



Perceived Influence of Adequacy of Biology Teachers And Instructional Materials On Students' Academic Performance In Secondary Schools In Port Harcourt Metropolis

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ABSTRACT

The study examined the perceived influence of adequacy of biology teachers and instructional materials on students' academic performance in public secondary schools in Port Harcourt metropolis. The study adopted the descriptive survey design. The population of the study comprised all the one hundred and eighty (180) biology teachers in the thirty-five (35) public secondary schools in Port Harcourt Metropolis. As the number is small, the entire population was studied. Three research questions and three hypotheses were formulated for the study. The instrument used for the study was a self-structured 12 item questionnaire which was validated by experts in the area. It's reliability was computed at 0.79 using Cronbach Alpha. Research questions were analysed using mean and standard deviation while the hypotheses were tested using t-test and analysis of variance (ANOVA) statistical tool. Findings among others showed that, the number of biology teachers is moderately adequate and equitably distributed while instructional materials are not adequate. Based on the findings, conclusion and recommendations were made amongst others that, government should do recruitment of biology teachers and maintain their equitable distribution based on the areas of need. Also government and Senior Secondary Schools Board should ensure that instructional materials are provided to the schools for effective teaching and learning.

Keywords: Adequacy, Availability of Teachers, Instructional Materials, Academic Performance

INTRODUCTION

The global assertion that education is the basic means to sustainable development as well as a means to economic growth of a nation has led to increase in enrolment of students in schools. It is expected that quality education will produce quality human resources required for a nation (Ibokun, 2009). The author asserted that no nation or society can rise above the quality of her educational system. Quality education has become very necessary for the advancement of technology and the introduction of basic education has increased the demand for education. This means that teachers who are the most vital resources in the education sector need to be motivated due to the role they play in the growth of the economy. Despite the advancement of science and technology the importance of provision of quality teachers cannot therefore be over emphasized (Adegbemile, 2011). This also corroborates the views of Okebukola (2010) who identified teacher quality and dedication as significant predictors of quality of education. The teachers hold the key to nation building. The success or failure of any nation depends on.

Academic performance of secondary school leavers in Nigeria has been in a declining state for the past years. The review and formulation of educational policy, plans and programmes from the universal primary education in 1976, the 6 3 3 4 educational system and the recent Universal Basic

Education (UBE) have not improved the performance of students in internal and external examinations. The number of students passing the West Africa School Certificate Examination (WASC) with six (6) credits including mathematics, English and one science subject has been on the decline (Akinsolu, 2013).

Teachers, parents and other stakeholders have attributed this to poor performance of teachers, supply and provision of instructional materials and poor implementation of educational policies and programme. This corroborates the statement of Ngussa (2012) that English language teachers are faced with problems of teaching tenses, spellings, pronunciation etc.. He opined that these problems are basically caused by non-availability of instructional materials. The primary purpose of teaching and learning is to bring a significant positive change in behaviour through active participation and critical thinking by the learner. This change will be eroded if the basic instructional materials are not available.

Kapoli (2001) noted that authentic materials enable the students to explore the language used in day-to-day life which is tailored to their needs and interest. Muthenia (2009) explained that teachers can only be effective and productive in their work if there are adequate and appropriate instructional materials provided. It is imperative that government and stakeholders in the education sector provide text books and other instructional materials as basic tools for teachers' effectiveness in the classrooms.

According to Adeogun (2010) schools endowed with adequate instructional teaching materials excel more in the performance of their students than others that lack basic instructional materials and teaching staff. This view was supported by Adeyanju (2002) in his study on the importance of instructional material. He found out that the use of learning aids in teaching was advantageous to both teachers and students, since it reduces talk and chalk method of teaching. The importance of the use of instructional materials cannot therefore be overemphasized due to its importance in enhancing learning and teaching. It stimulates and aids the students for active participation in the classrooms. It also serves as an aid for instruction. Students' enthusiasm, involvement and willingness to learn greatly depend on teaching aids used in the classrooms. They enhance the understanding and remembering of basic facts and concepts. It therefore behooves on the teacher to plan and design the instructional materials.

