the availability and adequacy of resources utilization promote effective teaching and learning activities in secondary schools while their inadequacy affects the academic performance of students negatively.

Omeoduogu (2000) posited that the teachers are responsible for the translation and implementation of the curriculum, no curriculum can achieve the desired result unless there is adequate provision and effective utilization of learning materials. Instructional resources bring about effective learning since it stimulates students' senses as well as arouse their interest in learning. Akinsola (2000) sees instructional resources as the sum total of all the factors used directly or indirectly for the purpose of educational training to support, facilitate or encourage the acquisition of knowledge and skill.

Purpose of the Study

The study was carried out to investigate availability of teachers and instructional resources for effective teaching and learning of Biology in schools in Akwa Ibom state. Specifically, the study sought to investigate:

- (i) the status of teacher availability in Secondary Schools for effective Biology education in schools in Akwa Ibom state.
- (ii) the availability status of instructional resources in secondary schools for effective Biology education in schools in Akwa Ibom state.

Research Questions

The following research questions were formulated to guide the study.

- (i) What is the status of teacher availability in Secondary Schools for effective Biology education in schools in Akwa Ibom state?
- (ii) To what extent are instructional resources available in secondary schools for effective Biology education in schools in Akwa Ibom state.

Research Hypotheses

- (i) There is no significant difference between the mean responses of Heads of Science Department and Biology Teachers on the availability of teachers in Secondary Schools for effective Biology education in schools in Akwa Ibom state.
- (ii) There is no significant difference between the mean responses of Heads of Science Department and Biology Teachers on the adequacy of instructional resources in secondary schools for effective Biology education in schools in Akwa Ibom state.

Methodology

A research design was used for the study. The study was carried out in public secondary schools in Akwa Ibom State of Nigeria.

Population of the Study

The population of the study covered the entire 237 Heads of Science Departments (HODs, Science) and 286 Biology teachers (134 males and 152 females) in the public secondary schools in the State, thus a total of 523 population size was used.

Sample and Sampling Technique

The stratified sampling technique was adopted for the study and the schools were stratified based on the three Senatorial Districts of the State. The sample stood at 209 respondents (95 HODs and 114 Biology Teachers), as 40% of the Heads of Departments and 60% Biology Teachers were involved in the study. Schools where only the Biology teacher was the Head of Science Department were not involved in the study.

Instrument for Data Collection

The instrument for data collection was a 20 item structured questionnaire patterned on a 4-point Likert type scale weighted as follows: Strongly Agree (SA) = 4; Agree (A) = 3; Disagree (D) = 2 and Strongly Disagree (SD) = 1, developed by the researcher. The questionnaire was tagged: Teachers Availability and Instructional Resources Questionnaire (TAIRQ).

The questionnaire consisted of two parts (I and II) and two Sections (A & B). Part I solicited information on personal data, while Part II contained the questionnaire items. Section A of Part II had 10 items on teacher availability, while section B had 10 items on availability of instructional resources for the teaching of Biology.

Validation of Instrument

The questionnaire was validated by two science educators and one specialist in measurement and evaluation from University of Uyo. The comments and suggestions of the specialists were incorporated in building up the final copy of the instrument. The instrument was trial tested on 20 Heads of Science Department and 20 Biology teachers from private secondary schools in the State. The result was used in determining the reliability of the instrument using Cronbach Alpha technique. It gave a reliability index of 0.83. This value was considered high enough, thus justifying the use of the instrument for the study.

Administration of Instrument

The instrument was administered with the assistance of two research assistants. A return rate of 100 per cent was obtained as the instrument were administered and collected back on the spot.

Statistical Analysis

Mean and standard deviation were used in answering the research questions, while independent t-test was used in testing the null hypotheses at 0.05 statistical level of significance. The criterion mean value was 2.5. Items with mean values of 2.5 and above were regarded as accepted, while those with mean values less than 2.5 were regarded as rejected.

Data Analysis and Results

The results are presented in tables based on the research questions and null hypotheses as follows.

Research Questions

Research Question 1

What is the state of teachers' availability in Secondary Schools for effective Biology education in schools in Akwa Ibom state?

