

Resources for Teaching Secondary School Biology In Bayelsa State of Nigeria

Obomanu, Balama Joseph.
Curriculum Studies and Educational Technology
Faculty of Education
University of Port Harcourt.
E-mail: baljek@yahoo.com

Akporehwe, Joy
Curriculum and Instruction, Faculty of Education,
Niger Delta University,
Amasoma.
E-mail: joynateakporehwe@yahoo.com

Abstract

The study investigated the resource potentials for teaching secondary biology in Yenagoa and Ogbia Educational Zones of Bayelsa State. The survey design was adopted. Thirty four (34) secondary school biology teachers from sixteen schools from both private and public constituted the sample. They were randomly selected from the eighty two (82) biology teachers in these zones. Two instruments, namely; Resources for Teaching Secondary Schools Biology (RTSSB) and Biology Laboratory Checklist (BLC) were used to generate data for the study. The data was analyzed using simple percentages and numerical values. The findings indicated that resources for teaching biology were lacking or insufficient on the basis of which recommendations were made for the provision of both material and human resources for effective teaching of biology at the secondary school level.

Keywords: Survey, Sustainable Development, Professional organization, Human resources.

1. Introduction

The place of science in the development and fulfillment of the needs of any country is not in doubt. For instance, major advances in science and technology have helped nations to promote efficiency, self reliance and the overall wellbeing of humanity through inventions/innovations in telecommunications, transportation, health, agriculture etc. (Oyediji, 2010). Simpson and Anderson (1981) had put the picture on how science affects our lives in this form.

Science affects every aspect of our lives; what we eat and what we wear, what we do as work, what we do as play, what we think and what we feel; even how we are born and how we die. Few moments in our lives are untouched by the products and processes of science.

In Nigeria, the National Policy on Education (FRN, 2004) clearly spells out the objectives of science teaching from pre-primary to the tertiary level. Specifically, at the secondary level it entails equipping students to live effectively in our modern age of science and technology.

The global change in science curriculum arising from knowledge explosion and new wave in science and technological development demands for qualitative science teaching. According to Oludipe and Lasis (2006) the change calls for the provision and utilization of resources which tend to enhance the effective teaching and learning of science. Resource materials are all the materials, objects and aids that can be used in helping children to learn. Achimagu (2006) classified resource materials into classroom/laboratories equipment/chemicals and textual/audio visual materials.

For the purpose of this work, resources for science teaching are classified into material and human resources. Human resources refer to science teachers and laboratory attendants. While material resources play an integral role in the teaching and learning of science as they serve to stimulate thinking, make learning enjoyable, interesting, exciting and concrete. Similarly Gbamanja (2003) opined that the use of

materials in teaching could make learning more practical, applicable and meaningful. Citing Hoban (1949), he went further to stress the fact that resource materials are things that;

1. Supply a concrete basis for conceptual thinking and reduce meaningless word responses of pupils.
2. Make learning more permanent.
3. Have a high degree of interest for the learner.
4. Offer a reality of experience which stimulates self-activity on the part of pupils.
5. Develop a continuity of thought.
6. Contribute to growth of meaning and, hence to vocabulary development.
7. Provide experiences not easily obtained through other materials and contribute to the efficiency, depth and variety of learning.

Material resources remain useless if there are no qualified teachers to put them into use. Thus, the science teacher is an indispensable human resource who has a vital role to play in the utilization of all other resources.

Aggarwal (2006) commenting on the vital role of the teacher puts it succinctly.

Premises and equipment are needed in the education enterprise and persons are vital to them and a teacher is the supreme factor. There is no exaggeration that a spacious building, costly equipment, and a sound syllabus will serve some useful purpose only when there are teachers who are fully alive to the nobility of the profession and its accompanying responsibilities.... p:396

In the same vein Buseri (2010) contends that to meet up with the rapid scientific progress in technology requires the presence of well trained, efficient, knowledgeable and skillful teachers who are versatile in the discharge of their duties and responsibilities. In Nigeria, the Federal Government does not mince words when it declared that “no education system can rise above the quality of its teachers FRN (2004 P: 138). The availability of adequate and qualified science teachers cannot be compromised for the success of any science programme. It has been commented that, however well conceived a programme is, however valid the theory that underlies it, and whatever the objectives of the plan will be determined by the nature, quality, attitudes, motivation and convictions of the classroom teacher.

2. The Problem

Development is only meaningful when it is sustainable. Sustainable development according to Cunningham and Saigo (2005) is “meeting the needs of the present without compromising the ability of future generations to meet their own needs”.