Gogo (2002) in his study on access, equity and quality of secondary schools revealed that to provide quality education, the availability of relevant teaching and learning materials is crucial. In corroboration of this view, Muthama (2009) stated that teachers can only be effective and productive in teaching if there is adequate supply of relevant facilities. Indeed instructional materials play an important role in effective teaching and learning.

Availability/Assessment of Teachers

Improvement in the quality of education is determined by the quality of teachers. Therefore quality teaching and learning is sine qua non for students' academic performance. The controversy over the falling standard of education has been on the front burner of national discourse over the years. This has been linked to several factors which include shortage of quality teaching staff, political instability, lack of facilities and instructional materials, politicization of education etc. In the same vein, qualifications of teachers in both primary and secondary schools have been questioned due to poor performance of students in examinations.

Some of the states in Nigeria have sacked some of their teaching staff who failed to pass qualifying tests in their respective states. Also the student teacher ratio of one (1) to thirty – five (35) students has increased in alarming rate. This has also affected teaching and learning. Thus the abysmal performance of teachers is a major factor responsible for the poor students' academic performance in the science subjects especially Biology (Ewaton, 2010). Some studies have revealed that a number of variables for students' poor performance range from teachers' academic qualification, motivation, payment of salaries and wages (Daso, 2013 and Akinsolu, 2010), while Ayodele (2013) argued that the teacher factor is not the only factor but a combination of other variables such as teachers year of experience, teacher student ratio and utilization of instructional materials.

Kosemeni in Amaewhule (2006) commented on the distribution of human and material resources in secondary schools in Nigeria. He noted that the instructional materials were not equitably distributed.

Most of the rural schools do not have instructional materials, equipment and infrastructure. In the absence of these material resources, rural schools opted for arts subjects in place of science subjects in their senior secondary certificate examination. The disparity and the lack of teachers and material resources have a negative effect. Science inclined students are denied the opportunity to be admitted into science based professions. For effective performance of students, the required human and material resources have to be provided and equitably distributed according to the population of schools. Therefore schools must give special attention to their teaching personnel in order to achieve maximum result.

Human resources in an organization are those natural elements that make up an organization and which determine the success or the achievement of set goals and objectives. In educational organizations, the human resources are made up of students, teachers, non academic staff and parents. These parents who are part of the system are also expected to be members of Parents Teachers Association. Although school plant, equipment and financial assets are also resources required by organizations, the human resources influence the efficiency and effectiveness of all the other resources.

Amaewhule (2018) opined that the most important resource in an organization is the quality of the people who staff it. They are the most valuable assets. The vitality and effectiveness of a school are directly linked to the quality and resourcefulness of the staff. No responsible academic institution would commit funds to facilities without the required human resources. Amaewhule (2018) furthermore, explained that human resources are weakened if they are not properly employed as they may be ineffective.

Biology as one of the science subjects and a science of life is full of technical terms and concepts some of which may not be easy for students to understand. It needs a teacher to explain them clearly (Ramelingam, 2000). The objective of assessing adequacy of biology and instructional materials is to collect feedback for the improvement of teaching and learning of biology. Several studies have revealed that students' academic performance in WAEC and senior secondary certificate school examinations (SSCE) results are persistently poor (WAEC & NECO Chief Examiners Report, 2013, 2014, 2015 & 2016). Lee (200), Nwakonobi, Onwuachu (2009) in Ugwuadu (2017) reported on some of the problems that led to poor performance of students, which include the methodology adopted by teachers in teaching, use of instructional materials and good mastering of the subjects.

Concept of Instructional Materials

Instructional materials have been identified as very important variable in teaching and learning. Studies have shown that no effective teaching and learning can take place without the relevant basic instructional materials. According to Akuma (2005) and Isa (2007) instructional materials for teaching biology were lacking in the schools, laboratories are poorly equipped as well as libraries, which has led to lecture method of teaching that only promotes memorization.

Instructional materials therefore, are teaching aids that facilitate quick understanding of basic concepts as well as the subject matter in the classrooms. These include textbooks, educational media print, non-print, and electronic resources, computer, software, videotapes, films, DVD, instructional television programme etc.