Table 1: Means and Standard deviations of the availability of competent teachers for effective delivery in schools

| S/N | Questionnaire items | HOD | | Teachers | | Decision |
|-----|--|------|------|----------|------|-----------|
| | | Mean | SD | Mean | SD | |
| 1. | The school has sufficient Biology teachers. | 3.7 | 0.11 | 3.6 | 0.12 | Agreed |
| 2. | The Biology teachers are holders of B.Sc. degrees and above. | 3.6 | 0.14 | 3.5 | 0.13 | Agreed |
| 3. | The Biology teachers are specialists in Biological Sciences. | 3.5 | 0.16 | 3.4 | 0.14 | Agreed |
| 4. | The Biology teachers are drawn from other science disciplines. | *1.9 | 0.12 | 1.8 | 0.12 | Disagreed |
| 5. | The Biology teachers are serious with their work. | 3.3 | 0.17 | 3.3 | 0.16 | Agreed |
| 6. | They always write their lessons notes. | 3.6 | 0.18 | 3.7 | 0.19 | Agreed |
| 7. | They attend to their classes promptly. | 3.7 | 0.15 | 3.8 | 0.16 | Agreed |

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|----|---|-----|------|-----|------|--------|
| 8. | They evaluate the students property through tests, practicals and examinations. | 3.4 | 0.14 | 3.2 | 0.13 | Agreed |
| 9. | The teachers cover the Biology syllabus within the specified period. | 3.1 | 0.17 | 3.3 | 0.18 | Agreed |
| 10 | The Biology teachers in the school are competent and committed. | 3.2 | 0.13 | 3.3 | 0.12 | Agreed |

Cut off mean = 2.50

From Table 1, it can be observed that all the identified items have mean scores higher than the cutoff mean of 2.50 except item No. 4 with lower mean scores which can be attributed to the fact that qualified Biology teachers should not be from other disciplines. The Heads of Department and Biology Teachers agree to all the identified items except item No. 4, where they both also disagreed.

Research Question 2

To what extent are instructional resources available in secondary schools for effective Biology education in schools in Akwa Ibom State.

Table 2: Means and Standard Deviations of the Availability of Instructional Resources for Effective Biology Delivery in Schools

| S/ N | Questionnaire items | HODs Mea n | SD | Teachers Mean | SD | Decision |
|---------|--|------------------|------|------------------|------|-----------|
| 1. | There is a science laboratory in the school. | *2.6 | 0.13 | 2.7 | 0.12 | Agreed |
| 2. | The Biology laboratory is equipped with adequate materials and re-agents to work with. | 1.8 | 0.12 | 1.7 | 0.11 | Disagreed |
| 3. | Needed chemicals are available in the Biology laboratory. | 1.9 | 0.14 | 1.8 | 0.13 | Disagreed |
| 4. | There are sufficient charts for use in the teaching of Biology. | 2.4 | 0.18 | 2.5 | 0.19 | Disagreed |
| 5. | Practical lessons are carried out without much improvisation. | 2.3 | 0.17 | 2.2 | 0.16 | Disagreed |
| 6. | The principal releases funds when needed for the procurement of teaching | 2.4 | 0.18 | 2.1 | 0.16 | Disagreed |

materials.

| | | | | | | |
|----|--|-----|------|-----|------|-----------|
| 7. | There is a separate laboratory for Biology in the school. | 1.3 | 0.11 | 1.4 | 0.11 | Disagreed |
| 8. | The teaching of Biology is made simple in the school through the provision of required equipments and instructional resources. | 2.2 | 0.14 | 2.1 | 0.13 | Disagreed |
| 9. | There is a qualified Biology laboratory attendant in the school. | 1.9 | 0.13 | 1.4 | 0.11 | Disagreed |
| 10 | There are Modern Biology textbooks in the school library. | 2.5 | 0.19 | 2.5 | 0.17 | Agreed |

Cut off mean = 2.50

Table 2 indicates that all the identified items have mean scores lower than the cutoff mean of 2.50 except item No. 1 with higher mean scores. The mean scores in the responses of the Heads of Department and Biology Teachers in all the items are below the cut off point. This indicates agreement between the two groups of respondents regarding the availability of instructional resources for the teaching of Biology in the school.

Research Hypotheses

Hypothesis 1

There is no significant difference between the mean responses of Heads of Science Department and Biology Teachers on the availability of teachers for effective Biology education in schools in Akwa Ibom State.

Table 3: Independent t-test Analysis of the Responses of Heads of Science Department and Biology Teachers on the availability of teachers for effective Biology delivery in schools

| Groups | N | Score | X | SD | t |
|-------------------------------|----------|--------------|----------|-----------|----------|
| Heads of Department (Science) | 95 | 313.50 | 3.3 | 1.01 | 1.08* |
| Biology Teachers | 114 | 375.06 | 3.29 | 1.28 | |

$N_1 = 95; N_2 = 114; df = 207; t\text{-cri} = 1.96.$

The obtained t-value was 1.08. This value was tested for significance by comparing it with the critical t-value at 0.05 alpha level and 207 degrees of freedom.