To achieve sustainable development, human capacity (students’) development is required. In Nigeria, this is worrisome because, Nigerian students both primary and secondary have trailed behind other African countries in scientific assessment as reported by Adeniji (2005) in Akpan (2008). More worrisome is Nigeria ranking 32nd in Africa and 159 in the world by Human Development Index drawn from the United Nations Development Program’s Human Development Report 2006 (Akpan 2008).

Shortage of qualified science teachers and lack of equipment amongst others have been identified as constraints against the advancement of science education in Nigeria. For Nigeria to meet up with the challenges of human capacity development for sustainable development there must be both material and human resources

3. Purpose of the study

The purpose of this study is to assess the resource potentials for teaching secondary school biology in Bayelsa State.

4. Objectives of the study.

The specific objectives of the study are to:

1. Assess the availability of experienced and quality teachers in the schools.

2. Assess the availability of standard and well equipped science laboratories.
3. Determine the extent to which funds are provided for science activities
4. Compare public and private schools in terms of resource availability.

5. Research questions

1. To what extent are experienced and qualified science teachers available in the school?
2. To what extent are standard and well equipped laboratories available in these schools?
3. To what extent are funds provided for practical activities?
4. What difference exists between public and private schools in terms of available resources?

5. Research Design

A survey design was adopted for the study involving the responses of secondary school biology teachers on the availability of resources for teaching the subject in the schools.

The population consisted of all the (82) biology teachers in the 28 private and public secondary schools in Yenagoa and Ogbia Educational zones of Bayelsa State which have been registering students for West African Examination Council (WAEC) for a minimum period of five years.

Sixteen (16) schools comprising of eleven (11) public and five (5) private schools were randomly selected using simple random sampling technique through balloting. The sample size was thirty four (34) biology teachers in the eleven selected schools.

6. Instrumentation

Two instruments were used for the study namely:

- 6.1 A questionnaire tagged “resources for teaching secondary school biology (RTSSB)
- 6.2 Biology laboratory check list (BLC). The questionnaire (RTSSB) consisted of two sections: A and B. section A contains six items to elicit information on the bio data of the respondents. Section B, consisting of 16-items was meant to give information on the availability and status of resources for teaching biology. They were close ended questions requiring a ‘Yes or No’ responses with few contingency questions.
- 6.3 Biology Laboratory Checklist (BLC) this contained 36-items in which respondents were to indicate the number of laboratory equipment/materials available, number in good condition and the number in bad condition.

The two instruments were constructed by the researchers and validated by a team of experts consisting of two science educators and two seasoned biology teachers.

A reliability index of 0.74 for (RTSSB) was obtained using Kudar-Richardson (K-R-20).

7. Research procedure

The questionnaire was pretested by administering it on few biology teachers outside the study sample. This was to eliminate ambiguities, poorly worded questions and unclear items. Unclear items were modified. The two instruments were personally administered by the researcher. Few students were also interviewed to determine how often biology practical are conducted. Completed questionnaires were retrieved the same day while uncompleted ones were collected later at the convenience of the teachers. This exercise had duration of one month.

8. Data analysis

The data collected were analyzed using simple percentages and numerical values.

9. Results

9.1 Research question 1: To what extent are experienced/qualified teachers and laboratory attendants available in the school?

Table 1: Analyses of availability of experienced/qualified teachers and laboratory attendants

S/NO	Schools	No. of teachers	Qualification	Area of specialization	Years of teaching experience	Membership of professional organization	No. of laboratory attendants
Public							
1	A	4	B.Ed B.Ed B.Ed B.Ed	Biology Biology Biology Microbiology	Above 10 yrs " " "	STAN " " Nil	1
2	B	3	M.Sc M.Sc M.Sc	Microbiology Food Sc. Tech. Agriculture	Above 10yrs NYSC NYSC	STAN " "	1
3	C	2	B.Ed B.Ed	Biology Biology	Above 10yrs 5 years	STAN "	NONE
4	D	3	M.Ed M.Ed M.Ed	Biology Biology Biology	Above 10yrs " "	STAN " "	1
5	E	3	B.Sc B.Sc B.Sc	Food Sc.& Tech Biology Microbiology	Above 10yrs Above 10yrs 1-5yrs	STAN " "	1
6	F	2	B.Ed B.Sc	Biology Microbiology	Above 10yrs NYSC	STAN Nil	1
7	G	1	B.Ed	Biology	10 yrs	STAN	1
8	H	3	B.Sc B.Ed B.Ed	Biology Biology Biology	NYSC NYSC 1-5yrs	Nil Nil Nil	
9	I	1	B.Sc	Microbiology	10yrs	Nil	1
10	J	3	B.Sc/PGD E B.Ed B.Sc	Microbiology Guidance & counseling Biochemistry	10yrs 3yrs Above 10yrs	Nil Nil Nil	2
11	K	3	B.Sc NCE B.Sc	Human physiology Biology Biochemistry	10yrs 1-5yrs NYSC	Nil Nil Nil	1
Private							
12	L	1	B.Ed	Biology	NYSC		1