Maitarfsir (2003) reported that lack of instructional materials is an impediment to conducive learning. He further explained that materials such as laboratory equipment, charts diagrams, chemicals, models, specimens and technological devices like computer, tape recorder and video cassette recorder must be made available in the classrooms in order to assist the students to have thorough understanding of what is taught in their minds. Instructional materials are therefore devices through which knowledge, skills, ideas, beliefs are transmitted to the learner by the teacher. They are designed to enrich teaching and learning processes. In other words, they are a range of materials and devices designed to provide realistic imagery or tools used by the teacher to express ideas, skills, knowledge to the learners for better teaching and learning.

Thus the availability of instructional materials increases the rate of learning, saves time and effort as well as increases learners' interest and facilitates retention of what is learnt. Having mentioned some of the instructional materials, it is imperative to note that the study classified the instructional materials into four categories: audio aids otherwise known as sound aids, visual aids otherwise known as non-projected aids, audio – visual aid otherwise known as sound with pictures and projected aids.

Statement of problem

The poor performance of students in both internal and external examinations has been generating a lot of concern for parents, students, teachers and stakeholders in education. Some people have attributed it to lack of biology teachers, methodology employed by teachers and lack of instructional materials. The teaching of biology as a science of life is full of technical terms and concepts, some of which may not be easy for students to understand unless an effective teacher adopts concrete instructional materials in teaching. No educational system will achieve its goals and objectives without adequate teachers and instructional materials.

The non availability of instructional materials has impacted negatively on the teacher and students. Some of the few existing materials cannot be used for effective teaching and learning due to their state of deterioration. It is assumed that the ability of government to provide these materials as well as deployment of adequate number of biology teachers will invariably improve students' performance in admission to universities for both Arts and Science related courses. It is against this backdrop that the researcher examined the adequacy of biology teachers and instructional materials on students' academic performance in Port Harcourt Metropolis in Rivers State.

Purpose of the Study

The purpose of the study is to examine the influence of adequacy of biology teachers and instructional materials on academic performance of students in Port Harcourt Metropolis. Specifically, the objectives of the study are to:

- i. Investigate the influence of number of biology teachers on students' academic performance in public secondary schools in Port Harcourt Metropolis.
- ii. Examine the influence of equitable distribution of biology teachers on students' academic performance in public secondary schools in Port Harcourt metropolis.
- iii. Determine the influence of equitable distribution of biology instructional materials on the academic performance of students in public secondary schools in Port Harcourt Metropolis.

Research Questions

The following questions guided the study

1. How does the number of biology teachers influence academic performance of students in public secondary schools in Port Harcourt metropolis?
2. How does equitable distribution of biology teachers influence students' academic performance in Secondary Schools in Port Harcourt metropolis?
3. How does equitable provision of biology instructional materials influence academic performance of Secondary Schools' students in Port Harcourt Metropolis?

Hypotheses

The following null hypotheses were formulated to guide the study

1. There is no significant difference between the mean responses of male and female biology teachers in their assessment of the influence of the number of biology teachers on the academic performance of secondary school students in Port Harcourt metropolis.
2. There is no significant difference among Biology teachers with different years of experiences in their assessment of the influence on the equitable distribution of Biology Teachers on the academic performance of secondary school students in Port Harcourt metropolis?
3. There is no significant difference among Biology teachers with different qualifications in their assessment of the influence of Biology instructional materials on academic performance of secondary school students in Port Harcourt metropolis.

METHODOLOGY

The study adopted the survey descriptive design. The population consisted of all the biology teachers in the thirty five (35) public secondary schools in Port Harcourt Metropolis. The total number is 180. As the number is small, the entire population was studied. The instrument used for the study is a twelve (12) item questionnaire titled "Influence of Adequacy in the distribution of biology teachers and instructional materials (IABTIMAPS). It is designed in a four-point rating scale of very high

adequate (VHA), high adequate (HA), adequate (A), low adequate (LA), to elicit response from the respondents.