The obtained t-value (1.08) was less than the critical t-value (1.96). Hence, the null hypothesis was retained. It implies therefore that no significant difference exists in the responses of the Heads of Science Department and Biology teachers regarding the availability of competent Biology teachers in the schools.

Hypothesis 2

There is no significant difference between the mean responses of Heads of Science Department and Biology Teachers on the availability of instructional resources for effective Biology education in schools in Akwa Ibom State.

Table 4: Independent t-test Analysis of the Responses of Heads of Department and Biology Teachers on the adequacy Instructional Resources for Effective Biology Education in Schools in Akwa Ibom State.

| Groups | N | Score | X | SD | t |
|-------------------------------|----------|--------------|----------|-----------|----------|
| Heads of Department (Science) | 95 | 313.50 | 2.13 | 1.01 | 1.06* |
| Biology Teachers | 114 | 375.06 | 2.02 | 1.28 | |

$N_1 = 95; N_2 = 114; df = 207; t\text{-cri} = 1.96.$

The obtained t-value was 1.06. This value was tested for significance by comparing it with the critical t-value at 0.05 alpha level and 207 degrees of freedom. The obtained t-value (1.06) was less than the critical t-value (1.96). Hence, the null hypothesis was retained. It implies therefore that no significant difference exists in the responses of the Heads of Science Department and Biology teachers regarding the adequacy of instructional resources for the teaching of Biology in the schools.

Discussion of Findings

Data analysis for hypothesis 1 revealed no significant difference between the mean responses of the Heads of science Department and Biology Teachers regarding the availability of competent Biology teachers in secondary schools in Akwa Ibom State. The calculated t-value (1.08) was less than the critical t-value (1.96) leading to the retention of the null hypotheses. The mean scores on all the identified items, except item No. 4, were higher than the cut off mean of 2.50 indicating the availability of competent Biology teachers in the school. As observed by Lawal (2011), the teacher plays a very important role in curriculum content implementation and dissemination by acting as a bridge between the curriculum and the learners, and by translating the content of the curriculum to the learner.

The finding contradicts that of Ogunleye (2006) whose study indicated that effective teaching of the science, including Biology, in Secondary Schools in Nigeria was hindered by dearth of qualified teachers. Although there is still need for training and re-training of Biology teachers in the State, the Akwa Ibom State secondary schools are not experiencing serious problems in the area of Biology teachers. Every secondary school in the State had at least one Biology teacher as at the time of this study.

The result of data analysis on hypothesis indicated no significant difference between the mean responses of the Heads of Science Department and Biology Teachers regarding the adequacy of instructional resources for the teaching of Biology in secondary schools in Akwa Ibom State. The calculated t-value (1.06) was less than the critical t-value (1.96) leading to the retention of the null hypotheses. The mean scores of all the identified items, except item No. 1, were less than the cut off mean of 2.50 indicating the inadequacy of instructional resources for the teaching of Biology in the Schools. Instructional resources are information carrying devices (teaching aids) and very essential for effective teaching of Biology (Kola, 2007). They are the hardware and media used in teaching and learning of subject in schools (Onwuegbu, 2006).

The finding collaborated that of Aderounmi (2006), who in an empirical study found out that essential instructional resources are not adequately provided for use in secondary schools in Nigeria. This inadequacy in the provision and utilization of learning materials has been of serious concern to educators in the country. Mapadrum (2002) and Obah (2008) emphasized that the availability and effective utilization of instructional resources promote effective teaching and learning activities in secondary schools while their inadequacy affects the academic performance of students negatively. While the Akwa Ibom State Government is commended for its Free Education Programme, attention should be paid to the provision of instructional resources in schools without which teaching cannot be effective.

Conclusion

Based on the findings of the study, it is concluded that Akwa Ibom State has competent Biology teachers for effective teaching of Biology in schools. However, the State needs to pay more attention to the area of instructional resources. The supply of these materials is inadequate for effective teaching of the subject in the schools.

Recommendations

On the basis of this, it is recommended that:

- (i) Training through seminars, workshops and conferences be regularly organized for the teachers to keep them abreast of modern trends in the Sciences and Biology in particular.

- (ii) Teachers should be adequately motivated to encourage commitment and effectiveness.
- (iii) The stock of Biology teachers in the schools be maintained through the replacement of retiring teachers in the system.
- (iv) A closer look should be given to the secondary school Biology curriculum to ensure its compatibility with current trends globally for effective Biology education in schools.
- (iii) The relevant government agencies in charge of secondary education in the State should pay more attention to the provision of instructional resources in the school to aid in the teaching of Biology.

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