13	M	1	B.Sc	Biology	1-5yrs	Nil	None
14	N	1	B.Sc	Microbiology	1-5yrs	Nil	None
15	O	1	NCE	Integrated Sc.	1-5yrs	Nil	None
16	P	1	B.Sc	Applied micro biology	10yrs	Nil	1

Table 1 show that 60% of the public schools have experienced teachers with years of experience spanning from ten years and above, 35% being membership of professional organization, Science Teachers Association of Nigeria (STAN). The table also shows that only 20% of teachers in the private schools have relevant teaching qualification, less than 10 years of teaching experience and none being membership of any professional educational body. Table 2 also indicates that 81.8% of the public schools have laboratory attendants. In the private schools 40% have laboratory attendants.

9.2 Research question 2: To what extent are standard and well equipped laboratories available in the schools?

S/N	Schools	Presence of separate biology laboratory	Presence of general sc. Laboratory	Presence of school library
	PUBLIC			
1.	A	None	Combined	None
2	B	None	Combined	None
3	C	None	None	None
4	D	None	None	None
5	E	None	None	None
6	F	Present	None	None
7	G	None	None	None
8	H	None	None	None
9	I	None		
10	J	Present	Combined	Present
11	K	None	None	None
	PRIVATE			
12	L	None	Combined	None
13	M	None	Combined	None
14	N	None	Combined	None
15	O	None	None	None
16	P	Present	None	None

Table 2 revealed that 88.9% of all the schools do not have standard separate biology laboratories. While only 16.7% have combined science laboratories indicating that 88.9% of the schools are operating without

laboratories. The table also shows that only one school –Federal Government Girls College has a school library where science materials could be sourced while 97.2% do not have school libraries.

9.3 Research question 3: To what extent are funds provided for practical activities?

Table 3: Funding for practical activities.

S/N	Schools	Funding for biology materials	Regular budget for biology	Funding in emergencies
	Public			
1.	A	School authority	Absent	Not available
2	B	Ministry	Absent	Not available
3	C	Community	Absent	Not available
4	D	Ministry	Absent	Not available
5	E	School authority	Absent	Not available
6	F	School authority	Absent	Not available
7	G	School authority	Absent	Not available
8	H	Ministry	Absent	Not available
9	I	No provision	Absent	Not available
10	J	School authority	Absent	Available
11	K	School authority	Absent	Not available
	Private			
12	L	School authority	Absent	Available
13	M	School authority	Absent	Available
14	N	School authority	Absent	Available
15	O	School authority	Absent	Available
16	P	School authority	Absent	Available

From table 4, it can be deduced that funding for biology materials is the responsibility of the school authority as represented by 68.8% of the schools. Ministry of education represents 18.8% and 5.3% for community provision. The table also revealed that no regular funding is made for biology materials as represented by 100% of the schools. Another obvious finding from table 4 is that there is provision for emergency for biology materials in all the private schools. This is nearly absent in the public schools.

9.4 Research question 4: What difference exists between public and private schools in terms available resources for biology teaching?

From the biology laboratory checklist (BLC) and direct observation and interaction made by the researcher, it was found out that most of the public schools except for F.G.G.C lacked laboratories where practical activities are conducted and where the basic materials are present, they are either locked up in a store or packed in cartons where they are not utilized. Some of the students (SS3) confessed that they have never entered a laboratory nor carried out any practical in biology. The private schools are not spared of this. No regular funding for biology, practical is made for both public and private schools. It is only in terms of emergency provision that the difference exist between private and public schools as shown in table 3.