The instrument was validated by two experts in the Department of Education Management and its reliability was computed at 0.79 using Cronbach Alpha. The data collected were analyzed using mean and standard deviation for the three research questions while the hypotheses were tested using t-test and analysis of variance (ANOVA).

RESULTS

The result of this study is provided below:

Research question 1: *How does the number of biology teachers influence academic performance of students in public secondary schools in Port Harcourt metropolis?*

Table 1: Respondents' Opinion on Adequacy of Biology Teachers in Port Harcourt Metropolis

S/No	Statements	Male	Mean	Decision	Female	Mean	Decision
1	My school has adequate number of teachers in biology	75	1.85	Adequate	105	1.95	Adequate
2	My school has more qualified professional biology teachers than unqualified teachers	75	3.02	Adequate	105	3.13	Adequate
3	Only few teachers in my school are Youth Corp members	75	3.23	Adequate	105	3.26	Adequate
4	The experiences of the teachers are adequate for effective teaching and learning	75	3.10	Adequate	105	2.53	Adequate
Grand total			2.80			2.73	

Criterion mean 2.50

Findings in table 1 revealed that item 2, 3 and 4 had mean scores above 2.50 while item had weighted mean score below, implying that most of the respondents agreed with the fact that biology teachers are moderately adequate in public secondary schools in Port Harcourt Metropolis. With a mean score of 2.80 for male and 2.73 for female therefore question one, showed adequacy of biology teachers in the schools despite the fact that some of them are youth Corpsers.

Research Question 2: *How does equitable distribution of biology teachers influence students' academic performance in Secondary Schools in Port Harcourt metropolis?*

Table 2: Respondents Opinion on Equitable Distribution of Teachers

S/No	Statements	Male	Mean	Decision	Female	Mean	Decision
5	My school does have teachers in different subject areas	75	2.54	Adequate	105	2.86	Adequate
6	My school has fair posting of teachers as compared to other schools in the state	75	2.64	Adequate	105	2.78	Adequate
7	My school teachers do not have too much work load in their subject areas	75	2.60	Adequate	105	2.53	Adequate
8	My school teachers hardly teach subjects outside their area of specialization	75	3.10	Adequate	105	2.53	Adequate
Grand total			2.58			2.73	

Findings in table 2 revealed that most of the respondents agreed with the statement items 1–4 implying that there is equitable distribution of teachers in public secondary schools in Port Harcourt metropolis with a grand mean of 2.58 for male and 2.73 for female. Therefore the answer to research question two is that there is equitable distribution of biology teachers.

Research Question 3: *How does equitable provision of biology instructional materials influence academic performance of Secondary Schools in Port Harcourt Metropolis?*

Table 3: Respondents opinion on adequacy of instructional materials

S/No	Statements	Male	Mean	Decision	Female	Mean	Decision
9	My school does has fair share of teaching material	75	2.51	Adequate	105	2.54	Adequate
10	My school has enough teaching materials	75	1.72	Low Adequate	105	1.82	Low Adequate
11	My school lacks teaching materials only in intro-tech and vocational subjects	75	1.98	Low Adequate	105	1.97	Low Adequate
12	My school is provided with textbooks and other materials for students	75	1.21	Low Adequate	105	1.23	Low Adequate
Grand total			1.85			1.89	

Findings in table 3 revealed that most of the respondents disagreed with the statement item 2, 3, 4 implying that instructional materials are not equitably distributed to all public secondary schools in Obio/Akpor and Port Harcourt Local Government Area with grand mean of 1.89 for female teachers and 1.85 for male. Therefore the answer to research question three is that instructional materials are not equitably distributed in schools.

Table 4-4: There is no significant difference between the mean responses of male and female biology teachers in their assessment of the influence of the number of biology teachers on the academic performance of senior secondary school students in Port Harcourt metropolis.

Groups	No of Cases	X	t-value	t-critical	Level of Significant	Remarks
Male teachers	75	10.8684	0.09	1.96	0.05	Accept
Female teachers	105	10.8857				

With reference to table 4.4, male teachers recorded mean of 10.8684 where female teachers had a mean of 10.8859. The critical t-value at 178 degrees of freedom df and 0.05 level of significance is 1.97. Therefore the calculated t-value of 0.09 is less than t-table value. This implies that the calculated t-value is not significant. To this extent, the null hypothesis that there is no significant difference in the assessment of the adequacy of biology teachers between male and female teachers is accepted. It therefore means that there is no difference between the sexes in their assessment.

Table 4.5: There is no significant difference among Biology teachers with different years of experiences in their assessment of the influence on the equitable distribution of Biology Teachers on the academic performance of secondary school students in Port Harcourt metropolis?

Source of variance	df	Sum of Square	Mean Square	F-cal	F-crit	Level	Remarks
Between groups	4	9.6559	2.41	0.8265	2.4232	0.05	Accept
Within group	175	510.99	2.91				
Total	179	520.64					

The data in table 4.5 shows that the calculated f-ratio is 0.8265 at 0.05 level. The critical value of F (df 4 for numerator and df 175 for the denominator) is 2.4232. Thus, with the F-cal value less than F-crit value at 0.05, it means that there is no significant difference in the opinions of biology teachers of different experiences with respect to adequacy of instructional materials in the schools. Therefore the null hypothesis is accepted.

Table 4.6: There is no significant difference among Biology teachers with different qualifications in their assessment of the influence of Biology instructional materials on academic performance of senior secondary school students in Port Harcourt metropolis.

Source of variance	df	Sum of square	Mean square	F-cal	F-crit	Level	Remarks
Between groups	2	3.6893	1.8446	0.63160	3.0470	0.05	Accept
Within group	177	516.9550	2.9206				
Total	179	520.6444					

This table shows results of ANOVA showing difference in the opinion of biology teachers of instructional qualifications regarding adequacy of instructional materials and indicates f-cal value of 0.63160 as against F-crit value of 3.0470 at 0.05 level of significance. Since the F-cal is less than F-crit, it means that the null hypothesis is accepted. This further means that there is no significant difference in the opinions of biology teachers of different qualifications in respect of adequacy of instructional materials in schools.

DISCUSSION OF FINDINGS

The findings of the study revealed that there are qualified and experienced biology teachers although the number is fairly adequate compared to the number of students in the schools. Biology as one of the science subjects offered by both arts and science students should have adequate and competent teachers. This corroborates the views of Daso (2013) and Ayodele (2013). They argued that the teacher factor is not the only factor but a combination of other variables such as teachers' years of experience, teacher student ratio and utilization of instructional materials. In the same vein Amaewhule (2018) supported the views that the most important resource in an organization is the quality of the people who staff it. The vitality and effectiveness of a school are directly linked to the quality and the resourcefulness of the staff. In this case, the fairly adequate number of biology teachers will affect to students' performance in secondary school examinations.

The study showed that teachers are fairly equitably distributed in secondary schools although some of them are youth corpsers. This has not improved the performance of students in this, may be due to teachers' quality and the different years of experience on the job. This corroborates the views of Amaewhule (2018) that the most important resource in is the school system is the quality of the staff. The quality of human resources is weakened if they are not properly employed as they may be ineffective.

Finally it was found that the biology instructional materials are not equitably distributed in the secondary schools. (Maitaifsir 2003, Isa 2007) and Akuma (2000) in support of this view, reported that instructional materials for teaching biology when they are lacking can lead to impediments in teaching and learning of biology. This is because they enhance teachers' instructional delivery and enable good mastery of the subject.

CONCLUSION

Based on the findings of the study, the researcher concluded that the provision of biology teachers as well as the distributions of biology teachers is fairly adequate in public secondary schools in Port Harcourt Metropolis However, the provision of instructional materials is not adequate compared to the number of secondary schools as well as the number of students' enrolment in secondary school in Port Harcourt metropolis.

RECOMMENDATIONS

Based on the findings, the researcher recommended that:

1. The Rivers State Government should conduct effective recruitment of biology teachers and maintain their equitable distribution based on the areas of need.
2. The Rivers State Government and the school management Board should ensure that instructional materials are provided to the schools for effective teaching and learning.

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