10. Discussion of result

The findings of this study as shown in Table 1 revealed that the public schools have more qualified and experienced teachers who are also members of Science Teachers Association of Nigeria (STAN) when compared to the private schools. In terms of students' enrolment, public schools are more populated and as such, have high student –teacher ratio. Meaning that, there is dearth of biology teachers to meet up with increasing enrolment figures. This agrees with the assertion of Anene, (1999) in Nwachukwu and Nwosu (2007) that the population of students in most cases is disproportionate to the number of teachers handling the subjects. And the low number of qualified teachers in the private schools poses a threat to students' achievement in biology studies as performance to a large extent depend on the quality, adequacy and dedication of the teachers. (Soyibo and Ezeiroma 1987)

The findings shown in Table 2 indicate the absence of laboratories in virtually all the schools. And how can science activities be carried out effectively without laboratories which are the hallmarks of effective science teaching? Simpson and Anderson (1981). Perhaps, this accounts for lack of practical activities as attested by student. It also lays credence to Ndu (1991) in Nwosu (2007) that the science laboratories are inadequately equipped with facilities required for learning science. A situation worsened by obvious lack of funding for materials needed to improve the learning of science in general and biology in particular.

It was also observed that all the schools investigated have laboratory attendants who were rather engaged in other activities since there are no functional laboratories.

11. Conclusion

It has become clear that in our secondary schools, the teaching of biology and even other sciences is so much affected by lack of material and human resources in both public and private schools making the quality of some of our secondary school products questionable. If any difference does exist between the public and private schools might be largely due to the high level of monitoring that prevail in private schools.

Bayelsa State of Nigeria the centre of the Niger Delta is classified as one of the educationally disadvantaged states (EDS) and also at the rudiment of development with high level of scientific illiteracy and superstitious beliefs. Sound knowledge in science (biology) aided by both material and human resources for its youth will address most of the problems and set the stage on for rapid scientific development.

12. Recommendation

Based on the findings, it is recommended that the government should as a matter of urgency equip all the schools with standard science laboratories and other material resources. There should also be training and retaining of biology teachers to enable them cope with the challenges of teaching science effectively in this 21st century as part of the millennium development goals strategies (MDGS) and science for all Nigerians. Furthermore, there should be improved welfare packages as a motivating factor for science teachers in the State. Finally, State Ministry of Education officials should carryout regular inspections to assess facilities in the schools as well as encourage the spirit of improvisation as a viable alternative in material/equipment provision in schools.

References

- Akpan, B. B. (2008). *Nigeria and the future of Science Education*. Ibadan: Oluseyi; press Ltd
- Achimagu, L. (2006). Resource materials for teaching primary science. *Proceedings of the 47th annual conference of STAN*.
- Aggarwal, J.C. (2006). *Teacher and Education in a developing society*. New Delhi: Vikas Publishing House PVT Ltd.
- Barribor V. (2003). *Learning theories and instructional strategies*. Nigeria: Springfield Publishers Ltd
- Buseri J. C. (2010). Teaching practice: An imperative in teacher education. *A faculty seminar presentation to teaching practice supervisor in the faculty of education, Niger Delta University, Yenagoa*.
- Cunningham, W.P, Cummingham, M.A. and Cunningham, B.S. (2005). *Environmental Science: A global concern*. New York: McGraw Hill.
- Federal Republic of Nigeria (2004). *National policy on education* (4th edition), Lagos: N.E.R.D. Press
- Gbamanja, S.P.T. (2002). *Essentials of curriculum and instruction: Theory and practice*. Port Harcourt: Paragraphics
- Nwachukwu, J. N. & Nwosu, A. A. (2007). Effect of demonstration method on difference levels of students' cognitive achieve in senior secondary biology. *Journal of Science Teachers Association of Nigeria*, (42) (1&2), 50 59.
- Oludipe, O. and Lasisi, I. T. (2006). Resources as enhancer of effective teaching and learning of primary science. *Proceedings of the 47th annual conference of STAN*.
- Onwiodukit, F.A.R & Utibe, U.J. (2007), Analysis of the performance of the physics.
- Oyediji (2010). Effective teaching of mathematics and science in junior secondary schools in Bayelsa State. Organized by U.I. consultancy services in collaboration with Bayelsa State Universal Basic Education Board.
- Onyegegbu, N (2006). Using new technologies in creating excitement in biology laboratory activities. *Proceedings of the 47th Annual conference of STAN*. PP.134.
- Simpson, R.D. & Anderson, N.D. (1981). *Science, students, and schools: A guide for the teacher*. New York: John Willey and sons.
- Soyibo, K & Ezeiroma, C. O. (1987) Influence of teaching equipment and teacher supply on the school certificate biology results of fourteen schools in Anambra State, 1982, 1984. *International Journal of Educational Research* No. 1 (1), 56 66.

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage:

<http://www.iiste.org>

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. **Prospective authors of IISTE journals can find the submission instruction on the following page:**

<http://www.iiste.org/Journals/>

The IISTE editorial team promises to review and publish all the qualified submissions in a fast manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

